SLR-Z – 1

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2015
ENGLISH COMPULSORY
'On Track' English Skills for Success

Day and Date : Thursday, 29-10-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct alternative : **14**

1) The man from the west lived in the city of _____ after moving away from New York.

a) Washington b) Mexico
c) Chicago d) New Jersy

2) The note that the man from the west received was in fact from _____

a) his friend Jimmy b) his wife
c) Chicago police d) the owner of the restaurant

3) In the end the narrator refused to accept all of Miss Krishna's possession except _____

a) a cigarette lighter
b) a little nine-inch clock
c) a tiny glazed coffee cup
d) a small Burmese box

4) The writers attitude towards Miss Krishna was one of _____

a) deep affection and admiration
b) apathy and patience
c) hatred and contempt
d) tolerance and patience

5) The word 'almighty tool' refers to _____
   a) a scientific tool b) an electronic tool
   c) an all powerful method d) the almighty god
6) 'The Myth of Artificial Intelligence' is written by _____
   a) Anita Desai b) Attila Narin
   c) Nargis Dalal d) Dr. Abdul Kalam
7) The phrase 'like the flame of her marriage' is the _____ used in the poem.
   a) simile b) metaphor
   c) personification d) alliteration
8) In the poem 'Bangle Sellers', bangles are token of _____
   a) freedom b) sacrifice
   c) shackles d) prosperity
9) The words 'Kiltartan cross' refer to _____
   a) a well known place in Ireland b) an Irish Church
   c) the battle field d) a pilgrim place
10) Kedar painted the picture _____
   a) hisself b) herself c) himself d) itself
11) The population of the tiger has increased in India.
   The underlined word is a _____ noun.
   a) proper b) common c) collective d) material
12) _____ Hutatma express runs between Solapur and Pune.
   a) A b) An c) The d) No article
13) My brother returned home _____ 10 P.M.
   a) on b) in c) at d) to
14) Mrs. Khanna looked _____ the orphan child after his parents death.
   a) after b) about c) at d) for

2. Answer in brief **any seven** of the following questions : **14**
   1) Why did Jimmy send another police officer to arrest Bob ?
   2) What had happened to 'Big Joe Brady's restaurant ?
   3) What is the narrator's initial opinion of Miss Krishna ?

4) Why does the narrator decide to terminate Miss Krishna's stay at her house ?
5) What are the many facets of intelligence ?
6) Why can computers 'not think' in the same way as human being ?
7) Which colours of bangles are suitable for a maiden's wrist ?
8) How does the Irish Airman imagine he will die ?

3. A) Write short paragraphs on **any two** of the following : **8**
   1) Importance of tree plantation
   2) My hobby
   3) Solar energy

   B) Answer **any two** of the following questions in about **eight** lines **each** : **6**
   1) What sort of relationship did Bob and Jimmy share ?
   2) How did Krishna's sister behave with the narrator ?
   3) What image of bangle sellers at the temple do you gather from the poem ?

4. Write an essay on **any one** of the following : **14**
   1) The reasons of farmers suicides.
   2) The role of youth in nation building.

5. Read the following passage and make notes of it. Use an appropriate title for your notes. **14**

Advertising is the way in which the manufacturer is able to communicate with his customer. In India it is a gigantic task, when one remembers that there are nearly 400 million potential customers. Not all of them yet have reached the stage, when they have money for more than the barest minimum of goods and clothing but many have already started earning enough money to allow them to look for some modest improvement in their living standards. Thus, purchasing power is sure to increase as India's plans develop. More customers will be created, and it is through advertising that they will learn how their new earnings can buy them a fuller life.

Now, let us look for a moment at how advertising works – how it tells people about goods which will make the world a more comfortable place for them to live in. To be effective, advertising must first attract attention, but more important, it

must be noticed by people in the right way. Advertisements which clamour our for attention in a cheap or vulgar way do not bring any credit to the products they sell. Just as in life it is easy to be noticed, but, less easy to be respected; so it is with advertising. You can print your advertisement upside down and it will attract a lot of attention, but that does not mean that people will think more of the product. That is why the advertiser has to be very careful about humour, if he makes a reader laugh, he must be sure to see the laugh is not at the expense of the product. That does not mean humour has no place in advertising. It can brighten advertising and make it memorable.

The real job of the advertisement is to sell. It has to be convincing. Market research has revealed the needs and desires of the customers and the product has been designed to meet those needs. Now, the advertising must base itself on that research and must explain to the consumer how the product is going to benefit them.

All advertising must reach the right people. There are a number of ways communicating with the potential customers advertising media they are called they are the newspapers and magazines, cinema advertising, shop display material, posters and soon. The job of combining the right media to reach the greatest number of potential customers with the right sort of impact at the lowest cost is an intricate and important one.

SLR-Z – 2

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2015
CHEMISTRY (Paper – I)
Physical and Inorganic Chemistry

Day and Date : Friday, 30-10-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
iii) Figures to ***right*** *indicate* ***full*** *marks.*
iv) ***Use*** *of* ***log table*** *and* ***calculators*** *is* ***allowed****.*

SECTION – I
(**Physical Chemistry)**

1. Select the most correct alternative for the following and rewrite the sentence : **5**

   1) Pc, Vc, Tc are known as _____
      a) gas constants b) critical constants
      c) Vander Waal's constants d) velocity constants

   2) Integration of dx is _____
      a) x b) x + c c) log x d) log x + c

   3) The reaction in which molecularity and order of the reaction are not equal is known as _____ reaction.
      a) zero order b) pseudo-molecular
      c) second order d) first order

   4) No machine has _____ efficiency.
      a) 0% b) 80% c) 100% d) 1%

   5) The rate of reaction _____ with increase in temperature.
      a) decreases b) increases
      c) remains constant d) all of these

2. Answer **any five** of the following : **10**

   i) Define the term molecularity of reaction.

   ii) The half life period in a first order reaction is 45 min. What is its rate constant ?

P.T.O.

iii) Define ideal and non-ideal gases.

iv) Give any four rules of derivative.

v) What is an isotherm ?

vi) What is an intercept of a straight line ?

vii) What is heat engine ? Give examples.

3. A) Write short notes on **any two** of the following : **10**

i) Derive the rate constant equation for first order reaction.

ii) What is slope ? Give its characteristics.

iii) Write a note on Joule-Thomson effect.

B) Answer **any one** of the following : **10**

i) Mention various methods to determine the order of reaction. Describe any two methods in detail.

ii) What are the causes for deviations of gases from ideal behaviour ? Calculate the critical constants of a gas from the following data :

$a = 4 \times 1.013 \times 10^5\ Nm^{-2}(dm^3)^2\ mol^{-2}$

$b = 0.04275\ dm^3\ mole^{-1}$

$R = 0.08206 \times 1.013 \times 10^5 Nm^{-2}dm^3K^{-1}mol^{-1}$

SECTION – II
(**Inorganic Chemistry**)

4. Select the most correct alternative for the following and rewrite the sentences : **5**

1) S-orbital has _____ shape.

a) dumb-bell b) square c) spherical d) triangular

2) Atomic number of an element indicates _____ in it.

a) quantum number b) number of neutrons

c) number of orbitals d) number of protons

3) The shape of PCl_5 molecule is _____

a) Linear b) Octahedral

c) Trigonal bipyramidal d) Tetrahedral

4) The stability of molecule _____ with increase in bond order.
   a) increases b) decreases
   c) remains same d) first increases then decreases

5) The limiting radius ratio for square planer geometry is _____
   a) 1.00 b) 0.732 – 1.00
   c) 0.414 – 0.732 d) 0.225 – 0.414

5. Answer **any five** of the following : **10**
   i) State Pauli's exclusion principle.
   ii) Define the terms – Atomic radius and ionization potential.
   iii) Why gaseous PCl_5 molecule is unstable ?
   iv) Give the conditions for successful overlap of atomic orbitals.
   v) In water molecule H – O – H bond angle decreases from 109°28′ to 104°27′, why ?
   vi) Draw MO diagram for H_2 molecule.
   vii) Give the energetics of ionic bond formation.

6. A) Write short notes on **any two** of the following : **10**
   i) Describe the shapes of d-orbitals.
   ii) Discuss ClF_3 molecule w.r.t. VSEPR theory.
   iii) Explain the formation of SF_6 molecule w.r.t. VBT.

   B) Answer **any one** of the following : **10**
   i) Distinguish between bonding and antibonding molecular orbitals. Draw MO diagram for N_2 molecule comment on its stability and bond order.
   ii) What is radius ratio ? Describe the structure of CsCl w.r.t. unit cell, co-ordination number and stoichiometry.

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SLR-Z – 3

Seat No.	

B.Sc. – I (Semester – I) (C.G.P.A. Pattern) Examination, 2015
COMPUTER SCIENCE (Paper – I)
(Computer Fundamentals and Programming Using C-I)

Day and Date : Friday, 30-10-2015 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*

*2) Figures to the **right** indicate **full** marks.*

*3) Write answers of Section – **I** and Section – **II** on **separate** answer books.*

SECTION – I

(Computer Fundamentals)

1. Multiple choice questions : **5**

1) An operating system is a set of _____ that manages and co-ordinates all the functions of the computer-hardware.

a) Memory b) Software c) Programs d) File

2) Processor speed is measured in _____

a) MB b) GB c) MHz d) MBPs

3) The modifier keys on PC keyboard are _____

a) Enters space, Insert b) Shift, Ctrl, Alt

c) Esc, Backspace, Alt d) Function Key

4) BCD is _____

a) Biography code diagram b) Binary code diagram

c) Binary coded decimal d) None of these

5) Computers built before first generation of computers were _____

a) Mechanical b) Electro-mechanical

c) Electrical d) None of these

P.T.O.

2. Answer **any five** of the following : **10**

i) What is the CPU ?

ii) Draw block diagram of computer.

iii) What is meant by data ? Give suitable example.

iv) What is meant by printer ? List its types.

v) List characteristics of computer.

vi) Type of computers.

vii) List the input devices.

3. A) Write short notes on **any two** of the following : **10**

i) Computer Languages.

ii) Computer structure.

iii) Output devices.

B) Answer **any one** of the following : **10**

i) Explain all DOS Internal and External commands.

ii) What is meant by computer memory ? Explain primary memory and secondary memory in detail.

SECTION – II
(Programming Using C-I)

1. Multiple choice questions : **5**

1) The algorithm should terminate after a _____ number of steps.
a) Infinite b) 10 c) Finite d) None of these

2) In C programming language _____ reserved keywords available.
a) 52 b) 31 c) 32 d) 35

3) Relational operators are used to _____ expressions.
a) Assignment b) Relation c) Compare d) None of these

4) A segment of program code that is executed repeatedly is called a _____

a) Condition b) Selection c) Loop d) None of these

5) The basic building blocks of every C program are _____

a) subprogram b) procedure c) main ( ) d) functions

2. Answer **any five** of the following : **10**

i) Define Flowchart, Algorithm.

ii) What are the 'C' character set ?

iii) Define variable. Rules regarding naming variables.

iv) List Bitwise operator.

v) Difference between while and do-while.

vi) What are different forms of the if statement ?

vii) Define Token : list its types.

3. A) Write short notes on **any two** of the following : **10**

i) Selection statements.

ii) Operators available in 'C' language.

iii) Structure of 'C' program.

B) Answer **any one** of the following : **10**

i) Draw and explain the various flow-charting symbols. Write algorithm and flowchart for the calculating the factorial of given number.

ii) Explain any two loop statements with suitable program.

SLR-Z – 4

Seat No.	

B.Sc. (Part – I) (Semester – I) (CGPA Pattern) Examination, 2015
PHYSICS (Paper – I)
Mechanics and Properties of Matter and Optics and Laser

Day and Date : Saturday, 31-10-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*

ii) Figures to the ***right*** *indicate* ***full*** *marks.*

iii) ***Neat*** *diagrams must be draw* ***wherever*** *necessary.*

iv) Use of logarithmic table and calculator is ***allowed****.*

v) ***Two*** *Sections should be written in* ***separate*** *answer book.*

SECTION – I

(Mechanics and Properties of Matter)

1. Select the correct alternative from the following : **5**

i) The ratio of lateral contraction strain to the longitudinal extension strain is called _____

a) Young's modulus b) Bulk modulus

c) Modulus of rigidity d) Poisson's ratio

ii) Excess pressure inside a liquid drop is given by _____

a) $P = \frac{2T}{r}$ b) $P = \frac{4T}{r}$ c) $P = \frac{3T}{r}$ d) $P = \frac{T}{r}$

iii) As the area of cross section of a tube increases, the velocity of liquid flowing through it _____

a) decreases b) increases

c) remains constant d) reduces to zero

P.T.O.

iv) Moment of inertia of a circular disc of mass 50 gm and radius 5 cm about an axis passing through its centre and perpendicular to its plane is _____

a) 625 gm.cm^2 b) 525 gm.cm^2

c) 650 gm.cm^2 d) 1025 gm.cm^2

v) Torsional pendulum is used to determine _____ of material of wire.

a) Young's modulus b) Bulk modulus

c) Modulus of rigidity d) Poisson's ratio

2. Answer **any five** of the following : **10**

i) Define torsional constant.

ii) Define Poisson's ratio.

iii) What is fluid ? Give its examples.

iv) Define moment of inertia.

v) Draw the diagram of venturimeter.

vi) Calculate equivalent length of simple pendulum of compound pendulum for minimum periodic time having the radius of gyration 40 cm.

vii) Define viscosity. Write its dimension.

3. A) Write short notes on **any two** of the following : **10**

i) Surface tension by Jaeger's method.

ii) Streamline and turbulent flow.

iii) Rectangular lamina of metal sheet having its mass per unit area 12 gm/cm^2, length l = 20 cm and breadth b = 16 cm is rotated about an axis consisting with one of the long side and short side respectively, then find its moment of inertia about that both axes in separate cases.

B) Answer **any one** of the following : **10**

i) Give the principle and construction of Kater's pendulum. Explain how it is useful to determine gravitational acceleration. Derive Bessel's formula for gravitational acceleration.

ii) Define elastic constants. Derive the relation $Y = \frac{9k\eta}{3k+\eta}$, where the symbols have their usual meaning.

SECTION – II
(Optics and Laser)

1. Select the correct alternative from the following : **5**

   i) If $d^2t / dx^2 \rangle 0$ i.e. positive, time will be _____
   a) minimum b) maximum c) zero d) none of these

   ii) In Ramsden's eye-piece, the distance between two plano convex lenses of equal focal lengths is equal to _____
   a) difference in their focal lengths
   b) sum of their focal lengths
   c) product of their focal lengths
   d) two-third of the focal length of either

   iii) The interference fringes due to thin wedge shaped film are fringes of _____
   a) equal length b) equal inclination
   c) equal thickness d) different thickness

   iv) Ruby laser is _____
   a) semiconductor laser b) dye laser
   c) gas laser d) crystalline solid laser

   v) If there are 15,000 lines per inch of a given grating, then its grating element is _____
   a) $\frac{2.54}{15000}$ cm b) 15,000 cm c) $\frac{15000}{2.54}$ cm d) 2.54 cm

2. Answer **any five** of the following : **10**

   i) State the Fermat's principle of extremum time.

   ii) Draw the neat labelled diagram of interference in parallel faced thin film.

   iii) Give difference between grating spectra and prism spectra.

   iv) State properties of LASER.

   v) Explain spontaneous emission of radiation.

   vi) Write the types of diffraction and explain any one.

   vii) A convex lens has a mean focal length of 20 cm. Its material has $\mu_v = 1.65$ and $\mu_r = 1.63$. Find the axial chromatic aberration of the lens.

3. A) Write short notes on **any two** of the following : **10**
   i) Explain construction and working of He – Ne LASER.
   ii) Calculate the maximum possible order of spectra with a plane transmission grating having 18,000 lines per inch when light of wavelength 4500 $\mathring{A}$ is used.
   iii) Prove that angle of incidence is equal to the angle of reflection by Fermat's principle.

   B) Answer **any one** of the following : **10**
   i) Derive an expression for diameter of n^{th} dark ring in Newton's rings experiment and determine the wavelength of monochromatic light.
   ii) With neat ray diagram, explain Huygen's eye piece. The focal length of the Huygen's eye piece is 3.6 cm, calculate (1) the focal length of the eyelens (2) focal length of the field lens (3) the distance between the lenses.

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SLR-Z – 6

Seat No.	

B.Sc. – I (Semester – I) (C.G.P.A. Pattern) Examination, 2015
STATISTICS (Paper – I)
Descriptive Statistics, Probability and Probability Distributions – I

Day and Date : Monday, 2-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1) Figures to the **right** indicate **full** marks.*
*2) Answers of **two** Sections should be written in **separate** answer book.*

SECTION – I

(**Descriptive Statistics, Probability**)

Choose the correct alternative : **5**

1. i) Which limits are excluded in case of exclusive type of class intervals ?
   a) Lower limit b) Upper limit c) Both a) and b) d) None of these

   ii) Which one of the following is not a measure of central tendency ?
   a) Mean deviation b) Mean
   c) Median d) Mode

   iii) In standard deviation, the deviations of the item X are always taken from
   a) Median b) Mode c) Mean d) None of these

   iv) The first order moment about mean is
   a) Mean b) Variance c) One d) Zero

   v) The measures of kurtosis β_2 for a platykurtic curve is
   a) Greater than 3 b) Less than 3
   c) Equal to 3 d) None of these

2. Answer **any five** of the following : **10**

   i) What do you mean by primary and secondary data ?

   ii) Explain class frequency and relative frequency.

   iii) For two positive observations a and b, show that G.M. = $\sqrt{A.M. \times H.M.}$.

   iv) State any two properties of Arithmetic Mean.

P.T.O.

v) Define coefficient of variation and explain its utility.

vi) Define raw and central moments.

vii) Define skewness and coefficient of skewness.

3. A) Answer **any two** of the following : **10**

i) Explain the construction of frequency polygon.

ii) If $\overline{X}_1$ and $\overline{X}_2$ are the arithmetic means of two groups of sizes n_1 and n_2 respectively. Derive the formula to obtain the arithmetic mean of $(n_1 + n_2)$ values pooled together.

iii) The first three moments of a distribution about 2 are 1, 22 and 10. Find its mean, standard deviation and third central moment.

B) Answer **any one** of the following : **10**

i) Derive the formula of median for a grouped frequency distribution.

ii) Define mean deviation and standard deviation. Show that standard deviation is greater than or equal to mean deviation.

SECTION – II

(**Probability Distributions – I**)

1. Choose the correct alternative : **5**

i) An event that can be split into further events is known as

a) Complex event b) Mixed event

c) Simple event d) Composite event

ii) When the number of cases favourable to the event A is zero then P(A) is equal to

a) 1 b) 0 c) $\frac{1}{2}$ d) None of these

iii) Probability of occurrence of A as well as B is denoted by

a) $P(A \cup B)$ b) $P(A \cap B)$ c) P(A|B) d) P(B|A)

iv) If P(A|B) = P(A) then

a) A is independent of B b) A is subset of B

c) A and B are mutually exclusive d) Both a) and b)

v) Given following is distribution function of X, what is median of X ?

X	0	1	2	3
F(x)	0.1	0.6	0.8	1

a) 2 b) 1 c) 3 d) 0

2. Answer **any five** of the following : **10**

i) Define sample space with illustration.

ii) Suppose A and B are independent events. If P(A) = 0.8, P(A $\cup$ B) = 0.9, P(B) = x. Find the value of x.

iii) If A is subset of B then find P(A|B).

iv) Prove that i) $P(\overline{A}) = 1 - P(A)$ ii) $P(A) \leq 1$.

v) Prove that if A and B are independent then $\overline{A}$ and B are also independent.

vi) Verify whether the following can be looked upon as pmf for the given values of X.

$P(x) = \frac{x+1}{10}$ x = 0, 1, 2, 3.

vii) Give two examples of discrete random variable.

3. A) Solve **any two** from the following : **10**

i) State and prove addition theorem of probability.

ii) Prove that conditional probability satisfies three axioms of probability.

iii) Show that if A, B, C are mutually independent (A $\cup$ B) and C are independent.

B) Solve **any one** of the following : **10**

i) Explain partition of the sample space and prove Baye's theorem.

ii) For the following probability distribution of X.

X	0	1	2	3	4
P(x)	K	3K	5K	2K	K

Find :

i) K

ii) $P(X \geq 2)$

iii) Mode of X

iv) Distribution function of X

v) Probability distribution of 2X.

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SLR-Z – 7

Seat No.	

B.Sc. (Part – I) (Semester – I) (CGPA Pattern) Examination, 2015
ZOOLOGY (Paper – I)
Animal Diversity & Cell Biology and Genetics

Day and Date : Monday, 2-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions: *1) Draw **neat** labelled diagram **wherever** necessary.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Two** Sections should be written in **separate** answer-book.*

SECTION – I

(Animal Diversity)

1. Rewrite the following sentences choosing correct alternative given below. **5**

1) Earthworm belongs to phylum _____
   a) Platyhelminthes b) Annelida
   c) Coelenterata d) Aschelminthes

2) Main function of contractile vacuole is _____
   a) Digestion b) Respiration
   c) Osmoregulation d) Reproduction

3) _____ pairs of spermatheca are present in earthworm.
   a) One b) Two c) Three d) Four

4) Tapeworm is _____
   a) endoparasite b) ectoparasite
   c) partial parasite d) blood parasite

5) In Hydra the function of nematocyst is _____
   a) excretion b) protection c) circulation d) absorption

P.T.O.

2. Answer **any five** of the following. **10**

   i) Salient features of Annelida.

   ii) Archaeocytes of Sycon.

   iii) Spermatheca of earthworm.

   iv) Tentacles of Hydra.

   v) Scolex of Tapeworm.

   vi) Binary Fission in Paramoecium.

   vii) Budding in Hydra.

3. A) Write short notes on **any two** of the following. **10**

   i) Describe digestion in Hydra.

   ii) Describe physiological adaptations in Tapeworm.

   iii) Describe contractile vacuoles in Paramoecium.

   B) Answer **any one** of the following. **10**

   i) Describe different types of locomotion in Hydra.

   ii) Describe the digestive system of earthworm.

SECTION – II

(Cell-Biology and Genetics)

1. Rewrite the following sentences choosing correct alternative given below. **5**

   1) _____ are concerned with energy production.

   a) Golgi body b) Endoplasmic reticulum

   c) Lysosomes d) Mitochondria

   2) In monohybrid cross the phenotypic ratio is _____

   a) 3 : 1 b) 2 : 2 c) 9 : 3 : 4 d) 9 : 3 : 3 : 1

   3) The person with blood group _____ is called universal acceptor.

   a) A b) B c) AB d) O

4) Golgi body is involved in _____

a) Cell secretion b) Cell protection

c) Cell reproduction d) Cell excretion

5) RBCS in sickle cell anemia are _____

a) with nucleus b) without nucleus

c) swollen d) sickle shaped

2. Answer **any five** of the following. **10**

i) Give applications of Electron microscope.

ii) Give the functions of Endoplasmic reticulum.

iii) Law of segregation.

iv) Give the genotypes of the person having blood group 'A' and 'O'.

v) Give the functions of Lysosome.

vi) Give the structure of polytene chromosome.

vii) XO method of sex determination.

3. A) Write short notes on **any two** of the following. **10**

i) Describe the structure of prokaryotic cell.

ii) Describe the ultrastructure of Mitochondrian.

iii) Describe human genetic disorder Phenyl Keton Uric imbecility. (PKU).

B) Answer **any one** of the following. **10**

i) Describe the fluid mosaic model of plasma membrane.

ii) Describe the multiple alleles with reference to ABO blood group system.

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SLR-Z – 8

Seat No.	

B.Sc. (Part – I) (Semester – I) (C.G.P.A. Pattern) Examination, 2015
MATHEMATICS (Paper – I)
Algebra and Calculus

Day and Date : Tuesday, 3-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Answer to the ***two*** *Sections should be written in the* ***separate*** *answer book.*

SECTION – I
(Algebra)

1. Select the correct alternative for each of the following : **5**

1) If A and B are skew-symmetric then A + B is _____
   a) Symmetric b) Identity
   c) Skew-symmetric d) None of these

2) If $\rho(A) \neq \rho[A : B]$ then the system AX = B is _____
   a) Consistent b) Inconsistent
   c) Homogeneous d) Possess a solution

3) For any complex number z, tanh(iz) = _____
   a) – i tan (iz) b) tan (iz)
   c) i tan (iz) d) i tanz

4) The eigen vector for the matrix $A = \begin{bmatrix} -3 & 8 \\ -2 & 7 \end{bmatrix}$ corresponding to the eigen value $\lambda = 5$ is _____

   a) $\begin{bmatrix} k \\ k \end{bmatrix}$ b) $\begin{bmatrix} -k \\ k \end{bmatrix}$ c) $\begin{bmatrix} k \\ -k \end{bmatrix}$ d) $\begin{bmatrix} 0 \\ k \end{bmatrix}$

P.T.O.

5) If $z = \sqrt{i}$ then Re(z) = _____

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$

c) 2 d) 1

2. Attempt **any five** of the following : **10**

1) Solve the following system of equations x + 2y + 3z = 0, 3x + 4y + 4z = 0, 7x + 10y + 12z = 0.

2) Using Euler's formula show that $\sin(-\theta) = -\sin\theta$.

3) Find the values of λ for which the following equations has a non-zero solution, 2x + 3y – 2z = 0, 3x – y + 3z = 0, 7x + λ y – z = 0.

4) Let A and B be symmetric matrices of the same order. Prove that AB + BA is symmetric.

5) Separate into real and imaginary part of cos (x + iy).

6) Find the characteristic equation of a matrix $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$.

7) Find the two values of $\sqrt{i}$.

3. A) Attempt **any two** of the following : **10**

1) Reduce the following matrix to normal form and hence find its rank

$$\begin{bmatrix} 1 & 4 & 3 & 2 \\ 1 & 2 & 3 & 4 \\ 2 & 6 & 7 & 5 \end{bmatrix}$$

2) Use De Moivre's theorem to solve the equation $x^4 – x^3 + x^2 – x + 1 = 0$.

3) Find the values of λ and μ such that the following system of equation has

i) no solution

ii) unique solution

iii) many solutions

x + y + z = 3, x + 2y + 2z = 6, x + λ y + 3z = μ .

B) Attempt **any one** of the following : **10**

1) Find the characteristic equation of the matrix $A = \begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$. Find the inverse of A and then express $A^5 - 4A^4 - 7A^3 + 11A^2 - A - 10I$ as a linear polynomial in A.

2) State and prove De Moivre's theorem and simplify

$$\frac{(\cos 2\theta + i \sin 2\theta)(\cos \theta - i \sin \theta)^3}{(\cos 3\theta + i \sin 3\theta)^2 (\cos 5\theta - i \sin 5\theta)^4}$$

SECTION – II
(Calculus)

1. Select correct alternative for **each** of the following : **5**

1) If $y = \log (ax + b)$ then $y_{n+1} =$ _____

a) $\frac{(-1)^n \, n! \, a^n}{(ax + b)^n}$ b) $\frac{(-1)^n \, n! \, a^{n+1}}{(ax + b)^n}$

c) $\frac{(-1)^n \, n! \, a^{n+1}}{(ax + b)^{n+1}}$ d) none of these

2) If $y = (ax + b)^m$ then $y_n = m! \, a^m$ if _____

a) $n < m$ b) $n \leq m$ c) $n > m$ d) $n = m$

3) $\lim_{k \to 0} \frac{f_y (a, b + k) - f_y (a, b)}{k} =$ _____

a) f_{xx} (a, b) b) f_{yy} (a, b) c) f_{yx} (a, b) d) f_{xy} (a, b)

4) If $\nabla \cdot \bar{f} = 0$ where $\bar{f}$ is vector point function then $\bar{f}$ is called as _____ vector.

a) Solenoidal b) null c) irrotational d) unit

5) If by replacing x by xt, y by yt, z by zt in f(x, y, z) becomes t^{n+1} f(x, y, z) then f(x, y, z) is said to be _____

a) homogeneous function of degree n
b) non-homogeneous function of degree n
c) homogeneous function of degree n + 1
d) non homogeneous function of degree n + 1

2. Attempt **any five** of the following : **10**

1) Find n^{th} derivative of

$$y = \frac{1}{6x^2 - 5x + 1}$$

2) Expand $(1 + x)^m$ in powers of x.

3) If $u = xy\ f\left(\frac{x}{y}\right)$ prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 2u$.

4) Discuss the continuity of

$$f(x, y) = \frac{|x - y|}{x - y} \text{ if } x \neq 0, y \neq 0$$

$f(0, 0) = 1$

5) Find the directional derivative of

$\phi\ (x, y, z) = x^2yz + 4xz^2$ at (1, –2, –1) in the direction of $2i – j – 2k$

6) Find $\text{div}\,\bar{f}$ and $\text{curl}\,\bar{f}$ at (1, –1, 1) if $\bar{f} = xz^3i – 2x^2yzj + 2yz^4k$.

7) Evaluate $\lim_{x\to 1} \frac{1+\cos \pi x}{x^2 - 2x + 1}$.

3. A) Attempt **any two** of the following : **10**

1) Evaluate $\lim_{x\to 0} (\cot x)^{\frac{1}{\log x}}$.

2) Evaluate $\int_0^1 x^4 \cos^{-1} x dx$.

3) State and prove Euler's theorem for homogeneous function of degree n in x and y.

B) Attempt **any one** of the following : **10**

1) State and prove Leibnitz's theorem and prove that if $y = e^{m\cos^{-1}x}$ then $(1–x^2)y_{n+2} – (2x+1)xy_{n+1} – (n^2+m^2)y_n = 0$

2) Prove that $\text{curl}\,(\bar{f} + \bar{g}) = \text{curl}\,\bar{f} + \text{curl}\,\bar{g}$ and show that $\nabla r^n = n\, r^{n-2}\, \bar{r}$.

SLR-Z – 9

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2015
BOTANY (Paper – I)
Microbiology and Cryptogams, Plant Physiology and Horticulture

Day and Date : Tuesday, 3-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) Write ***two*** *Sections in* ***separate*** *answer books.*
3) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I
(Microbiology and Cryptogams)

1. Rewrite the following sentences by choosing correct alternative : **5**

1) The shape of coccus bacterium is _____
   a) Spherical b) Spiral
   c) Rod shaped d) Filamentous

2) G. M. Smith classified algae into _____ divisions.
   a) 10 b) 7
   c) 14 d) 3

3) In Fungi Mode of nutrition is _____
   a) Autotrophic b) Lithophytic
   c) Heterotrophic d) Both a) and b)

4) NOSTOC is a _____ algae.
   a) Red b) Brown
   c) Yellow d) Blue green

5) Selaginella is a _____ plant.
   a) Heterosporous b) Monosporous
   c) Homosporous d) None of these

2. Answer **any five** of the following : **10**
   i) What is virus ?
   ii) Give any four economic importance of bacteria.
   iii) Sketch and label the cell structure of Spirogyra.
   iv) Give any four general characters of Fungi.
   v) Give medicinal importance of bryophytes (any four).
   vi) Give systematic position of Nostoc.
   vii) What is rhizophore ?

3. A) Write short notes on **any two** of the following : **10**
   i) Sexual reproduction in Albugo.
   ii) External and internal thallus structure of Riccia.
   iii) General characters and forms of bacteria.

   B) Answer **any one** of the following : **10**
   i) Describe the external morphology of sporophyte and T.S. of stem in Selaginella.
   ii) Describe asexual reproduction in Nostoc.

SECTION – II
(Plant Physiology and Horticulture)

1. Rewrite the sentence by choosing correct alternative : **5**

   1) The branch of horticulture with deals with cultivation, processing and marketing of vegetable crops is called _____
      a) Olericulture b) Pomoculture
      c) Floriculture d) Agriculture

   2) _____ is Micro element.
      a) N b) P
      c) Ca d) Cu

   3) _____ is natural method of vegetative propagation.
      a) Cuttings b) Layering
      c) Budding d) Rhizome

   4) Phytochrome pigment exists in _____ forms.
      a) Only Pr form b) Only Pfr form
      c) Both Pr and Pfr from d) None of these

5) In holoenzyme, the protein part is called _____

a) Apoenzyme b) Prosthetic group

c) Co-enzyme d) Co-factor

2. Answer **any five** of the following : **10**

i) Enlist the mactro elements you have studied.

ii) What is 'grand period' of growth ?

iii) Define Isoenzymes.

iv) Define growth redardant.

v) Mention any two merits of sexual reproduction.

vi) What is floriculture ?

vii) Mention any two applications of GA in agriculture.

3. A) Write short notes on **any two** of the following : **10**

i) Explain in brief the Mechanism of Vernalization.

ii) Define enzyme, explain in brief Lock and Key hypothesis of enzyme.

iii) What is vegetative propagation ? Discuss the technique of patch budding.

B) Answer **any one** of the following : **10**

i) What are Micro elements ? Add a note on role and deficiency symptoms of any two micro elements.

ii) What is layering ? Explain the technique of Air layering.

_____

SLR-Z – 10

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2015
ELECTRONICS (Paper – I)
Fundamentals of Electronics, Digital Fundamentals

Day and Date : Wednesday, 4-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*
5) ***Two*** *Sections should be written in* ***two separate*** *answer papers.*

SECTION – I

1. Select correct alternative for the following : **5**

1) After applying Thevenin's theorem, equivalent circuit will have a new
   a) Voltage source in series with resistance
   b) Current source in series with resistance
   c) Current source in parallel with resistance
   d) Voltage source in parallel with resistance

2) If resistance of series LCR resonance circuit decreases then resonance frequency will
   a) increases b) decreases c) remains same d) none of these

3) The unit of reactance is
   a) Ohm b) Mhos c) Henry d) Farad

4) A residential mains supply has _____ frequency.
   a) 100 b) 50 c) 230 d) 440

5) In parallel resonance circuit at resonance frequency, impedance is
   a) minimum b) maximum
   c) remains same d) changing

P.T.O.

2. Answer **any five** for the following : **10**

i) Define time period and frequency.

ii) Define quality factor and selectivity.

iii) Define h-parameters and give their formulae.

iv) Define node and network.

v) Calculate equivalent capacitor of circuit having two capacitor each of 10 μf connected in parallel.

vi) Define ideal voltage and current source.

vii) Define T and π network.

3. A) Write short notes on **any two** of the following : **10**

i) Inductor

ii) Constant current and voltage source

iii) Mesh analysis.

B) Answer **any one** of the following : **10**

i) Obtain Z-parameters for two port network. Obtain Z – parameters in terms of h-parameters.

ii) Explain transformer and its types.

SECTION – II

1. Select correct alternative for the following : **5**

1) Hexadecimal number B is equivalent to decimal number

a) 10 b) 11 c) 12 d) 13

2) Gray code of 1011 is

a) 1110 b) 1010 c) 1100 d) 1101

3) IC 7402 is

a) OR gate b) AND gate c) NOR gate d) XOR gate

4) Which gate used as universal building blocks ?

a) NOR gate b) NAND gate c) Both a & b d) None of these

5) Half substractor is substract how much bite at a time

a) 1 b) 2 c) 3 d) 4

2. Answer **any five** of the following : **10**

i) What is hexadecimal number system ?

ii) Draw the logic diagram for the logic equation Y = A + B.C.

iii) Draw pin layout diagram of IC 7408.

iv) Convert the binary number $(111)_2$ into its equivalent decimal number.

v) State OR laws.

vi) Draw the K map for 3 variables. Show their corresponding cell numbers.

vii) What is negative logic ?

3. A) Write short notes on **any two** of the following : **10**

i) NAND as a universal block.

ii) Full-adder

iii) Signed binary numbers.

B) Answer **any one** of the following : **10**

i) Explain parallel binary adder.

ii) State and prove the DeMorgan's Theorems.

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SLR-Z – 11

Seat No.	

B.Sc. I (Semester – I) Examination, 2015
PSYCHOLOGY Paper – I (CGPA Pattern)
General Psychology and Human Development

Day and Date : Wednesday, 4-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Section ***I*** *and Section* ***II*** *should be write in* ***separate*** *answer books.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

(General Psychology)

1. Fill in the blanks. **5**

1) Determining what will happen in the future is a _____.
A) Explanation B) Description C) Prediction D) Control

2) A _____ is a general explanation of a set of observations.
A) theory B) study C) experiment D) test

3) The first step in _____ anything.
A) understanding B) exam
C) observation D) mind

4) The _____ is the specialized cell in the nervous system.
A) neuron B) soma C) axon D) brain

5) There are _____ kinds of sleep.
A) 4 B) 2 C) 8 D) 10

2. Answer the following (**any five**) : **10**

   1) Define psychology.

   2) State the term of description.

   3) How many goals of psychology ?

   4) Who was the founder of behavioural perspective ?

   5) Give any four modern psychological perspectives.

   6) Define experiment.

3. Write short notes (**any two**) : **10**

   1) Case studies method.

   2) The somatic nervous system.

   3) The necessity of sleep.

4. A) Discuss on the psychology goal. **10**

   OR

   B) Explain the types of psychological professionals.

SECTION – II

(Human Development)

1. Multiple choices. **5**

   1) Adolescence is generally considered to begin of about _____ and end in the late teen or early twenties.

      A) 12 or 13 B) 11 or 12 C) 15 or 14 D) 14 or 15

   2) Girls begin to show puberty change at 9 or 10 years of age achieving sexual maturation in 13 or _____

      A) 16 B) 14 C) 19 D) 20

   3) Adolescents spend their lot of time with _____

      A) peers B) mother

      C) father D) grand father

4) Perry's nine stages are divided among _____ broader categories.

A) 3 B) 4 C) 6 D) other

5) _____ mean sexual self stimulation.

A) Masturbation B) Intercourses C) Dating D) Any other

2. Answer **any five** of the following. **10**

1) What are the Piagets four stages of cognitive development ?

2) What is the marriage work ?

3) What is the function of puberty state ?

4) What are the seven form of level ?

5) What is self-esteem ?

6) What is human development ?

3. Write short notes (**any two**). **10**

1) Physical development in early-adulthood.

2) Cognitive development in early-adulthood.

3) Passionate companions love.

4. Answer **any one** of the following. **10**

A) Discuss elaborately 'AIDS' sexually transmitted disease.

OR

B) Explain the stages of sexuality in adolescence.

_____

SLR-Z – 12

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2015
GEOLOGY (Paper – I)
Mineralogy, Palaeontology, Igneous, Sedimentary and Metamorphic Petrology

Day and Date : Wednesday, 4-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) Answers to ***two*** *Sections should be written in* ***same*** *answer book.*
4) Draw neat diagrams ***wherever*** *necessary.*

SECTION – I
(Mineralogy and Palaeontology)

1. Fill in the blanks with correct answer from the given answers : **5**

1) Quartz shows _____ lustre.
(a) Silky b) Greasy
c) Vitreous d) Dull)

2) Form of Muscovite is _____
(a) Amorphous b) Foliated
c) Crystalline d) Drusy)

3) Fe, Mg rich mineral is _____
(a) Olivine b) Muscovite
c) Microcline d) Flint)

4) Beak shaped projection of shell is _____
(a) Valve b) Apex
c) Umbo d) Pallial sinus)

5) Head, Thorax and Tail are parts of _____ Phylum animals.
(a) Mollusca b) Brachiopoda
c) Coelentera d) Arthropoda)

2. Answer **any five** of the following : **10**

   i) Describe Biotite.

   ii) Describe Orthoclase.

   iii) Describe Microcline.

   iv) Describe cleavage of mineral.

   v) Define fossil.

   vi) Describe Pectin.

   vii) Describe Physa.

3. A) Write short note on **any two** of following : **10**

   i) Mould and cast.

   ii) Olivine group of minerals.

   iii) Pyroxene group of minerals.

   B) Answer **any one** of the following : **10**

   i) Amphibole group of minerals.

   ii) Morphological characteristics of Gastropoda class shell.

SECTION – II
(Igneous, Sedimentary and Metamorphic Petrology)

1. Fill in the blanks with correct answer from the given options : **5**

   1) Rocks formed due to compaction of sediments are _____ rocks.

   (a) Igneous b) Sedimentary

   c) Metamorphic d) Cataclastic)

   2) Pressure and temperature effect caused formation of _____ rocks.

   (a) Thermal metamorphic b) Dynamothermal metamorphic

   c) Cataclastic d) Slaty)

   3) Minerals present in large amount in a rock are called as _____ minerals.

   (a) Secondary b) Essential

   c) Accessary d) Coarse grained)

4) Epizone is _____ zone of metamorphism.

(a) Middle b) Lower

c) Upper d) Central)

5) Lamination is structure of _____ rock.

(a) Metamorphic b) Igneous

c) Sedimentary d) Slaty)

2. Answer **any five** of the following : **10**

i) Define rock.

ii) Describe major subdivisions of petrology.

iii) Secondary minerals.

iv) Glassy structure.

v) Oolitic structure.

vi) Pisolitic structure.

vii) Slaty cleavage structure.

3. A) Write short note on **any two** of the following : **10**

i) Rock cycle.

ii) Describe Sill, Dykes and Laccoliths.

iii) Describe Augen structure and Granulose structure.

B) Answer **any one** of the following : **10**

i) Describe any three sedimentary rock structures.

ii) Describe types of metamorphism.

SLR-Z – 13

Seat No.	

B.Sc. – I (Semester – I) Examination, 2015
MICROBIOLOGY (Paper – I) (CGPA Pattern)
Fundamentals of Microbiology and Microbial Techniques

Day and Date : Wednesday, 4-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Answers to the ***two*** *Sections should be written in* ***separate*** *answer book.*

SECTION – I

(**Fundamentals of Microbiology**)

1. Rewrite the following sentences by selecting correct answer from given alternatives : **5**

   1) Peptidoglycan is the chemical component of _____ of bacteria.
      a) Cell membrane b) Cell wall
      c) Capsule d) Flagella

   2) The spherical bacteria arranged in a chain is known as
      a) tetrad b) staphylococcus
      c) streptococcus d) diplococcus

   3) _____ act as organs of motility in bacteria.
      a) Flagella b) Capsule c) Pili d) Mesosomes

   4) The process of antiseptic surgery was developed by
      a) Joseph Lister b) Edward Jenner
      c) Robert Koch d) John Tyndall

   5) The size of bacteria is measured in
      a) mm b) cm c) μm d) meter

2. Answer **any five** of the following : **10**

   i) Give any two harmful activities of bacteria.

   ii) What is abiogenesis ?

   iii) What is a capsid ?

P.T.O.

iv) Write any two functions of pili.

v) Write specific characteristics of chlamydia.

vi) What are endospores ?

vii) Give contribution of Alexander Fleming.

3. A) Write short notes on **any 2** of the following : **10**

i) Capsule and slime layers.

ii) Archaebacteria.

iii) Principles of bacterial nomenclature.

B) Answer **any one** of the following : **10**

i) Write in detail structure and functions of cell membrane.

ii) Enumerate the differences between procaryotic and eucaryotic cell with well labelled diagram.

SECTION – II

(**Microbial Techniques**)

1. Rewrite the following sentences by selecting correct answer from the alternatives : **5**

1) _____ is an example of acidic stain.

a) Basic fuchsin b) Crystal violet

c) Methylene blue d) Congo red

2) Mac Conkey's agar is _____ medium.

a) Differential

b) Selective

c) Enriched

d) Differential as well as selective

3) Sterilization of culture media is carried out in

a) Autoclave b) Hot air oven

c) Incubator d) Fermentor

4) The part of compound microscope that collects light rays at one point is

a) Oil immersion objective b) Mirror

c) Condenser d) Eye piece

5) The process of reducing load of micro-organisms on object is

a) Disinfection b) Sanitization

c) Antisepsis d) Sterilization

2. Answer **any five** of the following : **10**

i) List the staining solutions used in gram staining.

ii) Define resolving power of compound microscope.

iii) Write the principle of sterilization by moist heat.

iv) What do you mean by enriched medium ? Give example of it.

v) What is tyndallization ?

vi) What is the use of asbestos membrane filteration.

vii) Which staining solutions are used to stain cell wall by Chance's method ? Give their role in it.

3. A) Write short notes on (**any 2**) : **10**

i) Embryonated eggs

ii) Sterilization by phenol and phenolic compounds

iii) Selective media.

B) Answer **any one** of the following : **10**

i) Write an essay on 'serial dilution technique'.

ii) Describe different parts of compound microscope and draw a ray diagram of compound microscope.

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SLR-Z – 14

Seat No.	

B.Sc. (Semester – II) Examination, 2015
ENGLISH COMPULSORY (New CGPA Pattern)
On Track : English Skills for Success

Day and Date : Thursday, 5-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B.** : 1) **All** questions are **compulsory.
*2) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by choosing the correct alternative given below **each** : **14**

1) Wernher von Braun advised Dr. A.P.J Abdul Kalam to make rocketry his mission and _____
   a) Profession b) Glory c) Religion d) Division

2) To succeed in any mission, says Dr. Kalam, one needs _____
   a) Single handed victory b) Single man's devotion
   c) Single attempt success d) Single minded devotion

3) The Parliament of religions was to be held in _____
   a) America b) Singapore
   c) Canada d) South Africa

4) When did Vivekanand leave Bombay ?
   a) On September 11, 1893 b) On May 31, 1893
   c) On May 15, 1893 d) On June 5, 1893

5) The Lusaka Zoo presents_____as the World's most dangerous animal.
   a) Man b) Woman
   c) Carnivorous animals d) Reptiles

P.T.O.

6) The main reason of the serious economic problems of the majority is _____

a) Famine b) Negligence c) Drought d) Ignorance

7) Brahma is a Hindu deity who is responsible for _____

a) The creation of the World b) The maintenance of the world

c) The destruction of the World d) The rules of governing the World

8) The poem "Brahma" displays the influence of _____ on Emerson.

a) The Vedas b) The Upanishads

c) The Geeta d) The Puranas

9) The people on whose graves the full moon shines were_____

a) Poor people b) Simple people

c) Superstitious people d) Moon-dependent people

10) Today the moon is merely an attraction for_____

a) The poets b) The children

c) The lovers d) The scientists

11) The gentleman would not drink _____tea without your company.

a) my b) her c) our d) his

12) _____ are the European people.

a) English b) The English c) An English d) The english

13) The _____ refused to admit him in the science stream.

a) Principle b) Principal c) Prince d) Princess

14) Who won the race ? The_____ or the tortoise ?

a) here b) hair c) hare d) heir

2. Answer **any seven** of the following questions in **two** to **three** sentences **each** : **14**

1) What kind of personality was Von Braun, according to Dr. Kalam ?

2) What happened to the first V-Z missile when it was first tested ?

3) Who were the other Indians present at the Parliament of Religions ?

4) Where did Swami Vivekanand leave for and why ?

5) Human rights are against the government. How ?

6) What message does the poem "Brahma" leave for us ?

7) What is the theme of the poem "Full Moon" ?

8) Is the moon depicted as a challenge or a threat or a comfort in the poem ?

3. A) Write short answers on **any two** of the following : **8**

1) Summarise the points of advice that Von Braun gave Dr. Kalam.

2) How was Vivekananda's speech at the Parliament of Religions different from those of the other speakers ? How did it create a magic on the occasion ?

3) Examine Palkhivala's evaluation of the current status of human rights in the World.

B) Answer **any two** of the following questions briefly : **6**

1) What is a notice ?

2) What are the aspects of a good CV ?

3) What is an e-mail ?

4. You are Anne Jacob, a graduate in Chemical Engineering from the NIT Warangal. You have three years experience as an assistant project engineer with a fertilizer company. Write an email application letter in response to an advertisement for the post of Project Engineer in a well-known Petrochemical Company. Refer only briefly to your educational qualifications and work experience in the body of the letter and say that you are attaching your C.V. and testimonials for the company's reference. **14**

OR

You are the principal of the Arya College of Arts and Science, Lucknow. Prepare an agenda for a meeting with the head of the English department and the secretary and the treasurer of the college's literary association. The meeting has been called to discuss the venue, date, time.

5. Write a suitable C.V. for the post of lecturer in the Senior College in English subject. **14**

SLR-Z – 15

Seat No.	

B.Sc. I (Semester – II) Examination, 2015
CHEMISTRY (Paper – II) (CGPA Pattern) (New)
Organic and Analytical Chemistry

Day and Date : Friday, 6-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions: *1) Answer to the **two** Section should be written on **separate** answer books.*
*2) **All** questions are **compulsory**.*
*3) Draw **neat** diagrams and give equations **wherever** necessary.*
*4) Figures to the **right** indicate **full** marks.*
*5) **Use** of logarithmic table and calculator is **allowed**.*
(Atomic weights : H = 1, C = 12, O = 16, N = 14, Na = 23, Cl = 35.5)

SECTION – I
(Organic Chemistry)

1. Select the correct alternative for **each** of the following and rewrite the sentences **5**

i) Carbenes are _____
a) monovalent b) divalent
c) trivalent d) none of these

ii) If compound has two different chiral carbon atoms, then number of optical isomers are _____
a) 3 b) 6 c) 4 d) 8

iii) All carbon atoms of benzene are _____ hybridized.
a) SP b) SP^2 c) SP^3 d) None of these

iv) 2, 3 - Pentadiene is an example of _____
a) isolated diene b) conjugated diene
c) cumulated diene d) none of these

v) Inductive effect involves _____
a) σ electrons b) π electrons
c) both σ and π electrons d) lone pair of electrons

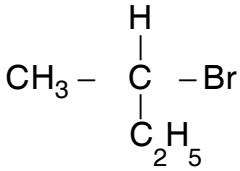
P.T.O.

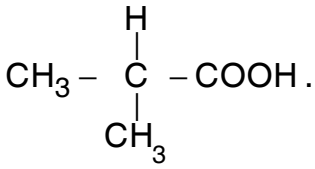
2. Answer **any five** of the following. **10**

i) Define :
   a) Nitrene
   b) Carbon free radical.

ii) What are electrophiles and nucleophiles ?

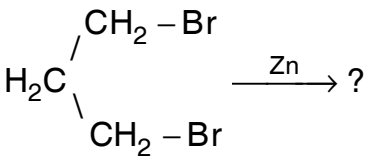
iii) Which of the following compounds are optically active ? Why ?

a) 

b) 

iv) Complete and rewrite the balanced equations for

a) $CH_4 + Cl_2 \xrightarrow{h\nu} ?$

b) 

v) Define :
   a) Aromatic compounds
   b) Anti-aromatic compounds.

vi) Why does benzene undergo electrophilic substitution reaction ?

vii) What is Friedel Craft alkylation reaction ? Give its reaction.

3. A) Write short notes on **any two** of the following. **10**

i) Elimination reaction

ii) Centre of symmetry

iii) Kolbes reaction and decarboxylation of carboxylic acid.

B) Answer **any one** of the following. **10**

i) What is the effect of SP, SP^2 and SP^3 hybridisation on bond length, bond angle and bond energy.

ii) What is conjugated diene ? Explain Diel's-Alder reaction and polymerisation of 1, 3 - butadiene.

SECTION – II
(Analytical Chemistry)

4. Select the most correct alternative for the following and rewrite the sentences. **5**

i) The property which determines the rate of flow of liquid is known as _____

a) surface tension b) parachor
c) viscosity d) refractive index

ii) The catalyst used in the Kjeldahl's method is _____

a) H_2SO_4 b) K_2SO_4
c) $CuSO_4$ d) None of these

iii) The percentage of fat in cow milk is _____

a) 3.1 b) 4.5 c) 1.3 d) 4.6

iv) The mineral from which metal can be extracted economically, profitably and easily then such minerals are called as _____

a) minerals b) ore c) flux d) slag

v) _____ oxide of nitrogen is not a pollutant.

a) NO b) N_2O c) NO_2 d) N_2O_5

5. Answer **any five** of the following. **10**

i) Explain the sources of water.

ii) Draw the diagram of reverse osmosis cell.

iii) Mention limitations of distribution law.

iv) Define the terms :

a) Gangue b) Calcination.

v) Explain magnetic separation method.

vi) Give the classification of air pollutants.

vii) What is green house effect ?

6. A) Write short notes on **any two** of the following. **10**

   i) Discuss the role of sodium carbonate as an antacid.

   ii) Nernst distribution law.

   iii) Froth floatation process.

   B) Answer **any one** of the following. **10**

   i) What is surface tension ? Explain the principle of Drop-Weight method in the determination of surface tension.

   ii) Discuss the principle involved in the quantitative analysis of halogen by Carius method. 2.59×10^{-4} kg of organic compound gave 1.78×10^{-4} kg of silver chloride in Carius method of estimation. Find the percentage of chlorine in the organic compound.

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Seat No.	

B.Sc. – I (Semester – II) (New) (CGPA Pattern) Examination, 2015
COMPUTER SCIENCE
Computer Fundamentals and Programming Using C – II
(Paper – II)

Day and Date : Friday, 6-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *place indicate* ***full*** *marks.*
3) Answer of the ***two*** *Sections should be written in* ***separate*** *answer sheet.*

SECTION – I
(**Computer Fundamentals)**

1. Multiple choice questions : **5**

i) Systems having multiple CPUs are called _____ systems.
   a) Multiprocessing b) Multiprogramming
   c) Multitasking d) Time sharing

ii) _____ is a new way of information storage and retrieval that enables authors to structure information in novel ways.
   a) Hypertext b) Hyperlink
   c) Hyperspeed d) None of these

iii) _____ is the extension of excel file.
   a) .xls b) .doc c) .ppt d) .txt

iv) _____ is the dialog box in Java script.
   a) inputbox b) msgbox c) prompt d) none of these

v) The acronym FTP stands for _____
   a) File Transfer Protocol
   b) Fast Transfer Protocol
   c) File Tracking Protocol
   d) File Transfer Procedure

P.T.O.

2. Answer **any five** of the following : **10**
   i) Explain sum and count function in excel.
   ii) Give full form of :
      a) SGML
      b) HTTP.
   iii) Explain any two attribute of body tag.
   iv) What is DHTML ? Give advantages of DHTML.
   v) Give the list of dialog boxes in Vbscript.
   vi) HTML is markup language. Comment on it.
   vii) Give the advantage of operating system.

3. A) Write short notes on **any two** of the following : **10**
      i) Write a program in Java script to find out given number is palindrome.
      ii) Give the steps for mail merge with example.
      iii) Explain data types in vbscript in detail.
   B) Answer **any one** of the following : **10**
      i) What are the different tags used in HTML ? And explain it in detail.
      ii) Explain image map tag with example.

SECTION – II
(**Programming using C – II)**

1. Choose correct alternatives : **5**
   1) _____ is a variable that represents the location of a another variable.
      a) Pointer b) Array c) Structure d) File
   2) _____ open a new file for writing only.
      a) r b) w c) a d) w+
   3) _____ a is a user defined data type.
      a) structure b) array c) pointer d) none
   4) The _____ function dynamically allocates memory when required.
      a) free( ) b) malloc( ) c) alloc d) none
   5) _____ is used to calculate how many bytes required for storing that variable.
      a) typedef b) byte c) bit d) sizeof

2. Write answer of **any five** : **10**
   1) Explain local and global variable.
   2) Explain fscanf and fprintf in file handling.
   3) Give the syntax for declaration of structure.
   4) Give the list of file opening modes.
   5) What is pointer ? Give advantages of pointer.
   6) Give the syntax for creation of binary file.
   7) Difference between malloc( ) and calloc( ).

3. A) Write answers of **any two** : **10**
      1) Explain pointer to structure with example.
      2) What is recursion ? Explain with example.
      3) Explain storage classes in detail.

   B) Write answers of **any one** : **10**
      1) What is preprocessor ? Explain preprocessor with its type and example.
      2) Write programs to implement create and type command in file.

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Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
PHYSICS (Paper – II) (CGPA Pattern) (New)
Heat and Thermodynamics, Electricity, Magnetism and Basic Electronics

Day and Date : Saturday, 7-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***Two*** *Sections should be written on* ***separate*** *answer books.*
2) ***All*** *questions are* ***compulsory.***
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
4) ***Use*** *of logarithmic table is* ***allowed.***

SECTION – I
(Heat and Thermodynamics)

1. Select correct alternative : **5**

i) Transport of _____ gives rise to the phenomenon of thermal conductivity of a gas.

a) Mass b) Energy c) Momentum d) Force

ii) For liquid helium II, viscosity _____ with decrease in temperature.

a) Increases b) Does not change

c) Decreases d) Abruptly increases

iii) In an isothermal process, internal energy _____

a) Increases b) Decreases

c) Remains constant d) None of the above

iv) An engine works between the temperatures 30 K and 300 K. What is its efficiency ?

a) 50% b) 47% c) 10% d) 90%

v) In refrigerator, heat is extracted from _____ and delivered to _____

a) Source to sink

b) Sink to source

c) Atmosphere to sink

d) Atmosphere to source

2. Answer **any five** of the following : **10**

i) State Zeroth law of thermodynamics.

ii) Distinguish between Otto engine and diesel engine.

iii) Calculate the coefficient of viscosity of a gas having average velocity 600 m/s. (Density of gas = 1.5 kg/m^3 and mean free path = 8×10^{-6} m).

iv) Why liquid Helium II is called as superfluid ?

v) What is the effect of pressure and temperature on the thermal conductivity ?

vi) Define reversible process.

vii) Write general principle of refrigerator.

3. A) Answer **any two** of the following : **10**

i) Draw Otto cycle. Explain different operations of Otto cycle.

ii) Obtain Clausius equation for mean free path by collision cross-section method.

iii) A Carnot's refrigerator takes heat from water at 0°C and discard it to a room temperature at 27°C. If 80,000 calories of heat are absorbed how many calories of heat are discarded to the room ? What is the coefficient of performance of the machine ?

B) Answer **any one** of the following : **10**

i) Describe the experimental setup to produce low temperature by adiabatic demagnetisation of paramagnetic substance and obtain an expression for fall in temperature.

ii) What is adiabatic process ? Deduce the relation PV^r = constant for an adiabatic change.

SECTION – II
(Electricity, Magnetism and Basic Electronics)

1. Select correct alternative : **5**

   i) The time constant of RC circuit is given by _____

   a) R/C b) C/R c) RC d) R^2C

   ii) Multiplication to vector by j rotate the vector by _____

   a) 90° b) 180° c) 360° d) 45°

   iii) Unit of current sensitivity (Si) of a ballistic galvanometer is _____

   a) μA/mm b) mm/μA

   c) mm/μv d) μv/mm

   iv) The _____ circuit removes negative half cycle from output voltage signal.

   a) Negative clipper b) Positive clamper

   c) Positive clipper d) Negative clamper

   v) If β of a transistor is 99, then its α is _____

   a) 9.9 b) 0.98

   c) 0.099 d) 0.99

2. Answer **any five** of the following : **10**

   i) Calculate the time constant of circuit containing L = 10H and R = 100 ohm.

   ii) Define self inductance of a coil.

   iii) Draw circuit diagram for Owen's bridge.

   iv) Draw positive clamper circuit with input and output waveforms.

   v) What is Pi-Filter ?

   vi) Give types of transistor with their circuit symbol.

   vii) Define figure of merit and voltage sensitivity of a Ballistic galvanometer.

3. A) Answer **any two** of the following : **10**

i) Explain the working of Zener diode as a voltage regulator.

ii) Derive the expression for charging of capacitor through resistor.

iii) Series L-C-R circuit is connected to a variable frequency 230 Va.c. The circuit consists of L = 5H, C = 80 μF, R = 40 ohm.

Find :

a) Resonant frequency

b) Quality factor

c) Bandwidth.

B) Answer **any one** of the following : **10**

i) Obtain an expression for magnetic induction along the axis of a straight solenoid.

ii) Draw neat circuit diagram to obtain transistor characteristics in common emitter configuration. Describe the input, output and transfer characteristics.

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Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2015
PHYSICAL GEOGRAPHY (Paper – II)
Climatology (New) (C.G.P.A. Pattern)

Day and Date : Saturday, 7-11-2015 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Answers to the ***both*** *Sections should be written in* ***separate*** *answerbooks.*
3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
4) Use of map stencils is ***allowed****.*
5) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. Complete the following sentences by choosing correct alternatives : **5**

1) _____ is the branch of science that studies various climate on the earth.

a) Climatology b) Geomorphology
c) Oceanography d) Geology

2) The normal lapse rate of temperature in the atmosphere is _____ °C/km.

a) 5.5 b) 6.5 c) 7.5 d) 8.5

3) _____ is composed of gases, water vapour and dust particles.

a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere

4) _____ zone extends between the tropic of cancer and tropic of Capricorn.

a) Tropical b) Temperate c) Frigid d) None of them

5) The westerlies blowing at about 50° latitude in Southern hemisphere are called as _____

a) Roaring fourties b) Furious fifties
c) Shrinking sixties d) Land breezes

P.T.O.

2. Answer **any five** questions from the following : **10**
   i) Define weather.
   ii) Proportion of different gases in Atmosphere.
   iii) Solar constant.
   iv) Give the name of atmospheric pressure belts on the earth.
   v) Types of cyclones.
   vi) What is albedo of earth ?
   vii) What is inversion of temperature ?

3. A) Write a short notes on **any two** of the following : **10**
   i) Define insolation and state various factors.
   ii) Composition of the atmosphere.
   iii) Scope and importance of atmosphere.

   B) Answer **any one** of the following : **10**
   i) Define atmosphere and state its structure with neat diagrams.
   ii) What is meant by planetary winds and state its types with characteristics.

SECTION – II

1. Complete the following sentences by choosing correct alternatives : **5**
   1) _____ is interdisciplinary specialized branch of knowledge about oceans and seas on the earth surface.
      a) Oceanography b) Geomorphology
      c) Climatology d) Geology
   2) _____ is having higher salinity sea in the world.
      a) Red sea b) Black sea c) Dead sea d) North sea
   3) Glacial control theory of coral formation introduced by _____
      a) R. A. Daly b) Charles Darwin
      c) W. M. Davis d) T. Marphy
   4) The proportion of _____ salt is maximum in the oceanic water.
      a) $CaCl_2$ b) NaCl c) $MgCl_2$ d) $BrCl_2$
   5) The tides of the full moon and the new moon night are known as _____ tide.
      a) Spring b) Neap c) Low d) Moderate

2. Answer **any five** questions from the following : **10**
   i) Give the name of ocean current in Indian Ocean.
   ii) Give the name of dissolved salts in oceanic water.
   iii) What is meant by the fringing reefs ?
   iv) Explain the importance of warm currents in temperate and cold climate.
   v) Vertical temperature of ocean water.
   vi) What is meant by ocean deposits ?
   vii) What is maritime cyclone ?

3. A) Write a short notes on **any two** of the following : **10**
      i) Structure of the ocean floor.
      ii) R. A. Daly theory of coral formation.
      iii) Factor affecting on the distribution of salinity in the oceans and seas.

   B) Answer **any one** of the following : **10**
      i) Define oceanography and explain its scope and importance in the view of human beings.
      ii) Describe the ocean current in the pacific ocean.

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Seat No.	

B.Sc. – I (Sem. – II) (C.G.P.A. Pattern) Examination, 2015
STATISTICS (Paper – II) (New)
Descriptive Statistics, Probability and Probability Distributions – II

Day and Date : Monday, 16-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Answers of **two** Sections should be written in **separate** answer book.*

SECTION – I
(Descriptive Statistics Probability)

1. Choose the correct alternative. **5**

1) The correlation coefficient (r) is always lies between
a) – 1 to 0 b) 0 to 1 c) – 1 to 1 d) none of these

2) For two variables X and Y maximum number of regression lines are
a) 1 b) 2 c) 3 d) 4

3) In a regression line of Y on X, the variable X is known as
a) independent variable b) dependent variable
c) both a) and b) d) none of these

4) The coefficient of association (Q) always lies between
a) 0 & 1 b) 0 & ∞ c) – 1 & + 1 d) none of these

5) Fisher's index number is known as
a) An ideal index b) Price index
c) Quantum index d) None of these

2. Answer **any five** of the following : **10**

i) Define covariance between X and Y. State the effect of change of origin and scale.

ii) Define the coefficient of correlation. Interpret the following cases.
a) r = + 1 b) r = – 1 c) r = 0

P.T.O.

iii) Define Laspeyre's and Paasche's index number.

iv) If A and B are two attributes and they are independent, then show that $\delta = 0$.

v) Explain the term association and disassociation with examples.

vi) State the properties of regression coefficients.

vii) Given if $\sigma_x = \sigma_y$ and $r = \sqrt{2} - 1$. Obtain the acute angle between two regression lines.

3. A) Answer **any two** of the following : **10**

i) Write a short note on index number.

ii) Show that the coefficient of correlation is independent of change of origin and scale.

iii) Define the terms :

i) An attribute ii) Order of class

iii) Positive class frequency iv) Negative class frequency

v) Ultimate class frequency.

B) Answer **any one** of the following : **5**

i) Derive the equation of line of regression of Y on X by method of least square.

ii) With usual notation, prove that $R = 1 - \frac{6\Sigma di^2}{n(n^2 - 1)}$.

SECTION – II

(Probability Distributions – II)

1. Choose the correct alternative : **10**

1) Let X be a random variable with mean 3 then E(3X + 5) is

a) 0 b) 8 c) 9 d) 14

2) If (X, Y) is a bivariate random variable with joint pmf

$P(x, y) = \frac{x^2 + y^2}{20}$ $x = -1, 1$ $y = -2, 2$ then P(Y = 2) is

a) $\frac{1}{2}$ b) $\frac{2}{5}$ c) $\frac{1}{10}$ d) $\frac{1}{5}$

3) If X and Y are two independent random variables then

a) E(XY) = E(X) . E(Y) b) Cov (X, Y) = 0

c) Corr (X, Y) = 0 d) All of the above

4) The mean and variance of binomial distribution are 8 and 4 respectively, then p(x = 1) is

a) $\frac{1}{2^{12}}$ b) $\frac{1}{2^4}$ c) $\frac{1}{2^6}$ d) $\frac{1}{2^8}$

5) The mean of hypergeometric distribution with parameters (20, 5, 4) is

a) 5 b) 1 c) 2 d) 4

2. Attempt **any five** of the following : **10**

i) Define marginal distribution of X.

ii) A r.v.X has the following probability distribution

X	−1	−2	1	2
P(x)	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{3}$

Find E(X).

iii) State addition theorem of expectation.

iv) Prove that E(aX + b) = aE(X) + b.

v) Obtain mean of two point distribution.

vi) Two fruits are to be selected at random from 4 mangoes, 2 oranges and 3 apples. Let X and Y denote respectively mangoes and oranges selected. Obtain the joint probability distribution of (x, y).

vii) Give two examples of real life situations of Binomial distribution.

3. A) Attempt **any two** of the following : **10**

i) Find mean and variance of Bernouli distribution.

ii) Let (X, Y) are independent r.v. then prove that

a) $P_{KX}(s) = P_X(s^K)$ b) $P_{X+Y}(s) = P_X(s) \cdot P_Y(s)$

iii) Let V(X) = 2 and V(Y) = K. If X and Y are independent random variables such that V(3X – Y) = 25. Find the value of K.

B) Attempt **any one** of the following : **10**

i) The joint probability of (X, Y) is given below :

X \ Y	−1	0	1
0	0	$\frac{1}{3}$	0
1	$\frac{1}{3}$	0	$\frac{1}{3}$

a) Show that E(X Y) = E(X) . E(Y)

b) Are X and Y independent ?

c) Find E(Y/X = 1).

ii) Define binomial distribution. Find pgf of binomial distribution and hence obtain its mean and variance. State the relation between them.

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Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2015
ZOOLOGY (Paper – II) (CGPA Pattern) (New)
Animal Diversity – II and Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Monday, 16-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **Draw** neat labeled diagrams **wherever** necessary.*
*2) Figures to **right** indicate **full** marks.*
*3) **Two** Sections should be written in **separate** answer book.*

SECTION – I

(Animal Diversity – II)

1. Rewrite the following sentences choosing alternative given below : **5**

1) The heart of Frog is _____ chambered.
   a) 1 b) 3 c) 2 d) 4

2) The digestion in stomach is called _____ digestion.
   a) Intestinal b) Rectal
   c) Oral d) Gastric

3) The bunches of egg of frog are called as _____
   a) Clusters b) Bundles
   c) Spawns d) Groups

4) The body of urochordates is enclosed in a test called as _____
   a) Tunic b) Test
   c) Meninges d) Thec

5) Gills of bony fishes are covered with _____
   a) Operculum b) Leathery flap
   c) Spiracle d) Valve

2. Answer **any five** of the following : **10**

   i) Three germ layers of frog embryo.

   ii) Salient features of Cyclostomata.

   iii) Blastula of frog.

   iv) Vocal sacs in frog.

   v) Cycloid scale.

   vi) Ventricles of frog brain.

   vii) Sexual dimorphism in frog.

3. A) Write short notes on **any two** of the following : **10**

   i) Describe the mechanism of respiration in frog.

   ii) Describe the metamorphosis of frog.

   iii) Describe courtship behavior in birds.

   B) Answer **any one** of the following : **10**

   i) Describe the digestive system of frog. Add a note on mechanical and chemical digestion in gastric region.

   ii) Describe the arterial system of frog.

SECTION – II

(Ecology, Ethology, Evolution and Applied Zoology)

1. Rewrite the following sentences choosing alternative given below : **5**

   1) _____ is an abiotic factor of an ecosystem.

   a) Water b) Bacteria

   c) Protozoans d) Fungi

   2) The study of gradual changes in animals is called as _____

   a) Ecology b) Ethology

   c) Economics d) Evolution

   3) The domestication of milk producing animals is called _____

   a) Dairy science b) Apiculture

   c) Vermiculture d) Silviculture

4) _____ is considered as a social insect.

a) Honey bee b) Cockroach

c) Silk moth d) Housefly

5) _____ are also called as tertiary consumers.

a) Tigers b) Elephants

c) Frogs d) Rabbits

2. Answer **any five** of the following : **10**

i) Ethology

ii) Ecosystem

iii) Sericulture

iv) Food chain

v) Abiotic factors

vi) Synecology

vii) Biome.

3. A) Answer **any two** of the following : **10**

i) Describe the consumers of a typical ecosystem.

ii) Describe the ecological pyramids.

iii) Define the followings and write in brief their scope.

a) Fishery

b) Pearl culture

c) Apiculture

d) Poultry

e) Lac culture.

B) Write short note on **any one** of the following : **10**

i) Define Vermiculture. Write note on vermiwash and varmicompost.

ii) Describe in detail the components of a grass land ecosystem.

_____

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Seat No.	

B.Sc. I (Semester – II) (C.G.P.A.) Pattern Examination, 2015
MATHEMATICS (Paper – II) (New)
Geometry and Differential Equation

Day and Date : Tuesday, 17-11-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Answer to the ***two*** *Section should be written in the separate answer book.*

SECTION – I
(Geometry)

1. Select the correct alternative for each of the following : **5**

1) $(\sqrt{3}, 1)$ are the Cartesian coordinates whose polar coordinates are

a) (3, 30°) b) (2, 30°) c) (2, 45°) d) (3, 45°)

2) The direction ratio's of the normal to the plane $\frac{x}{2}+\frac{y}{3}+\frac{z}{4}=1$ is

a) $\left(-\frac{1}{2}, \frac{1}{3}, \frac{1}{4}\right)$ b) $\left(\frac{1}{2}, -\frac{1}{3}, \frac{1}{4}\right)$

c) $\left(\frac{1}{2}, \frac{1}{3}, \frac{1}{4}\right)$ d) none of these

3) The equation of the plane through P (3, 2, 4) and parallel to the plane $x - 3y + 2z = 2$ is

a) $x - 3y + 2z = 5$ b) $x - 3y + 2z = 0$

c) $x - 3y + 2z = 7$ d) $x - 3y + 2z = 6$

P.T.O.

4) The centre of the sphere

$2x^2 + 2y^2 + 2z^2 - 4x - 8y + 4z + 5 = 0$ is

a) (1, 2, –1) b) (–1, 2, –1) c) (–1, –2, –1) d) (1, 2, 1)

5) The radius of the sphere

$x^2 + y^2 + z^2 - 4x - 6y + 8z + 4 = 0$ is

a) 4 b) 5 c) 7 d) 9

2. Attempt **any five** of the following : **10**

1) Find the polar equivalents of the following Cartesian equations.

i) $x^2 + y^2 = a^2$ ii) $x^3 = y^2 (2a - x)$.

2) Transform the equation

$2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0$ to parallel axes through the point (–2, 3).

3) Every equations of the first degree in x, y, z represent a plane.

4) Show that the three points A (–2, 3, 5), B (1, 2, 3) and C (7, 0, –1) are collinear.

5) Find the distance of the plane

$2x - 6y + 3z - 28 = 0$ from the origin.

6) Find the radius of the sphere

$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$.

7) Find the equation of the sphere having the join of A (1, –2, 3) and B (–3, 1, 2) as a diameter.

3. A) Attempt **any two** of the following : **10**

1) If by rotation of axes the expression $\alpha x + \beta y$ changes to $\alpha' x' + \beta' y'$ then $\alpha^2 + \beta^2$ is invariant.

2) Obtain the normal form of the equation of plane.

3) Find the equation of the tangent planes to the sphere $x^2 + y^2 + z^2 - 4x + 2y - 6z + 5 = 0$. Which is parallel to the plane $2x + 2y = z$.

B) Attempt **any one** of the following : **10**

1) If by rotation of axes, the expression $ax^2 + 2hxy + by^2$ becomes $a'x'^2 + 2h'x'y' + b'y'^2$ then $a + b$ and $ab - h^2$ are invariant.

2) Show that the equation of tangent plane to the sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ at a point $P(x_1, y_1, z_1)$ is $xx_1 + yy_1 + zz_1 + u(x + x_1) + v(y + y_1) + w(z + z_1) + d = 0$.

SECTION – II
(Differential Equation)

4. Select the correct alternative for each of the following : **5**

1) The P.I. of $\frac{1}{D^2 + 2D + 1}e^{2x}$ is

a) $\frac{1}{7}e^{2x}$ b) $-\frac{1}{7}e^{2x}$ c) $\frac{1}{8}e^{2x}$ d) $\frac{1}{9}e^{2x}$

2) The P.I. of $\frac{1}{\phi(D^2)}\sin ax =$

a) $\frac{1}{\phi(-a^2)}\sin ax$ b) $\frac{1}{\phi(a^2)}\sin ax$

c) $\frac{1}{\phi(-a^2)}\cos ax$ d) $\frac{1}{\phi(a^2)}\cos ax$

3) The C.F. of $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$ is

a) $c_1 e^{-2x} + c_2 e^{3x}$ b) $c_1 e^{2x} + c_2 e^{-3x}$

c) $c_1 e^{2x} + c_2 e^{3x}$ d) $c_1 e^{-2x} + c_2 e^{-3x}$

4) The $\frac{1}{D - a}X =$

a) $e^x \int e^{-x} X dx$ b) $e^{-x} \int e^x X dx$

c) $e^{-ax} \int e^{ax} X dx$ d) $e^{ax} \int e^{-ax} X dx$

5) A differential equation is obtained from its primitive by differentiation only and without any operation of elimination is called _____ differential equation.

a) Exact b) linear

c) Homogeneous d) Non-homogeneous

2. Attempt **any five** of the following : **10**

1) Solve : $\left(y - x\frac{dy}{dx}\right) = a\left(y^2 + \frac{dy}{dx}\right)$.

2) Solve : $\frac{dy}{dx} = (4x + y + 1)^2$.

3) Solve : $\frac{dy}{dx} + \frac{4x}{x^2+1}.y = \frac{1}{(x^2+1)^3}$.

4) Solve : $(1 + 6y^2 - 3x^2y)\frac{dy}{dx} = 3xy^2 - x^2$.

5) Define Bernoulli's equation and explain how to solve it.

6) Explain how to find $\frac{1}{f(D)}x^m$.

7) Solve $(x + y)(dx - dy) = dx + dy$.

3. A) Attempt **any two** of the following : **10**

1) Solve : $(x^2 + y^2)\,dx - 2xydy = 0$.

2) To, prove that $(D-\alpha)(D-\beta)y \equiv (D-\beta)(D-\alpha)y$

3) Solve : $(2x + 4y + 3)\frac{dy}{dx} = (x + 2y + 1)$.

B) Attempt **any one** of the following : **10**

1) Define exact differential equation and to prove that the necessary and sufficient condition for $Mdx + Ndy = 0$ to be exact is $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$.

2) Obtain the particular integral of $f(D)\,y = \sin ax$, $f(-a^2) \neq 0$.

If $f(D) = (D^2 + a^2)\left[\phi_1(D^2) + D\phi_2(D^2)\right]$ and solve :

$\frac{d^2y}{dx^2} - 4y = 2\sin x/2$.

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Seat No.	

B.Sc. I (Semester – II) Examination, 2015
BOTANY (Paper – II) (New CGPA Pattern)
Gymnosperms and Angiosperms, Cell Biology, Genetics and Plant Biotechnology

Day and Date : Tuesday, 17-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***N.B.** : 1) **All** questions are **compulsory**.*
*2) Draw neat and labeled diagram **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

SECTION – I

(Gymnosperms and Angiosperms)

1. Rewrite the following sentences by choosing correct answer from the given alternatives. **5**

   1) Sporne has divided gymnosperms into _____ classes.
      a) two b) three c) four d) five

   2) The naked ovules are found in _____ .
      a) bryophytes b) pterodophyte c) gymnosperms d) angiosperms

   3) In the floral formula 'C' stands for _____ .
      a) calyx b) corolla c) perianth d) androecium

   4) Ocimum shows _____ inflorescence.
      a) capitulum b) verticillaster c) raceme d) spike

   5) Datura metal belongs to family _____.
      a) Amaryllidaceae b) Nyctaginaceae
      c) Solanaceae d) Caeasalpinaceae

2. Answer **any five** of the following. **10**

   i) Write any two salient features of gymnosperms.

   ii) Mention two economic importances of gymnosperms.

iii) Mention any two species you have studied of Cycas.

iv) Write the full form of ICBN.

v) What is mean by epigynous flower ?

vi) Write on siliqua fruit.

vii) Mention any two economic important plant belongs to Annonaceae family.

3. A) Answer **any two** of the following. **10**

i) Write on structure of mature Cycas ovule.

ii) Give the outline of Bentham and Hooker's system of classification.

iii) Write on hypanthodium type of inflorescence.

B) Answer **any one** of the following. **10**

i) Write on the structure of microsporophyll and microspores of Cycas.

ii) Give the distinguishing characters of any two families.

a) Ceasalpinaceae b) convolvulaceae

c) Nyctaginaceae d) solanaceae

SECTION – II

(Cell Biology, Genetics and Plant Biotechnology)

1. Rewrite the following sentences by choosing correct answer from the given alternatives. **5**

1) _____ helps in repair and replacement of dead cells.

a) Meiosis b) Cytokinesis c) Mitosis d) Apoptosis

2) _____ is responsible for photosynthesis.

a) Ribosome b) Mitochondria c) Chloroplast d) ER

3) The BGA _____ is used for the preparation of biofertilizers.

a) *Chara* b) *Nostoc* c) *Spirogyra* d) *Ulothrix*

4) The fluid mosaic model of plasma membrane was proposed by _____.

a) Singer and Nicolson b) Robertson

c) Warburg d) Kreb

5) Mendel conducted several experiments of hybridization on _____ plants.

a) mustard b) bean c) mung d) pea

2. Answer **any five** of the following. **10**

i) Define cytokinesis.

ii) Sketch and label the structure of mitochondrion.

iii) State any two functions of cell wall.

iv) Give any two functions of peroxisomes.

v) What is dihybrid cross ?

vi) Define supplementary genes.

vii) Define biotechnology.

3. A) Answer **any two** of the following. **10**

i) State the difference between prokaryotic and eukaryotic cell.

ii) Discuss the functions of nucleus.

iii) Write in brief about the chemical composition of cell membrane.

B) Answer **any one** of the following. **10**

i) Describe the Mendel's law of independent assortment.

ii) Give the applications of tissue culture in Agriculture.

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Seat No.	

B.Sc. (Part – I) (Semester – II) (New) Examination, 2015
ELECTRONICS (CGPA Pattern) (Paper – II)
Electronic Devices and Digital Electronics

Day and Date : Wednesday, 18-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*
5) ***Two*** *Sections should be written in two* ***separate*** *answer books.*

SECTION – I

(Electronics Devices)

1. Select correct alternative for the following : **5**

i) A pentavalent impurity has _____ valence electrons.
a) 2 b) 3 c) 4 d) 5

ii) A LED is basically a _____ PN junction.
a) heavily doped b) lightly doped
c) forward biased d) reverse biased

iii) In transistor symbol, the direction of arrowhead on emitter shows _____
a) conventional emitter current b) electron movement in emitter
c) reverse bias current d) none of these

iv) A JFET is a _____ controlled device.
a) voltage b) current
c) both voltage and current d) none of these

v) Which of the following acts like a diode and two resistors ?
a) SCR b) TRIAC c) DIAC d) UJT

P.T.O.

2. Answer **any five** of the following : **10**

i) What are majority and minority carriers of P and N type semiconductors ?

ii) Draw symbols of zener diode and LED with labels.

iii) In common base configuration, the collector current is 9 mA and α =0.9. Calculate emitter current.

iv) A transistor has β = 100, how much may be base current to set 20 mA collector current.

v) Draw symbols of N-channel and P-channel JFET with labels.

vi) Define intrinsic standoff ratio of UJT.

vii) Why MOSFET is also called as an insulated gate field effect transistor ?

3. A) Answer **any two** of the following : **10**

i) Write a note on varactor diode.

ii) Explain construction and working of JFET.

iii) Write a note on static and dynamic resistance of a diode.

B) Answer **any one** of the following : **10**

i) Explain input and output characteristics of a transistor in CE configuration.

ii) Explain construction and working of an UJT.

SECTION – II
(Digital Electronics)

1. Select correct alternative for the following : **5**

i) The worst case output voltage of TTL in case of high logic output is _____

a) 2.4V b) 2V c) 0.8V d) 5V

ii) IC 74138 is _____ decoder.

a) 2 : 4 b) 3 : 8 c) 4 : 1 d) 8 : 1

iii) Output of RS flip-flop sets when _____

a) R = S = 0 b) R = S = 1 c) R = 1, S = 0 d) R = 0, S = 1

iv) MOD-5 counter requires _____ flip-flops.

a) 5 b) 1 c) 3 d) 2

v) IC _____ is universal 4-bit shift register.

a) 7490 b) 7495 c) 7400 d) 7402

2. Answer **any five** of the following : **10**

   i) What is fan-in and fan-out in TTL ?

   ii) Draw diagram of 1 : 4 De MUX.

   iii) What is encoder ?

   iv) Give Truth Table of JK Flip-Flop.

   v) What is combination counter ?

   vi) Draw timing diagram for Right shift register with input 1100.

   vii) Compare synchronous and asynchronous counter.

3. A) Answer **any two** of the following : **10**

   i) Explain TTL NAND gate.

   ii) Describe 8 : 1 multiplexer.

   iii) Write a note on clocked RS Flip-flop.

   B) Answer **any one** of the following : **10**

   i) What is serial and parallel loading ? Explain left shift register using IC 7495.

   ii) Describe 4-bit synchronous counter.

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Seat No.	

B.Sc. (Part – I) (Semester – II) (CGPA Pattern) Examination, 2015
PSYCHOLOGY (Paper – II) (New)
General Psychology and Human Development

Day and Date : Wednesday, 18-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Section **I** and Section **II** should be written in the **separate** answer sheet.*
*3) Figures to the **right** indicate **full** marks.*

SECTION – I
(General Psychology)

1. Choose the correct alternative : **5**

i) A _____ holding onto information for some period of time.
A) Storage B) Memory
C) S.M.T. D) Retrieval

ii) The _____ step in the memory system is to get sensory information.
A) First B) Second
C) Sixth D) Fourth

iii) The third stage of memory is _____
A) Sensory B) Short term
C) Long term D) Echoic

iv) Drive reduction theory talk about _____
A) Need B) Self
C) Memory D) Sense

v) The final psychological need proposed by _____ is the need for power.
A) Skinner B) Maslow
C) Freud D) McClelland

P.T.O.

2. Answer the following (**any five**) : **10**

   1) Define memory.

   2) Define motivation.

   3) How many types of memory ?

   4) Who proposed the human beings more basic needs ?

   5) Define emotion.

   6) Who introduce cognitive arousal theory ?

3. Write the short note (**any two**) : **10**

   1) Cannon – Bard Theory

   2) Decay Theory

   3) Ebbinghaus and Forgetting curve.

4. A) Explain the stages of memory. **10**

   OR

   B) Discuss on long term memory.

SECTION – II
(Human Development)

1. Fill in the blanks (multiple choice) : **5**

   1) _____ theory of adult development is the notion of life course.

   a) Levinson b) Likert

   c) Freud d) None of the above

   2) _____ is equally important to Levinson's theory.

   a) Life span b) Life structure

   c) Life style d) Any other

   3) _____ percent of American get married at their lives in early adulthood.

   a) 90 b) 95

   c) 80 d) 75

4) Our each of the five sense undergoes change _____
   a) Early adulthood b) Late adulthood
   c) Middle age d) Childhood

5) _____ intelligence depends on the proper functioning of nervous system.
   a) Flukt b) Crystalized c) Emotion d) Physical

2. Answer **any five** of the following : **10**
   i) Which two dimension of intelligence describe by Horn ?
   ii) Define middle adulthood.
   iii) What are types of marriage ?
   iv) What is approximate age of middle age ?
   v) Give the names of live senses which in late adulthood.
   vi) Define death. What is the four types of death ?

3. Write short notes (**any two**) : **10**
   i) Retirement in late adulthood.
   ii) Erikson's crisists – Intimacy Vs Isolation in young adulthood.
   iii) Sexuality in young adulthood.

4. Answer **any one** of the following : **10**
   A) Describe the marriage and family relation in middle adulthood.

   OR

   B) Explain the mid career crisis in middle adulthood.

_____

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Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
GEOLOGY (Paper – II) (New CGPA Pattern)
Introduction to General Geology and Physical Geology

Day and Date : Wednesday, 18-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *neat diagrams* ***wherever*** *needed.*

SECTION – I
(Introduction to General Geology)

1. Fill in the blanks with correct answer given in the options : **5**

   1) The solar system travels around the centre of the Galaxy and takes _____ Ma to complete one revolution.
   a) 200 b) 300 c) 400 d) 500

   2) _____ is the second planet from the sun.
   a) Mercury b) Venus c) Earth d) Mars

   3) The equatorial diameter of the earth is greater than the polar diameter by a length _____ km.
   a) 54 b) 64 c) 44 d) 34

   4) The mantle has a volume of _____ percent.
   a) 82 b) 92 c) 72 d) 62

   5) _____ waves are called surface waves.
   a) Primary b) Secondary
   c) Tertiary d) Love

2. Answer **any five** of the following : **10**

   i) Constitution of universe
   ii) Revolution of earth
   iii) Seismic waves

P.T.O.

iv) Fumaroles

v) Earthquake belt

vi) Biosphere

vii) Density of earth.

3. A) Write short notes on **any two** of the following : **10**

i) Explain planetesimal hypothesis.

ii) 1st and 2nd order relief features.

iii) Types of volcanoes and their characteristics.

B) Answer **any one** of the following : **10**

i) Describe Internal structure of the earth and explain use of seismic waves in understanding the internal structure of the earth.

ii) Origin of universe.

SECTION – II
(Introduction to Physical Geology)

1. Fill in the blanks with correct answer from the given options : **5**

1) The soil type developed in an area depends on the _____

a) climate b) parent rock

c) topography d) all of these

2) The common features of deserts are _____

a) River flood plains b) Structural plains

c) Playas d) All of these

3) The highest point of a river is called _____

a) Intermittent b) Load

c) Head d) Mouth

4) _____ are formed where a glacier flows from the mountains into the sea.

a) Fjords b) Cirques

c) Grooves d) Col

5) _____ are carved at the base of a sea cliff by wave action.

a) Stacks b) headlands

c) Terrace d) Sea caves

2. Answer **any five** of the following : **10**

   i) Playas

   ii) Ventifacts

   iii) Erratics

   iv) Outwash Plains

   v) Wave-built terrace

   vi) Natural levees

   vii) Waterfalls.

3. A) Write notes on **any two** of the following : **10**

   i) Explain depositional features of stream-point bar and delta.

   ii) Explain movement of sea water – tides and Tsunamis.

   iii) Explain types and movement of glaciers.

   B) Answer **any one** of the following : **10**

   i) Explain mechanical and chemical weathering.

   ii) Explain erosion by wind – hollows, yardangs and pedestal rocks.

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Seat No.	

B.Sc. I (Semester – II) (New CGPA Pattern) Examination, 2015
MICROBIOLOGY (Paper – II)
Microbial Physiology and Applied Microbiology – I

Day and Date : Wednesday, 18-11-2015 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : i) **All** questions are **compulsory**.*

*ii) Answers to the **two** Sections to be written on separate answer sheets.*

*iii) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Rewrite the following sentences by selecting correct answers from the given alternatives. **5**

i) Net gain of EMP pathway is _____ ATP molecules.

a) 18 b) 2 c) 6 d) 14

ii) Neutral read indicator is used in _____ medium.

a) Starch agar b) Milk agar

c) Blood agar d) MacConkey's agar

iii) Lactose is an example of

a) Monosaccharide b) Disaccharide

c) Polysaccharide d) Trisaccharide

iv) _____ is the nonprotein low molecular weight inorganic compound which helps in enzyme action.

a) Coenzyme b) Prosthetic group

c) Apoenzyme d) Cofactor

v) Microorganisms are biologically young and physiologically active in _____ phase of growth.

a) Lag b) Log c) Stationary d) Death

2. Answer **any five** of the following. **10**
   i) Define cofactor.
   ii) Explain role of agar agar in culture media.
   iii) Define oligosaccharide.
   iv) Define anabolism.
   v) Explain chemoheterotrophs.
   vi) Define growth.
   vii) Structure of ATP.

3. A) Write short notes on **any two** of the following. **10**
      i) Explain Polysaccharide.
      ii) Extracellular and intracellular enzymes with example.
      iii) Explain types of Lipids.

   B) Answer **any one** of the following. **10**
      i) Write an essay on EMP pathway.
      ii) Give an account of classification of bacteria on the basis of C and energy.

SECTION – II

1. Rewrite the following sentences by selecting correct answers from the given alternatives. **5**
   i) _____ is an indicator of fecal pollution.
      a) Bacillus b) S.aureas c) E.coli d) Shigella
   ii) Liquid impingement method is used for microbial examination of
      a) Water b) Air c) Milk d) Sewage
   iii) _____ is main sugar present in milk
      a) Glucose b) Maltose c) Lactose d) Sucrose
   iv) _____ is an example of water borne disease.
      a) Gastero b) TB c) AIDS d) Rabies
   v) Kovac's reagent is used in _____ test.
      a) Methyl Red b) Citrate Utilization
      c) Voges Proskauer d) Indole

2. Answer **any five** of the following. **10**

i) Define Fomites.

ii) What is composition of milk ?

iii) Define droplet nucleis.

iv) What is fecal pollution of water ?

v) Define pathogen.

vi) Define Epidemic diseases.

vii) What is etiology ?

3. A) Write short notes on **any two** of the following. **10**

i) Modes of transmission of diseases.

ii) IMViC test.

iii) Sources of microorganisms in milk.

B) Answer **any one** of the following. **10**

i) Describe in detail purification of municipal water supply.

ii) Describe in detail microbiological examination of air.

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Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
ENGLISH (Compulsory) (Old)
On Track : English Skills for Success

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Fill in the blanks by choosing correct alternative : **10**

1) _____ had become a cult figure in America after creating the Saturn rocket in the Apollo Mission.
   a) Dr. Abdul Kalam b) Verner von Braun
   c) Vikram Sarabhai d) Dr. Brahm Prakash

2) On which day was the first session of the Parliament of Religions scheduled to begin ?
   a) On May 31, 1893 b) On September 11, 1893
   c) On September 21, 1894 d) On May 31, 1894

3) _____ was launched in May 1961.
   a) Anti-Slavery society
   b) UNO
   c) Amnesty International
   d) UN Declaration against torture and degrading treatment

4) In the poem 'Brahma' the poet presents the essence of the _____
   a) Philosophy of Socrates b) Hindu Philosophy
   c) Christian Philosophy d) Jain Philosophy

5) The vanished Gods to me appear ; And one to me are _____.
   a) shadow and sunlight b) far and forgot
   c) doubter and doubt d) shame and fame

P.T.O.

6) Who is the 'Goddess' in the poem 'Full Moon' ?
   a) Moon b) Laxmi
   c) Menaka d) Saraswati

7) They have the _____ jackets.
   a) mens b) mens'
   c) men's d) man's

8) Who won the race ? The _____ or the tortoise ? Tie up your _____. It is falling over your eyes.
   a) hair, hare b) hare, hair
   c) hear, hare d) here, hair

9) The antonym of diffident is _____.
   a) competent b) confident
   c) difficult d) tolerant

10) Rakesh is the _____ singer in the class.
   a) better b) best
   c) good d) more good

2. Answer **any five** of the following questions in brief : **10**
   1) What advice did Verner von Braun give to Dr. Kalam ?
   2) Who was Verner von Braun and what was his contribution to science and to the world ?
   3) Which type of progress struck Vivekananda on his arrival in the west ?
   4) What is the essence of Vivekananda's speech at the Parliament of Religions ?
   5) What are the signs of hope for a better world that Palkhivala sees ?
   6) What do you mean by 'human rights' ?

3. A) Answer **any two** of the following questions in brief : **6**
   1) What is the message of the poem 'Brahma' ?
   2) What is the central theme of the poem 'Full Moon' ?
   3) Explain any two images in the poem 'Brahma'.

B) Answer **any two** of the following in brief : **4**

1) As Sam Thomas, Secretary of the Press Club of India, write a notice informing the Club's members about its annual meeting scheduled to be held in No. 3, Barakhamba Road, New Delhi, on 6 December 2014 from 10 a.m. to 1 p.m. Also invite the members to lunch in the Club's reception hall.

2) Prepare an agenda for the above mentioned meeting.

3) Suppose the above mentioned meeting was held as per the schedule. You are the secretary of the club. Prepare the minutes of the same meeting.

4. Answer **one** of the following questions : **10**

1) You are the secretary of the Bharat Sports Club in your town. The meeting of the office bearers of the club is scheduled for the 15th of next month. Prepare an agenda for the meeting and then draft the minutes of the meeting.

2) You are Prerana Pai living at 24, Marigold Apartment, Indira Nagar, Bengaluru and you have just received a letter of appointment as Assistant Executive in the accounts department of Samtron Industries, 124, Shubham Complex, M.G. Road, Bengaluru. Write an email to inform your confirmation to join the same company within given time.

5. You wish to apply for the post of an Executive Human Resource Manager in Infosys Company. Prepare a CV for the said post. **10**

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Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
CHEMISTRY (Paper – III)
Organic Chemistry

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** diagram and give equations **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Choose the most correct alternative for each of the following : **10**

i) The stability of carbocation is affected by _____
   a) Inductive effect b) Hyperconjugation effect
   c) Resonance effect d) All of these

ii) Resonance is represented by inserting the _____ arrow between each pair of resonating structures.
   a) Fish hook b) Curved
   c) Double headed d) None of these

iii) Which of the following compound show cis-trans isomerism ?
   a) But-1-ene b) Propene
   c) But-2-ene d) Pent-1-ene

iv) Mesotartaric acid is _____
   a) Optically active b) Optically inactive
   c) Racemic mixture d) Geometrical isomer

v) Which of the following compound can not be prepared by Wurtz reaction ?
   a) Ethane b) Methane
   c) Propane d) Butane

P.T.O.

vi) _____ is nonbenzenoid aromatic compound.

a) Naphthalene b) Benzene

c) Pyridine d) Phenol

vii) In sulphonation of benzene, the electrophile is _____

a) HSO_3^- b) SO_3

c) SO_2 d) H_2SO_4

viii) Baeyer's reagent is _____ solution.

a) Acidic $KMnO_4$ b) alk. $KMnO_4$

c) Neutral $KMnO_4$ d) aq. Br_2

ix) The general formula of diene is _____

a) C_nH_{2n-2} b) C_nH_{2n+2}

c) C_nH_{2n} d) None of these

x) The compound having both sp^3 and sp^2 hybridised carbon atom is _____

a) Propene b) Acetylene

c) Ethylene d) Propanol

2. Answer **any five** of the following : **10**

i) What is heterolytic bond fission ? Give one example.

ii) Define :

a) Chiral centre

b) Racemic mixture.

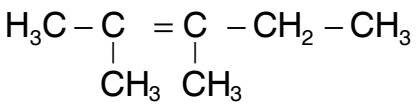
iii) Write the structures of following :

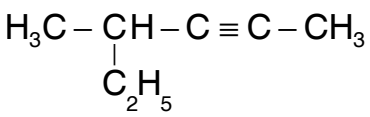
a) Cyclohexane

b) Cyclobutane.

iv) Define anti-aromatic compound with suitable example.

v) Write IUPAC names for the following :

a) 

b) 

vi) Define :

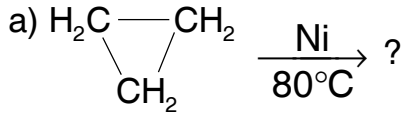
a) Bond energy

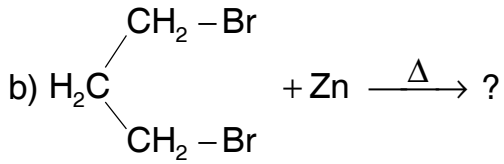
b) Bond length.

3. A) Answer **any two** of the following : **6**

i) Explain addition reaction with suitable example.

ii) Complete the following reactions :

a) 

b) 

c) $C_2H_5 - Br + C_2H_5Br + 2Na \xrightarrow[\Delta]{\text{Dry ether}} ?$

iii) Explain hyperconjugation effect with respect to toluene.

B) Give an account of isomerism exhibited by Lactic acid. **4**

4. Answer **any two** of the following : **10**

i) What is nitration ? Explain the mechanism involved in nitration of benzene.

ii) What is dehydration ? Explain the mechanism involved in the dehydration of lower alcohols.

iii) What is hybridization ? Explain the SP hybridization with respect to acetylene.

5. Answer **any two** of the following : **10**

i) What are reactive intermediates ? Discuss carbene and nitrene intermediate with suitable examples.

ii) Illustrate the term enantiomers and distereoisomers with suitable examples.

iii) Predict the products for the following :

a) $HC \equiv CH + H_2O \xrightarrow[\Delta]{HgSO_4/H_2SO_4} ?$

b) $HC \equiv CH + 2\,Cl_2 \xrightarrow{CCl_4} ?$

c) $H_3C - CH = CH_2 + HOBr \xrightarrow[\text{addition}]{\text{Markownikoff's}} ?$

d) $H_3C - CH = CH_2 \xrightarrow{C_6H_5-\overset{\overset{O}{\|}}{C}-O-OH} ?$

e) $n.H_2C = CH_2 \xrightarrow[O_2,\ \Delta/\text{Pressure}]{\text{Polymerization}} ?$

SLR-Z – 29

Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
COMPUTER SCIENCE (Paper – III) (Old)
Computer Fundamentals – II

Day and Date : Friday, 6-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

1. Choose the correct alternative : **10**

1) The extension of the excel file is _____
   a) .doc b) .txt c) .xls d) .bat

2) _____ tag starts text from a new line skipping one line in between.
   a) \t b) <title> c) <p> d) \n

3) Communication takes place between objects called _____
   a) Item b) Computer c) Entities d) None of these

4) Every program is assigned a fixed period of time is called _____
   a) Required time b) Time stamp c) Time slice d) None of these

5) HTML tags define _____
   a) The data types of elements of document
   b) The contents of the document
   c) Presentation of specified elements of document
   d) The structure of the document

6) The icons appearing in the control panel depend upon the hardware and software _____ in the computer.
   a) Copied b) Delete c) Pasted d) Installed

7) The program is divided into independent stream of execution called _____
   a) Threads b) Task
   c) Multitasking d) None of these

P.T.O.

8) MAN stands for _____
   a) Meta Data Network b) Main Area Network
   c) Metropolitan Area Network d) None of these

9) _____ is a menu which is displayed by right clicking the mouse.
   a) Programs b) Cascade c) Pull down d) Short cut

10) To undo the changes made in file _____ short cut key is used.
   a) Ctrl + o b) Ctrl + s c) Ctrl + z d) Ctrl + v

2. Answer **any five** of the following : **10**

1) Define tags in HTML.

2) Explain the term Clipboard.

3) Define Icon, Desktop.

4) List the names of some Network Operating System.

5) Define Modem.

6) List out the elements of Windows.

3. A) Answer **any two** of the following : **6**

1) Define the term Topology.

2) Write note on 'Program Manager'.

3) Write note on Time Sharing.

B) Explain any four functions in MS-Excel with example. **4**

4. Answer **any two** of the following : **10**

1) What is multiprocessing ? Explain with diagram.

2) What are the goals of a network in brief.

3) Write short note on WordPad.

5. Answer **any two** of the following : **10**

1) What is an HTML ? Explain its structure with suitable example.

2) Advantages of Javascript.

3) Explain the terms MAN and WAN.

_____

SLR-Z – 30

Seat No.	

B.Sc. I (Semester – II) (Old) Examination, 2015
CHEMISTRY (Paper – IV)
Analytical Chemistry

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *and labelled diagrams.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) ***Use*** *of logarithmic tables and scientific calculator is* ***allowed****.*
*(****At.Wts*** *: H = 1, C = 12, O = 16, N = 14, Na = 23, Cl = 35.5)*

1. Choose the most correct alternative from **each** of the following : **10**

i) Measurement of viscosity by Ostwald's method is
   a) a absolute method b) a relative method
   c) both (a) and (b) d) none of these

ii) Parachor means molecular volume of liquid when its surface tension is
   a) zero b) infinite c) unity d) two

iii) The distribution coefficient, $K = C_1/C_2$ indicates that the solute undergoes
   a) neither association nor dissociation
   b) association
   c) dissociation
   d) none of these

iv) Generally, sulphide ores are subjected to _____ process.
   a) calcination b) roasting c) electrolysis d) physical

v) Smoke is _____ air pollutant.
   a) aerosols b) organic gases
   c) inorganic d) particulate

P.T.O.

vi) Carbon and hydrogen are estimated by

a) Kjeldahl's method b) Carius method

c) Liebig's method d) None of these

vii) In combustion method, an organic compound is heated with

a) $FeSO_4$ b) $CuSO_4$ c) Na d) CUO

viii) The pH of drinking water according to ISI standard is

a) 6.0 – 9.0 b) 5.0 c) 9.0 – 12.0 d) 7.0

ix) Aluminium hydroxide get reacts with gastric acid to form

a) potassium chloride b) aluminium chloride

c) ferric chloride d) sodium chloride

x) Out of all the water on earth, the percentage of fresh water is

a) 1.0 – 2.0 b) 2.5 – 2.75 c) 0.1 – 0.3 d) 0.5 – 0.8

2. Answer **any five** of the following : **10**

i) What is additive and constitutive property ?

ii) What is oxide ore ? Give its examples.

iii) Draw a neat and labelled diagram of magnetic separation of ores.

iv) Mention the types of pollution.

v) What is qualitative and quantitative analysis of element ?

vi) What is hard and soft water ?

3. A) Answer **any two** of the following : **6**

i) Explain the term parachor.

ii) What are the limitations of Nernst's distribution law ?

iii) Give the characteristics of an ideal antacid.

B) Distinguish between CO and CO_2. **4**

4. Answer **any two** of the following : **10**

   i) Describe Kjeldahl's method for the estimation of nitrogen in an organic compound.

   ii) What is adulteration of milk ? Give the chemical test for detection of
      i) Urea
      ii) Sugar
      iii) Starch in the milk.

   iii) Acetic acid has its normal molecular weight in water. In the distribution of the acid between water and CCl_4, the concentrations in the aqueous and CCl_4 layer were as follows :

CH_2O (mol./lit.)	10.80	7.96	5.01
CCl_4 (mol./lit.)	1.325	0.729	0.290

   Calculate the mol. wt. of acetic acid in CCl_4.

5. Answer **any two** of the following : **10**

   i) Define coefficient of viscosity. How it is determined by Ostwald's method ?

   ii) Discuss the chemical methods used for concentration of metal in ore.

   iii) The quantitative analysis of an organic compound gave the following results :

   C = 9.98%, H = 0.84% and Cl = 89.18%. Calculate its empirical formula.

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SLR-Z – 31

Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
COMPUTER SCIENCE
Paper – IV : Programming Using 'C' – II (Old)

Day and Date : Saturday, 7-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *place indicate* ***full*** *marks.*

1. Choose correct alternatives : **10**

1) By default 'C' function returns _____ type value.
   a) char b) int c) void d) none of these

2) Size of structure variable is
   a) Total number of structure members
   b) Sum of size of members
   c) Both a and b
   d) None of these

3) _____ function is used to release allocated memory.
   a) release () b) delete () c) realloc () d) free ()

4) Function is _____ type data type.
   a) basic b) user defined c) derived d) none of above

5) Function can return _____ values at a time.
   a) 1 b) 2 c) 3 d) 4

6) Pointers allow C to supports dynamic memory management.
   a) true b) false

7) A variable declared outside the all functions is called local variable
   a) true b) false

P.T.O.

8) _____ function is used to give the current position in file.
   a) gotoxy ( ) b) ftell ( ) c) fseek ( ) d) rewind ( )

9) A _____ variable contains the address of another variable.
   a) value b) pointer c) structure d) none of these

10) Structure is collection of similar data elements only.
   a) true b) false

2. Answer **any five** of the following : **10**

   1) What is pass by value ?

   2) Write a note on union.

   3) What is use of putche () and getche () ?

   4) What is auto storage class ?

   5) What is use of typedef ?

   6) Define formal and actual parameters.

3. A) Answer **any two** of the following : **6**

      1) Explain nested structure.

      2) Explain function prototypes.

      3) What is sizeof () ? How it work ?

   B) Write a program for demonstrates function with return value. **4**

4. Answer **any two** of the following : **10**

   1) Explain union with example.

   2) List and explain different types of function.

   3) Write a program which display content of file.

5. Answer **any two** of the following : **10**

   1) Explain call by pointer parameter passing mechanism with example.

   2) Write a program calculate factorial of given number by using function.

   3) Explain how array can pass to function.

SLR-Z – 32

Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
PHYSICS (Paper – III) (Old)
Heat and Thermodynamics

Day and Date : Monday, 16-11-2015 Total Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***Compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
4) ***Use*** *of logarithmic table is* ***allowed****.*

1. Select correct alternative : **10**

i) Clausius expression for mean free path is

a) $\lambda = \frac{3}{4\pi 6^2 n}$ b) $\lambda = \frac{1}{\sqrt{2}\pi 6^2 n}$ c) $\lambda = \frac{1}{\pi 6^2 n}$ d) $\lambda = \frac{4}{3\pi 6^2 n}$

ii) Adiabatic demagnetization method is used to produce a very low temperature by using _____ salt.

a) Diamagnetic b) Ferromagnetic

c) Paramagnetic d) Ferrimagnetic

iii) Efficiency of heat engine is never

a) Less than one b) Greater than one

c) Equal to one d) All of the above

iv) coefficient of viscosity of any gas is

a) Independent of temperature

b) Increases with temperature

c) Decreases with increase in temperature

d) None of the above

P.T.O.

v) Flow of heat energy from hot body to cold body is related with

a) First law of thermodynamics

b) Second law of thermodynamics

c) Third law of thermodynamics

d) Zeroth law of thermodynamics

vi) The temperature at which Joule-Thomson reverses its sign is called

a) Critical temperature b) Absolute temperature

c) Inversion temperature d) Negative temperature

vii) In isothermal process; entropy

a) Remains constant b) Decreases

c) Increases d) None of the above

viii) Coefficient of performance of refrigerator working between temperatures 5°C and 25°C is

a) 12.5 b) 13.9 c) 14.75 d) 16.20

ix) As compared to otto engine, efficiency of diesel engine is

a) Less b) More c) Equal d) All of the above

x) The method of obtaining artificially the pleasant climatic conditions in the desired space is called

a) Air cooling b) Air conditioning

c) Air heating d) None of the above

2. Answer **any five** of the following : **10**

i) Define coefficient of viscosity of a gas.

ii) What is meant by liquefaction of gases ?

iii) What is thermal equilibrium ?

iv) Define coefficient of performance of a refrigerator.

v) State the first law of thermodynamics.

vi) Give the difference between otto engine and diesel engine.

3. A) Answer **any two** of the following : **6**

   i) Explain the principle of air conditioning.

   ii) Obtain an expression for work done during isothermal change.

   iii) In case of heat engine; efficiency is always less than one. Explain.

   B) Calculate the mean free path of hydrogen gas molecule of N.T.P if diameter of a gas molecule is 2.5×10^{-8} cm and molecular density is $n = 2.7 \lambda 10^{19}$. **4**

4. Answer **any two** of the following : **10**

   i) Describe the working of vapour compression refrigerator.

   ii) Describe the method of cooling by adiabatic demagnetization.

   iii) Obtain Clausius expression for mean free path.

5. Answer **any one** of the following : **10**

   i) Describe the working of diesel engine and obtain an expression for its efficiency.

   ii) Define entropy. Give its physical significance.Explain the change of entropy during natural processes.

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Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
PHYSICAL GEOGRAPHY (Old) (Paper – III)
Geomorphology

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw neat diagrams **wherever** necessary.*
*3) **Use** of stencils is **allowed**.*
*4) Figures to the **right** indicate **full** marks.*

1. Select the proper answer from the given below and rewrite the sentences : **10**

1) The 'Geographical cycle of Erosion' is a concept put forth by _____
   a) W. M. Davis b) L. C. King c) A. Penek d) A. Gilbert

2) There is a _____ change in the landforms.
   a) Abrupt b) Rapid c) Slow d) Sequential

3) _____ is a plain formed by wind deposition.
   a) Alluvial plain b) Loess c) Coastal plain d) Peneplain

4) The fertility of soil depends upon the content of _____ in the soil.
   a) Humus b) Water c) Air d) Gravel

5) Hydration is one of the process of _____ weathering.
   a) Physical b) Chemical c) Mechanical d) Biotic

6) _____ rocks are known as parent rocks.
   a) Conglomerate b) Basalt c) Marble d) Graphite

7) Meanders are typical landforms related to _____ work.
   a) River b) Glacier
   c) Oceanic waves d) Underground water

8) Human settlement are compact in nature in _____ areas.
   a) Mountain b) Forest c) Plains d) Wet land

P.T.O.

9) _____ soils supports to low density of population.
   a) Permafrost b) Alluvial c) Fertile d) Black regur

10) _____ of river is important for waterways navigation.
   a) Mouth b) Waterfall c) Cascade d) Rapids

2. Write in short **(any five)** : **10**
   1) What is mean by deposition ?
   2) Draw a neat diagram of waterfall.
   3) Define weathering.
   4) Define 'Cycle of Erosion'.
   5) State any two landforms related to erosional work of wind.
   6) State 'Loess plain'.
   7) Importance of phosphorus in soil.

3. A) Write a brief answer **(any two)** : **6**
      1) State textural classification of soils.
      2) Draw a diagram of Gorges.
      3) Describe the sand dunes.

   B) What is weathering ? State its types with good examples. **4**

4. Write short answer **(any two)** : **10**
   1) Describe the erosional landforms formed by wind.
   2) Give the classification of soils in detail.
   3) Distinguish in between physical weathering and chemical weathering.

5. Write short answer **(any two)** : **10**
   1) Write in brief the theory of 'cycle of erosion'.
   2) State the impact of geomorphology on agriculture.
   3) Describe the deposition features made by river.

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SLR-Z – 34

Seat No.	

B.Sc. (Part – I) (Semester – II) (Old) Examination, 2015
PHYSICS
Paper – IV : Electricity, Magnetism and Basic Electronics

Day and Date : Tuesday, 17-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct answer from the given alternatives : **10**

i) An iron core is used in Ballistic Galvanometer (B.G.) to _____

a) Increase the sensitivity of galvanometer
b) Decrease the sensitivity of galvanometer
c) Keep the sensitivity of galvanometer charging
d) Decrease current through the galvanometer

ii) The time period of oscillations of a Ballistic Galvanometer is given by formula _____

a) $T = 2\pi I_0 K$ b) $T = 4\pi^2 I_0^2 K^2$

c) $T = \sqrt{\frac{2\pi I_0}{K}}$ d) $T = 2\pi\sqrt{\frac{I_0}{K}}$

iii) The time constant (T) of LC circuit is _____

a) L + C b) $2\pi\sqrt{LC}$

c) L – C d) $2\pi LC$

iv) The time constant of LR circuit is _____

a) $\frac{L}{R}$ b) LR

c) $\frac{R}{L}$ d) L + R

P.T.O.

v) Multiplication of a vector by the operator j rotates the vector through _____ in anticlockwise direction.

a) 360° b) 180°

c) 90° d) 45°

vi) The quality factor of parallel resonance circuit is _____

a) $Q = w_o LR^2$ b) $Q = w_o L^2 R$

c) $Q = w_o L$ d) $Q = \frac{w_o L}{R}$

vii) The _____ of a transistor is heavily doped.

a) Collector b) Emitter

c) Base d) Emitter and base

viii) When both junctions of a transistor are forward biased, the transistor operates in _____ region.

a) Saturation b) Active

c) Cut off d) Forbidden

ix) The junction barrier potential difference for a germanium diode is of the order of _____

a) 1.7 V b) 1 V

c) 0.7 V d) 0.3 V

x) An ideal forward biased diode offers _____ resistance.

a) Infinite b) Zero

c) Moderate d) Maximum

2. Solve **any five** of the following : **10**

i) Define figure of merit and current sensitivity of ballistic galvanometer

ii) What is transient current ? How is it different from direct current ?

iii) State any two applications of a.c. bridges. Find the magnitude of complex impedance (3 + 4j).

iv) What is a transistor ? Draw circuit symbol of p-n-p transistor.

v) Draw circuit diagram of common emitter transistor amplifier.

vi) Draw circuit diagram of bridge rectifier.

3. A) Solve **any two** of the following : **6**
   i) Discuss damping in ballistic galvanometer.
   ii) Discuss the growth of charge in R-C circuit.
   iii) Write a note on π-Filter.

   B) In a series L – C – R circuit L = 25 μF and C = 100 μF . What is the frequency of a.c. source so that circuit resonates ? **4**

4. Answer **any two** of the following : **10**
   i) Derive an expression for charge flowing through the coil of ballistic galvanometer.
   ii) Derive an expression for the growth of current in L–R circuit.
   iii) Discuss parallel resonance circuit. Show that at resonance impedance is maximum.

5. Answer **any one** of the following : **10**
   i) With a circuit diagram, describe input and output characteristics of transistor in common emitter mode.

      Derive relation between α and β.
   ii) Explain breakdown mechanism in zener diode. Describe with neat circuit diagram working of zener diode as a voltage regulator.

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Seat No.	

B.Sc. I (Semester – II) Examination, 2015
PHYSICAL GEOGRAPHY
Oceanography (Paper – IV) (Old)

Day and Date : Tuesday, 17-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions carry* ***equal*** *marks.*
2) ***All*** *questions are* ***compulsory****.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Use*** *of stencils is* ***allowed****.*

1. Choose the correct alternative and rewrite : **10**

1) Oceanography is a branch of _____ geography.
a) Agricultural b) Physical c) Economic d) Human

2) North pole is surrounded by _____ ocean.
a) Artic b) Indian c) Atlantic d) Pacific

3) The general movement of a mass of oceanic water in a definite direction is called as ocean
a) tide b) wave c) current d) stream

4) Sodium chloride dominates the salinity of _____ water.
a) river b) tank c) lake d) ocean

5) Glacial control theory of coral formation was propounded by
a) Daly b) Murry c) W.M. Davis d) Drawin-Dana

6) The deepest part of the pacific ocean is called as
a) Kurile Trench b) Mariana Trench
c) Philippines Trench d) Tonga Trench

7) The average salinity of oceanic water is _____ %.
a) 15 b) 25 c) 35 d) 45

P.T.O.

8) The tropical cyclones of Western pacific ocean are called as
   a) Typhoon b) Cyclone c) Depression d) Hurricane

9) The annual average surface temperature of the ocean water gradually _____ from equator to poles.
   a) decreases b) increases c) never changes d) remains constant

10) The linear position of earth and moon is responsible for _____ tides.
   a) seasonal b) diurnal c) spring d) neap

2. Answers **any five** questions of the following : **10**
   1) What is 'tide' ?
   2) Define oceanography.
   3) Name the oceans in the world.
   4) Define the term 'Coast'.
   5) What is 'Continental slope' ?
   6) Give names of any two ocean currents.

3. A) Answer **any two** questions : **6**
      1) Nature of oceanography.
      2) Describe the salinity of Indian ocean.
      3) Explain the Kurile current.
   B) Draw a neat diagram of the ocean floor. **4**

4. Answer **any two** questions : **10**
   1) Describe the ocean currents in South pacific ocean.
   2) Explain the subsidence theory of coral formation.
   3) Write in brief the importance of oceanography.

5. Answer **any two** questions from the following : **10**
   1) Describe the factors affecting on the distribution of oceanic temperature.
   2) What is meant by ocean deposits ? State its types.
   3) State the economic importance of the coasts.

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SLR-Z – 36

Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
STATISTICS (Paper – III)
Descriptive Statistics – II

Day and Date : Wednesday, 18-11-2015 Total Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figure to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct answer : **10**

i) If r (X, Y) = 0.9, then r (2X + 1, Y + 3) is _____

a) 0.9 b) – 0.9 c) 1.9 d) – 1.9

ii) Correlation coefficient is independent of change of _____

a) Origin b) Scale

c) Both origin and scale d) None of these

iii) The limits of rank correlation is _____

a) 0 to 1 b) 0 to ∞ c) –1 to +1 d) None of these

iv) If $r = \pm 1$, then two regression lines are _____

a) Coincident b) Parallel

c) Perpendicular to each other d) None of these

v) If $\sigma_x = \sigma_y$ and $r = \sqrt{2} - 1$, then acute angle between two regression lines is

a) $\frac{\pi}{2}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{6}$

vi) The two regression lines of regression intersect at _____

a) $(-\overline{X}, \overline{Y})$ b) $(\overline{X}, -\overline{Y})$ c) $(-\overline{X}, -\overline{Y})$ d) $(\overline{X}, \overline{Y})$

P.T.O.

vii) The total number of class frequencies of three attributes is

a) 3 b) 9 c) 27 d) 12

viii) The attributes A and B are independent, the coefficient of association (Q) is

a) $Q = 0$ b) $Q < 1$ c) $Q > 1$ d) $Q = 1$

ix) The total number of classes of attributes of all orders is

a) 2^n b) 3^n c) 3^{n+1} d) None of these

x) The best average in the construction of index number is

a) A.M. b) G.M. c) H.M. d) None of these

2. Answer **any five** of the following : **10**

1) Define a fundamental set of class frequencies with illustration.

2) Define the two regression coefficients.

3) With usual notation prove that $b_{yx} + b_{xy} \geq 2r$.

4) Define Fisher's price and quantity index number.

5) Describe Scatter diagram.

6) Define Karl Pearson's coefficient of correlation. State its limits.

3. A) Answer **any two** of the following : **6**

1) If two attributes A and B are independent then show that α and β are independent.

2) Interpret the following cases :

a) $r = +1$

b) $r = -1$

c) $r = 0$.

3) Explain the weighted aggregate method of calculating index number.

B) Show that the regression coefficients are independent of change of origin but not the scale. **4**

4. Answer **any two** of the following : **10**

   1) What do you mean by consistency of data ? Find the conditions of consistency of data related to two attributes A and B.

   2) State the equations of lines regression of Y on X and X on Y. Explain why we have two lines of regression.

   3) Show that the coefficient of correlation is independent of change of origin and scale.

5. Answer **any two** of the following : **10**

   1) With usual notation, prove that $R = 1 - \frac{6\sum d_i^2}{n^3 - n}$.

   2) What is time reversal test of consistency ? Verify the same for Paasche's index number.

   3) Obtain the relation between coefficient of association (Q) and coefficient of colligation (Y). Deduce that $|Q| > |Y|$.

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SLR-Z – 37

Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
ZOOLOGY (Paper – III)
(Animal Diversity – II)

Day and Date : Wednesday, 18-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Select appropriate answer for **each** of the following and complete the sentence : **10**

1) Age of fish can be calculated by counting lines of growth in _____ scales.
a) Cycloid b) Placoid c) Rhomboid d) Ganoid

2) Petromyzon belongs to _____
a) Cephalochordata b) Pisces c) Cyclostomata d) Hemi Chordata

3) Circular and suctorial mouth is distinguishing character of _____
a) Hemichordata b) Cephalochordata
c) Urochordata d) Cyclostomata

4) Ventricles of olfactory lobe of frog is called _____
a) Rhinocoel b) Optocoel c) Mylocoel d) Metacoel

5) Frog belongs to order _____
a) Urodela b) Anura c) Apoda d) Cyclostomata

6) Vocal sacs are present in _____ frog.
a) Sterile b) Female
c) Male d) Both male and female

7) _____ cells are involved in blood clotting.
a) Thrombocytes b) Eosinophil c) Erythrocytes d) Leucocytes

8) There are _____ pairs of cranial nerve in frog.
a) Nine b) Ten c) Twelve d) Eleven

P.T.O.

9) Ventricles of brain are filled with fluid known as _____
   a) Jelly
   b) Pericardial fluid
   c) Cerebrospinal fluid
   d) Mucous

10) Bony fishes are also known as _____
   a) Elasmobranch
   b) Osteichthyes
   c) Chondrichthyes
   d) Cartilaginous fish

2. Answer **any five** of the following : **10**
   i) General characters of Pisces.
   ii) Egg of frog.
   iii) Homocercal tail fin.
   iv) Sexual dimorphism in frog.
   v) Definition of neoteny.
   vi) Functions of gastric juice.

3. A) Answer **any two** of the following : **6**
      i) Enlist the parts of brain of frog and give their functions.
      ii) Structure of uriniferous tubule of frog
      iii) Cycloid scale.
   B) Describe structure of heart of frog. **4**

4. Answer **any two** of the following : **10**
   i) Describe the female reproductive system of frog.
   ii) Describe lung respiration in frog.
   iii) Describe parental care in amphibia with suitable example.

5. Answer **any one** of the following : **10**
   i) Describe the digestive system of frog.
   ii) Describe gastrulation and formation of three germ layers in frog.

_____

SLR-Z – 38

Seat No.	

B.Sc. I (Semester – II) (Old) Examination, 2015
STATISTICS (Paper – IV)
Probability and Probability Distributions – II

Day and Date : Thursday, 19-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***Each*** *question is* ***compulsory****.*
2) ***Each*** *question carries* ***equal*** *marks.*

1. Choose the correct alternative : **10**

1) Let X be a discrete r.v. with mean 5 then E (2x) is

a) 2 b) 5 c) 50 d) 10

2) Let (X, Y) is a bivariate r.v. with joint pmf $P(x, y) = \frac{2x + y}{6}$ $\begin{matrix} x = 0, 1 \\ y = 0, 1 \end{matrix}$ then P (Y = 0).

a) 0 b) $\frac{1}{6}$ c) $\frac{2}{6}$ d) $\frac{3}{6}$

3) For binomial distribution with n = 10 and P = 0.4, mean is

a) 10 b) 4 c) 40 d) 24

4) Let (X, Y) be independent bivariate r.v. then

a) E (XY) = E(X).E(Y) b) P (x, y) = P(x). P(y)

c) P_{X+Y} (s) = P_x (s).P_y (s) d) All of the above

5) pgf has effect of change of

a) origin b) scale

c) both origin and scale d) none of these

6) _____ moment is always zero.

a) First raw b) First central

c) First factorial d) None of these

P.T.O.

7) If (X, Y) are independent r.v. then cov (X, Y) is

a) 0 b) 1

c) V(X).V(Y) d) None of these

8) A dice is thrown then the number on the dice will follow

a) Binomial distribution b) Uniform distribution

c) Hypergeometric distribution d) None of these

9) If X has hypergeometric distribution then it has _____ parameters.

a) 1 b) 2 c) 3 d) 4

10) Variance of one point distribution is

a) Constant b) 1 c) 0 d) None of these

2. Attempt **any two** of the following : **10**

1) A r.v. X has following probability distribution. Obtain E(X)

X	1	2	3
p(x)	0.2	0.4	0.4

2) Define probability generating function of X.

3) Prove that if (X, Y) are independent then conditional distribution of X given $Y = y_j$ is same as marginal distribution of X.

4) Prove that mean of Binomial distribution is always greater than variance.

5) State multiplication theorem of expectation.

6) State two real life situations where Bernoulli distribution can be used.

3. A) Attempt **any two** from the following : **6**

1) A r.v. X has pgf $P_x(s) = \frac{1}{4} + \frac{1}{2}s + \frac{1}{4}s^2$ then find its mean.

2) Obtain recurrence relation for probabilities of binomial distribution.

3) Define one point distribution and obtain its mean.

B) Define discrete uniform distribution and obtain its mean. **4**

4. Attempt **any two** of the following : **10**

   1) State and prove effect of change of origin and scale on pgf.

   2) For the following probability distribution of (X, Y) obtain E (2X – Y).

X \ Y	2	3	4
1	0.1	0.2	0.3
2	0.1	0.3	0

   3) Prove that

   cov (aX+b, cY+d) = ab cov (X, Y).

5. Attempt **any two** of the following. **10**

   1) Prove that

      a) E (aX+b) = aE (X) + b

      b) V (aX+b) = a^2 v(X)

   2) For the following joint probability distribution

X \ Y	1	2	3
1	$\frac{2}{15}$	$\frac{4}{15}$	$\frac{3}{15}$
2	$\frac{1}{15}$	$\frac{1}{15}$	$\frac{4}{15}$

   Find conditional distribution of X given Y = 2.

   3) Obtain mean of hypergeometric distribution.

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Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2015
ZOOLOGY (Old)
Paper – IV : Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Thursday, 19-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*

1. Select the appropriate answer for each of the following and rewrite the sentence : **10**

1) In bee hive queen bee is a _____
   a) Sterile female b) Fertile female
   c) Sterile male d) Fertile male

2) Autoecology is the study of _____
   a) Group of organisms b) Pollution
   c) Individual organisms d) Evolution

3) The place of organism in the environment is called as _____
   a) Habitat b) Biome c) Niche d) Habit

4) Rearing of silkworm is known as _____
   a) Apiculture b) Sericulture c) Floriculture d) Agriculture

5) The soil transported by wind is called as _____
   a) Colluvial b) Alluvial c) Glacial d) Eolion

6) In ecosystem carnivores are _____
   a) Producers b) Primary consumers
   c) Secondary consumers d) Tertiary consumers

7) All food chains in a community together forms _____
   a) Pyramid b) Biome c) Climax d) Food substance

P.T.O.

8) Palaeontology is the study of past life based on _____
   a) Anatomy b) Fossil records
   c) Morphology d) Cytology

9) _____ is first phage in the process of formation of ecological succession.
   a) Climax b) Invasion c) Reaction d) Nudation

10) _____ is an extract of vermicasting.
   a) Vermin b) Vermiwash c) Vermibed d) Vermiculture

2. Answer **any five** of the following : **10**
   i) Camouflage
   ii) Scope of ecology
   iii) Parasitism
   iv) Ecological pyramid
   v) Herbivores
   vi) Vestigial organs.

3. A) Answer **any two** of the following : **6**
   i) What are the biotic factors ? Comment upon intraspecific relationship with reference to mate and reproduction.
   ii) Explain the casts of Honey bees.
   iii) Define food chain. Describe food chain in the aquatic ecosystem.

   B) Describe the niche. **4**

4. Answer **any two** of the following : **10**
   i) Describe the grassland ecosystem.
   ii) Describe the abiotic factor temperature. Add a note on their influence on ecosystem.
   iii) Describe the palaeontological evidences of evolution.

5. Answer **any one** of the following : **10**
   i) Give an account of vermi composting.
   ii) Describe the swarming behaviour of honey bee.

_____

SLR-Z – 40

Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
MATHEMATICS (Paper – III) (Old)
Geometry

Day and Date : Friday, 20-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose correct alternative for each of the following : **10**

1) The polar co-ordinates of a point are $\left(5, \frac{\pi}{6}\right)$ then its cartesian co-ordinates are _____

a) $\left(\frac{\sqrt{3}}{2}, \frac{5}{2}\right)$ b) $\left(\frac{5\sqrt{3}}{2}, \frac{5}{2}\right)$

c) $\left(\frac{5}{2}, \frac{\sqrt{3}}{2}\right)$ d) $\left(\frac{5}{2}, \frac{5\sqrt{3}}{2}\right)$

2) $r = 4 \sin\theta$ is the polar equation of the curve then its cartesian equation is _____

a) $x^2 + y^2 - 4y = 0$ b) $x^2 + y^2 - 4x = 0$

c) $x^2 + y^2 = 4$ d) $x^2 + y^2 - xy = 0$

3) The angle θ through which the axes have been rotated if the co-ordinate transformation formulae are

$x = \frac{x'}{2} - \frac{\sqrt{3}}{2} y'$, $y = \frac{\sqrt{3}}{2} x' + \frac{1}{2} y'$ then θ _____

a) $\frac{\pi}{2}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

P.T.O.

4) $(x^2 + y^2)^2 = a^2 (x^2 – y^2)$ is the equation of curve in cartesian system then its polar equation is _____

a) $r^2 = a^2 \sin 2\theta$ b) $r = a \cos\theta$

c) $r^2 = a^2 \cos 2\theta$ d) $r = 2a \sin\theta$

5) Angle between the planes $2x – y + z = 6$ and $x + y + 2z = 7$ is _____

a) π b) $\frac{\pi}{3}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}$

6) The intercept on z – axis made by the plane $x + y + 2z = 2$ is _____

a) 3 b) 4 c) 2 d) 1

7) The distance of a plane $3x + 4y – 2z = 6$ from origin is _____

a) $\frac{3}{\sqrt{29}}$ b) $\frac{4}{\sqrt{29}}$ c) $\frac{6}{\sqrt{29}}$ d) $\frac{-2}{\sqrt{29}}$

8) The radius of the sphere $x^2 + y^2 + z^2 – 2x + 4y – 6z + 7 = 0$ is _____

a) 49 b) 5 c) – 7 d) $\sqrt{7}$

9) The equation of tangent plane to the sphere $x^2 + y^2 + z^2 = 13$ at the point (1, 2, 3) is _____

a) $x + 2y + 3z = 13$ b) $x – 2y – 3z = 13$

c) $x – 2y + 3z = 13$ d) $x + 2y + 3z = – 13$

10) The intersection of a sphere and a plane is _____

a) Line b) Plane c) Circle d) Sphere

2. Attempt **any five** from the following : **10**

1) Transform the equation

$2x^2 + xy – 3y^2 + x + 19y – 28 = 0$

to parallel axes through the point (– 1, 3).

2) Identify the conic given by the equation

$x^2 + 2xy + y^2 – 2x – 1 = 0$

3) Transform the equation

$x^2 – y^2 – 2\sqrt{2}\ x – 10\sqrt{2}\ y + 2 = 0$

when the axes are turned through an angle 45°

4) Find the equation of a plane passing through (1 – 3, 1) and parallel to the plane $x + y + z = 3$.

5) Find the equation of the sphere whose centre is at (2, 3, – 4) and radius 5.

6) Find k, if (2, – 1, 1) lies on the sphere $x^2 + y^2 + z^2 + 4x + 2y - 2z - k = 0$ and with this k find its radius.

3. A) Attempt **any two** from the following : **6**

1) If by rotation of axes through an angle θ, the expression $\alpha x + \beta y$ changes to $\alpha' x' + \beta' y'$ then show that $\alpha^2 + \beta^2 = \alpha'^2 + \beta'^2$

2) Find the equation of a plane passing through three points A (0, 4, 3) B (– 2, – 2, 1) and C (1, 1, – 1)

3) Find the equation of the sphere whose diameter has extremities (3, 4, – 2) and (–2, – 1, 0)

B) Obtain the equation of a plane in normal form. **4**

4. Attempt **any two** from the following : **10**

1) If the origin is translated to a point (h, k) the equation of the curve $x^2 + 3xy + 2y^2 + 5x - 4y + 6 = 0$ does not contain linear terms in x and y. Find the point (h, k).

2) Show that the general equation of the first degree in x, y, z represents a plane.

3) Obtain the equation of the sphere through the four points A (4, – 1, 2), B (0, – 2, 3), C (1, – 5, – 1) and D (2, 0, 1).

5. Attempt **any one** from the following : **10**

1) Show that the equation of the plane tangent to the sphere

$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ at a point p (x_1, y_1, z_1) is $xx_1 + yy_1 + zz_1 + u(x + x_1) + v(y + y_1) + w(z + z_1) + d = 0$.

Hence find the equation of the tangent plane to sphere

$3(x^2 + y^2 + z^2) - 2x - 3y - 4z - 22 = 0$ at the point P (1, 2, 3).

2) If by transformation of rectangular axes the expression $ax^2 + 2hxy + by^2$ becomes $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that

i) $a + b = a' + b'$ ii) $ab - h^2 = a'b' - h'^2$.

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Seat No.	

B.Sc. I (Semester – II) Examination, 2015
BOTANY (Paper – III) (Old)
(Gymnosperms and Angiosperms)

Day and Date : Friday, 20-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B.** : 1) **All** questions are **compulsory.
*2) Draw neat and labeled diagram **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by choosing correct answer from the given alternatives. **10**

1) _____ is obtained from Abies balsamea.
a) Resin b) Gum c) Alcohol d) Canada balsam

2) In gymnosperms the seeds are
a) enclosed b) absent c) naked d) none of these

3) Sporne has divided gymnosperms into _____ classes.
a) two b) three c) four d) five

4) The leaves of Cycas are
a) pinnately compoundb)palmately compound
c) simple d) none of these

5) The name of family is added with suffix
a) aceae b) ales c) ateae d) none of these

6) Ficus shows _____ inflorescence.
a) Capitulum b) hypanthodium c) raceme d) spike

7) _____ is an essential whorl of flower.
a) Calyx b) Corolla c) Perianth d) Gynoecium

8) In perigynous flower the ovary is
a) superior b) inferior c) half superior d) none of these

P.T.O.

9) In the floral formula 'P' stands for

a) calyx b) corolla c) perianth d) androecium

10) Casalpinia pulcherima belongs to family

a) Annonaceae b) Caesalpinaceae

c) Solanaceae d) Nyctaginaceae

2. Answer **any five** of the following. **10**

i) Write two salient features of gymnosperms.

ii) Give the occurrence of Cycas.

iii) Describe the term epigynous.

iv) Describe the verticillaster inflorescence.

v) Describe the zygomorphic flower.

vi) Enlist the accessory whorls of flower.

3. A) Answer **any two** of the following. **6**

i) Describe the structure of megasporophyll of Cycas.

ii) Write demerits of Benthum and Hooke's system of classification.

iii) Describe the adelphous condition of stamens.

B) Describe the monochasial type of inflorescence with suitable examples. **4**

4. Answer **any two** of the following. **10**

i) Describe in brief the classification of gymnosperms by sporne.

ii) Mention two economic important plants of Amarylidaceae and Nyctaginaceae with use.

iii) Mention any two dry indehiscent fruit types you have studied.

5. Answer **any one** of the following. **10**

i) Describe the internal structure of leaflets of Cycas with suitable diagram.

ii) Give the distinguishing characters of any two families.

a) Ceasalpinaceae b) Convolvulaceae

c) Annonaceae d) Solanaceae

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Seat No.	

B.Sc. I (Semester – II) (Old) Examination, 2015
MATHEMATICS (Paper – IV)
Differential Equation

Day and Date : Saturday, 21-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose correct alternative for **each** of the following : **10**

1) The differential equation of the form

$\frac{dy}{dx} = \frac{ax + by + c}{a'x + b'y + c'}$ is known as

a) Homogeneous b) Non homogeneous

c) Exact d) None of these

2) If the equation Mdx + Ndy = 0 is homogeneous and Mx + Ny $\neq$ 0 then. I.F. =

a) $\frac{1}{My + Nx}$ b) $\frac{1}{My - Nx}$ c) $\frac{1}{Mx - Ny}$ d) $\frac{1}{Mx + Ny}$

3) The integrating factor for the differential equation $\frac{dx}{dy} + Px = Q$, where P and Q are functions of y only is

a) $e^{\int Pdx}$ b) $e^{\int P'dx}$ c) $e^{\int Pdx}.Q$ d) $e^{\int Pdy}$

4) The solution of the differential equation

$\sqrt{1-x^2}\, dy + \sqrt{1-y^2}\, dx = 0$ is

a) $\sin^{-1}x + \sin^{-1}y = c$ b) $\sin x + \sin y = c$

c) $\log(1 - x^2) + \log(1 - y^2) = c$ d) none of these

P.T.O.

5) A differential equation Ndx + Mdy = 0 is an exact if

a) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ b) $\frac{\partial N}{\partial y} = \frac{\partial M}{\partial x}$

c) $\frac{\partial^2 M}{\partial y^2} = \frac{\partial^2 N}{\partial x^2}$ d) None of these

6) The complementary function for the differential equation $(D^2 + 3D + 2)\, y = xe^{3x}$ is

a) $c_1e^{-x} + c_2e^{-2x}$ b) $c_1e^{x} + c_2e^{-2x}$

c) $c_1e^{-x} + c_2e^{2x}$ d) none of these

7) If m_1 and m_2 are two real and equal roots for an auxiliary equation then C.F. =

a) $c_1e^{m_1x} + c_2e^{m_2x}$ b) $c_1e^{-m_1x} + c_2e^{-m_2x}$

c) $(c_1 + c_2x)e^{+m_1x}$ d) none of these

8) $\frac{1}{D^2 + a^2} \sin ax =$

a) $\frac{-x}{2a} \cos ax$ b) $\frac{-x}{2a} \sin ax$

c) $+\frac{x}{2a} \sin ax$ d) none of these

9) The P.I. for the differential equation $(D^2 + 9)y = \cos 2x + \sin 2x$ is

a) $\frac{1}{13}(\cos 2x + \sin 2x)$ b) $\frac{1}{25}(\cos 2x + \sin 2x)$

c) $\frac{1}{5}(\cos 2x + \sin 2x)$ d) none of these

10) The particular integral of the equation $(D^2 + 5D + 6)y = e^x$ is

a) $\frac{e^x}{12}$ b) $\frac{-e^x}{12}$

c) $\frac{e^x}{11}$ d) none of these

2. Attempt **any five** from the following : **10**

1) Solve : $\tan x dx + \cot y dy = 0$.

2) Solve the exact differential equation

$(1 + 6y^2 - 3x^2y)\, dy = -(x^2 - 3xy^2)dx$.

3) The integrating factor for the differential equation

$\frac{dy}{dx} + \frac{4xy}{1+x^2} = \frac{1}{(1+x^2)^3}$ is

4) Solve $(D^2 + 3D - 54)y = 0$.

5) Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 2e^{3x}$.

6) Find $\frac{(e^x + 1)^2}{D^3 + 1} =$ _____

3. A) Attempt **any two** from the following : **6**

1) Solve : $\frac{dy}{dx} = \frac{x + 2y - 3}{2x + y - 3}$

2) If $D = \frac{d}{dx}$, then show that

$\frac{X}{D - a} = e^{ax} \int e^{-ax}.X dx$.

3) Solve : $(D^2 + 3D + 2)y = xe^{3x}$.

B) With usual notation show that **4**
$(D - \alpha)(D - \beta)\, y = (D - \beta)(D - \alpha)y$.

4. Attempt **any two** from the following : **10**

   1) Define the linear differential equation and explain the method for solving it.

   2) With usual notations prove that

   $$\frac{\cos ax}{f(D^2)} = \frac{\cos ax}{f(-a^2)}, \text{ if } f(-a^2) \neq 0.$$

   and also state the formula when $f(-a^2) = 0$.

   3) Solve :

   $$\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - 6\frac{dy}{dx} = x^2 + 1.$$

5. Attempt **any one** of the following : **10**

   1) State and prove the necessary and sufficient condition for exactness of the differential equation $Mdx + Ndy = 0$ and hence solve.

   $(\sec x \tan x \tan y - e^x)\, dx + \sec x \sec^2 y dy = 0.$

   2) With usual notation prove that

   $$\frac{e^{ax}}{f(D)} = \frac{e^{ax}}{f(a)}, \text{ if } f(a) \neq 0$$

   and hence solve

   $(D^3 - 4D^2 + 5D - 2)y = e^x.$

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Seat No.	

B.Sc. – I (Semester – II) Examination, 2015
BOTANY (Paper – IV) (Old)
Cell Biology, Genetics and Plant Biotechnology

Day and Date : Saturday, 21-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagram **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by choosing correct answer from the given alternatives : **10**

1) In eukaryotic cell _____ type of ribosomes are present.
a) 60S b) 40S c) 70S d) 80S

2) The _____ helps in repair and replacement of dead cells.
a) Meiosis b) Cytokinesis c) Mitosis d) Apoptosis

3) Enzyme _____ is present in peroxysomes.
a) catalase b) amylase
c) dehydrogenase d) nuclease

4) The _____ protects and supports the entire plant body.
a) plasma membrane b) cell wall
c) plasmodesmata d) cell membrane

5) The _____ is responsible for photosynthesis.
a) Ribosome b) Mitochondria
c) Chloroplast d) ER

6) The _____ is used to produce transgenic plants.
a) biotechnology b) microbiology
c) ecology d) physiology

P.T.O.

7) Mendel conducted several experiments of hybridization on _____ plants.
   a) mustard b) bean c) mung d) pea

8) The _____ is used as solidifying agent in plant tissue culture medium.
   a) manitol b) sucrose c) glucose d) agar-agar

9) The _____ cross involves two pairs of contrasting characters.
   a) monohybrid b) dihybrid c) polyhybrid d) none of these

10) The _____ bacteria is used for the preparation of biofertilizers.
   a) streptococcus b) klebsiella c) rhizobium d) clostridium

2. Answer **any five** of the following : **10**
   i) Define cytokinesis.
   ii) Sketch and label the structure of mitochondrion.
   iii) State any two functions of cell wall.
   iv) Give any two functions of glyoxysomes.
   v) Define supplementary genes.
   vi) What are biofertilizers ?

3. A) Answer **any two** of the following : **6**
   i) Explain in brief metaphase in mitosis.
   ii) State the functions of peroxisomes.
   iii) Define cell membrane and write any two functions of it.

   B) State the functions of nucleus. **4**

4. Answer **any two** of the following : **10**
   i) Describe the ultrastructure of chloroplast.
   ii) Explain the inhibitory genes.
   iii) Write a note on applications of tissue culture in agriculture.

5. Answer **any one** of the following : **10**
   i) Describe Mendel's Law of Segregation and independent assortment with suitable example.
   ii) Describe the multidisciplinary nature of Biotechnology.

_____

SLR-Z – 44

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Old)
Electronic Devices (Paper – III)

Day and Date : Monday, 23-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Use of log table and calculator is ***allowed****.*
4) Draw neat and labelled diagram ***wherever*** *necessary.*

1. Select correct alternative for the following : **10**

i) A bridge full wave rectifier uses _____ diodes.

a) 1 b) 2

c) 3 d) 4

ii) A trivalent impurity has _____ valence electrons.

a) 1 b) 2

c) 3 d) 4

iii) The α of transistor is 0.99, then the value of β is

a) 9 b) 99

c) 999 d) 100

iv) The forward voltage drop across silicon diode is about

a) 7 V b) 0.3 V

c) 3 V d) 0.7 V

v) The base of a transistor is _____ doped.

a) lightly b) heavily

c) moderately d) none of these

P.T.O.

vi) A zener diode is used as

a) an amplifier b) a voltage regulator

c) an oscillator d) a rectifier

vii) In a JFET, I_{DSS} is known as

a) drain to source current

b) drain to source current with gate open

c) drain to source current with gate short

d) none of these

viii) The barrier potential of PN junction decreases by _____ per degree rise in temperature.

a) 2 mV b) 2 V

c) 20 mV d) 20 V

ix) The ripple factor of a half wave rectifier is

a) 2 b) 1.21

c) 0.48 d) 2.5

x) A PN junction that radiates energy in the form of light instead of heat is called

a) LED b) Photo diode

c) Photo cell d) Zener diode

2. Answer **any five** of the following : **10**

i) Draw a symbol of zener diode and photo diode.

ii) Explain effect of temperature on intrinsic semiconductor.

iii) Why MOSFET is also called as an insulated gate FET.

iv) Draw a circuit diagram of full wave rectifier.

v) What is a transistor ? Draw the symbol of NPN transistor.

vi) A transistor has β = 100. If the collector current is 40 mA. Determine the emitter current.

3. A) Answer **any two** of the following : **6**

   i) Explain construction of NPN transistor.

   ii) Write a note on MOSFET.

   iii) Write a note on photo diode.

   B) Write a short note on π filter. **4**

4. Answer **any two** of the following : **10**

   i) Show that the maximum efficiency of full wave rectifier is 81.2%.

   ii) Explain transistor action in detail.

   iii) Explain zener diode as voltage regulator.

5. Answer **any two** of the following : **10**

   i) Define drain resistance, transconductance and amplification factor of a JFET. Deduce the relation between them.

   ii) Explain input characteristics of transistor in CB configuration.

   iii) Explain the interpretation of diode equation.

SLR-Z – 46

Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
GEOLOGY
Paper – III : Introduction to General Geology

Day and Date : Monday, 23-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** the questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Draw** neat diagram **wherever** needed.*

1. Fill in the blank with appropriate alternative : **10**

1) A group of star is known as _____
   a) Galaxy b) Solar system
   c) The earth d) Universe

2) Highest no. of satellite is found around _____ planets.
   a) Earth b) Jupiter c) Neptune d) Uranus

3) Mean radius of earth is _____
   a) 6378 b) 6758 c) 6371 d) 7361

4) Planetesimal theory is put forward by _____
   a) Chamberlain b) Moultain and Chamberlain
   c) Kant and Lapless d) Kant

5) Density of earth is _____
   a) 3.2 b) 4.5 c) 5.5 d) 5.4

6) Folded mountains are the _____ order relief features.
   a) Second b) Third c) Fourth d) First

7) P – wave passes through _____
   a) Only solid b) Only liquid c) Only gases d) All of these

8) Ejection of material from volcano is known as _____
   a) Fumilals b) Solfatrous c) Saffoni d) Gyesers

9) Ejection of water vapors from the volcanoes _____ %.
   a) 20 – 30 b) 80 – 90 c) 40 – 50 d) 60 – 70

10) Crust – Mantle boundary separated by _____ discontinuity.
   a) Moho b) Conrad c) Gatenberge d) Sima

2. Answer **any five** from the following : **10**

1) Relief features of earth
2) Elements of earthquake.
3) Equinox.
4) Seismic waves.
5) Galaxy.
6) Second order features.

3. A) Answer **any two** from the following : **6**

1) Seismograph
2) Volcanic belt
3) Hypsographic curve

B) Explain the planetary lows. **4**

4. Answer **any two** from the following : **10**

1) Describe the internal structure of earth.
2) What is an earthquake ? Write effect of earthquake.
3) Describe first order relief feature of earth.

5. Answer **any two** from the following : **10**

1) Describe the nebular hypothesis for the earth origin.
2) Describe the causes of earthquake.
3) Describe the types of volcanoes.

SLR-Z – 47

Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
MICROBIOLOGY (Paper – III)
Microbial Physiology

Day and Date : Monday, 23-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by selecting correct answers from the given alternatives. **10**

i) On hydrolysis of ATP it gives _____ amount of energy.
   a) –7.3 kcal/mole b) –18.0 kcal/mole
   c) –7.5 kcal/mole d) –14.8 kcal/mole

ii) Two amino acids in protein are joined by _____ bond.
   a) glycosidic b) hydrogen c) ionic d) peptide

iii) Organisms multiply actively in _____ phase.
   a) lag b) log c) stationary d) decline

iv) Neutral red indicator is present in _____ medium.
   a) Nutrient-agar b) Blood agar
   c) MacConkey's agar d) Peptone water

v) Photoautotrophs derive their energy from _____
   a) water b) organic compounds
   c) light d) inorganic compounds

vi) Protein part of an enzyme is called _____
   a) apoenzyme b) co-enzyme
   c) cofactor d) prosthetic group

vii) _____ species play role in symbiotic μ_2 fixation.
   a) Azotobacter b) Rhizobium
   c) Bacillus d) Staphylococcus

viii) Starch is an example of _____
a) Monosaccharide b) Disaccharide
c) Polysaccharide d) Trisaccharide

ix) Holley proposed clover leaf model for the structure of _____
a) tRNA b) rRNA c) mRNA d) DNA

x) The degradative portion of metabolism is _____
a) Catabolism b) Anabolism
c) Metabolism d) Commensalism

2. Answer **any five** of the following : **10**
i) Define active site.
ii) Give role of peptone in media.
iii) Explain parasitism.
iv) Define photoautotrophs.
v) Role of milk in media.
vi) Oligosaccharide.

3. A) Answer **any two** of the following : **6**
i) Explain induced and constitutive enzymes.
ii) High energy compounds.
iii) Clover leaf model of tRNA.

B) Write in brief on root modulation. **4**

4. Answer **any two** of the following : **10**
i) Write on classification of bacteria on the basis of energy and carbon source.
ii) Normal flora of human body.
iii) Describe EMP pathway.

5. Answer **any two** of the following : **10**
i) Give an account of growth phases of bacteria.
ii) Write in short-structure of DNA.
iii) Explain polysaccharides.

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SLR-Z – 48

Seat No.	

B.Sc. I (Semester – II) Examination, 2015
ELECTRONICS (Paper – IV) (Old)
Digital Electronics

Day and Date : Tuesday, 24-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***N.B.** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagram **wherever** necessary.*
*4) **Use** of lgorithm table and calculator is **allowed**.*

1. Select the correct alternative for the following : **10**

i) IC 7490 is _____
   a) Decade counter b) Binary mod 12 counter
   c) Binary ripple counter d) Up-Down counter

ii) To set the output of Flip Flop 1 then R = _____ and S = _____
   a) 0, 0 b) 0, 1 c) 1, 0 d) 1, 1

iii) _____ number of control lines used in 4 : 1 multiplexer.
   a) 0 b) 1 c) 2 d) 3

iv) IC 7473 is _____ Flip Flop.
   a) D b) JK c) RS d) MSJK

v) 4 bit Shift Register requires _____ number of Flip Flops.
   a) One b) Two c) Three d) Four

vi) _____ is operating system.
   a) MS Office b) MS Power Point
   c) MS Excel d) DOS

vii) ROM is _____ type memory.
   a) Volatile b) Non-volatile
   c) Temporary d) None of these

P.T.O.

viii) 3 : 8 decoder has _____ number of input lines.

a) One b) Two c) Three d) Four

ix) If clock frequency input is 100 Hz for divide by two counter then output frequency will be _____ Hz.

a) 10 b) 25 c) 50 d) 100

x) IC > 400 is _____ IC.

a) NAND gate b) NOR gate c) XOR gate d) NOT gate

2. Attempt **any five** of the following. **10**

i) Write the symbol and truth table of OR gate.

ii) What is meant by MUX and DEMUX ?

iii) Enlist input devices used in computer.

iv) Explain how many Flip Flops are used to construct Mod 10 counter.

v) Draw the logic diagram of 4 : 1 multiplexer.

vi) Write the truth table of RS Flip Flop using NOR gate.

3. A) Answer **any two** of the following. **6**

i) Explain 1 : 4 demultiplexer.

ii) Explain 3 bit S1S0 shift register.

iii) Draw timing diagram of mod 4 counter (ripple).

B) Draw block diagram of digital computer. **4**

4. Answer **any two** of the following. **10**

i) Explain 2 : 4 decoder.

ii) Write note on ring counter using 4 Flip Flop.

iii) Explain MS JK Flip Flop.

5. Answer **any two** of the following. **10**

i) Draw the diagram of 8 : 1 multiplexer.

ii) Write the characteristics of digital computer.

iii) Explain D Flip Flop.

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SLR-Z – 50

Seat No.	

B.Sc. – I (Semester – II) (Old) Examination, 2015
GEOLOGY
Introduction to Physical Geology (Paper – IV)

Day and Date : Tuesday, 24-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *needed.*

1. Fill in the blanks with appropriate alternative : **10**

1) _____ is the agent of weathering.
a) Water b) Glacier c) Wind d) All of these

2) The removal of loose material by the blowing action of wind is called
a) deflation b) corrosion c) abrasion d) saltation

3) Highest point of river is also called _____
a) Bed b) Head c) Mouth d) Channel

4) The spit connecting main land and an offshore island is termed _____
a) point bar b) hook
c) tombolo d) wave built terrace

5) Moraines are the till deposits of _____
a) glacier b) wind c) stream d) none of these

6) Formation of soil depends upon _____
a) time b) parent material
c) climate d) all of these

7) The movement of particle in the jump is termed _____
a) suspension b) rolling c) saltation d) traction

8) _____ are the faced stones due to abrasion by wind action.

a) Yardang b) Ventifacts c) Pavement d) Armour

9) Flowing of river in the formation of loops like channel are called _____

a) piracy b) meander c) water gap d) ox bow lake

10) Valley produced by glacier errosin whose cross section is _____ shaped.

a) U b) V c) U and V d) None of these

2. Answer **any five** from the following : **10**

1) Soil profile
2) Agent of weathering
3) Bajdas
4) Beaches
5) Transportation by river
6) Moraines.

3. A) Answer **any two** from the following : **6**

1) How natural bridges and stacks formed ?
2) Yardang.
3) Rate of weathering.

B) What are sand dune ? Describe the process of migration of sand dune. **4**

4. Answer **any two** from the following : **10**

1) Describe physical weathering.
2) Describe the any three erosional features produced by stream.
3) Describe erosional process by glacier.

5. Answer **any two** from the following : **10**

1) Describe depositional features by sea.
2) What is glacier ? How hanging valley is formed ?
3) Describe the erosional features produced by wind.

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SLR-Z – 51

Seat No.	

B.Sc. I (Semester – II) (Old) Examination, 2015
MICROBIOLOGY (Paper – IV)
Applied Microbiology – I

Day and Date : Tuesday, 24-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicates* ***full*** *marks.*

1. Rewrite the following sentences by selecting correct answers from given alternatives. **10**

i) _____ is considered as an indicator of fecal pollution of water.
a) Bacillus b) E.Coli c) Mycobacteria d) Clostridium

ii) _____ is an example of perishable food.
a) Milk b) Onion c) Potato d) Sugar

iii) _____ is main protein present in milk.
a) Globulin b) Albumin c) Gelatin d) Casein

iv) Smallest particle of soil is called
a) Silt b) Sand c) Clay d) Gravel

v) _____ are used for passive immunization.
a) Antigens b) Vaccines c) Antibiotics d) Antisera

vi) _____ is an example of food preservative.
a) Na-benzoate b) HCl c) NaOH d) H_2SO_4

vii) Quantitative examination of water is done by _____ test.
a) MBRT b) MPN c) IMViC d) Phosphatase

viii) Droplet nuclei are smaller than _____ mm.
a) 0.1 b) 2 c) 10 d) 20

P.T.O.

ix) _____ gives musty odour to the soil.

a) Bacteria b) Protozoa c) Fungi d) Actinomycetes

x) Microbiological quality of milk is determined by _____ test.

a) MPN b) MBRT c) Phosphatase d) DMC

2. Answer **any five** of the following : **10**

i) Define Pandemic diseases.

ii) Give the composition of milk.

iii) What is chlorination ?

iv) Define fecal pollution.

v) Define preservatives.

vi) Which media are used for presumptive test ?

3. A) Answer **any two** of the following : **6**

i) Different microorganisms in soil.

ii) General principles of food preservation.

iii) Types of diseases.

B) Describe various sources of milk contamination. **4**

4. Answer **any two** of the following : **10**

i) Municipal water purification.

ii) Preservation of food by low and high temperature.

iii) Methods of transmission of diseases.

5. Describe **any one** of the following : **10**

i) Describe in detail Routine bacteriological analysis of water.

ii) Describe in detail microbial examination of air.

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SLR-Z – 52

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2015
CHEMISTRY (New – CGPA Pattern)
Organic Chemistry (Paper – III)

Day and Date : Thursday, 26-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions: *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagram and give equation* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of log table or calculator is* ***allowed****.*
5) Atomic weights : ***H = 1, C = 12, N = 14, O = 16, Cl = 35.5, I = 127, Ag = 108****.*
6) Spectroscopic chart is ***supplied****.*

1. Choose correct alternative from **each** of the following. **14**

i) In hyperchromic shift _____

a) λ_{max} increases b) $\in_{max}$ increases

c) λ_{max} decreases d) $\in_{max}$ decreases

ii) In Beckmann transformation the product obtained by _____

a) Oxime b) N-substituted amide

c) Aldehyde d) Ketone

iii) By Kolbe reaction, phenols are converted into _____

a) Phthalic acid b) Succinic acid

c) Salicylic acid d) Benzoic acid

iv) The catalyst used in benzoin condensation is _____

a) $OH^{\ominus}$ b) Pyridine

c) Sodium acetate d) $CN^{\ominus}$

P.T.O.

v) The IUPAC name of the compound having formula $CH_3 - O - \underset{\underset{CH_3}{|}}{CH} - CH_3$ is

a) isopropoxy methane
b) 2-methoxy propane
c) 3-methoxy propane
d) 1-methoxy propane

vi) Citric acid is _____

a) monohydroxy dicarboxylic acid
b) dihydroxy mono carboxylic acid
c) dihydroxy tri carboxylic acid
d) monohydroxy tri carboxylic acid

vii) In diazotisation, dil HCl and $NaNO_2$ react to form _____

a) nitrogen
b) nitric acid
c) nitrous acid
d) nitrating mixture

viii) A typical example of chromophore is _____

a) $>C=O$ b) $-Cl$ c) $-OH$ d) $-NH_2$

ix) R and S nomenclature is also known as _____

a) relative configuration
b) cis & trans configuration
c) absolute configuration
d) none of these

x) Glycerol reacts with $KHSO_4$ to give _____

a) acrolein b) tartaric acid c) oxalic acid d) formaldehyde

xi) Aldehyde and ketone undergoes _____ reaction.

a) Electrophilic addition
b) Nucleophilic addition
c) Elimination
d) Nucleophilic substitution

xii) Dialkyl derivative of H_2O is known as _____

a) alcohols b) ketones c) anhydrides d) ethers

xiii) Among the following which is unsaturated acid ?

a) acrylic acid
b) citric acid
c) phthalic acid
d) chloroacetic acid

xiv) Wavelength range of UV region of the electromagnetic radiation is _____

a) 100 – 400 nm
b) 400 – 800 nm
c) above 800 nm
d) none of these

2. Solve **any seven** of the following. **14**

I) Explain the terms hypsochromic shift and hyperchromic shift.

II) Define geometrical isomerism and conformational isomerism.

III) Explain acidic nature of ethylene glycol.

IV) Discuss the reactivity of carbonyl group.

V) Write the reactions involved in Ziesel's estimation of $-OCH_3$ group.

VI) Complete the following reaction

a) $Cl-CH_2\ COOH \xrightarrow[H_2O/H+]{2NH_3} ?$

b) $Cl-CH_2\ COOH \xrightarrow[ethanol]{KCN} ?$

vii) Starting from benzene diazonium chloride how will you prepare iodobenzene and benzene.

viii) Write one method of preparation for malic acid and give its uses.

ix) Write the mechanism of acid catalysed ring opening of ethylene oxide.

3. A) Attempt **any two** of the following. **10**

I) Write a note on applications of UV spectroscopy.

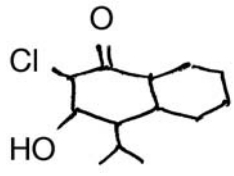
II) What are aldoximes ? Write note on configuration of aldoximes.

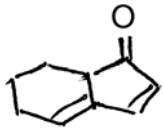
III) Give synthesis and uses of methyl orange.

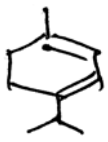
B) How will you estimate methoxy group in an organic compound by Ziesel's method ? **4**

4. Attempt **any two** of the following. **14**

I) Explain Beer-Lambert's law. Calculate the λ_{max} of following compounds by Woodward-Fieser rule

a) 

b) 

c) 

II) Explain conformational analysis of n-butane with energy profile diagram.

III) How will you prepare glycerol from oil and fats ? What is the action of following on it ?

a) Sodium (at high temp.)

b) HNO_3/conc.H_2SO_4

c) $(CH_3CO)_2O$.

5. Attempt **any two** of the following. **14**

I) Discuss the mechanism involved in Reimer-Tiemann reaction.

II) Discuss the mechanism of Perkin reaction.

III) Write two methods of preparation of succinic acid. Give their uses. What is the action of heat and $NaHCO_3$ on succinic acid ?

Spectroscopic Chart

Woodward's-Fieser's rules for calculating ultraviolet absorption maxima

A) For substituted dienes (Ethanol solution)

No.	Basic Value	λ_{max} (nm)
1)	Acyclic and heteroannular dienes	214
2)	Homoannular dienes	253
3)	**Addition for each substituent**	
	a) – R alkyl (including part of carbocyclic ring)	5
	b) – OR (alkoxy)	6
	c) – Cl, –Br	5
	d) – OCOR (acyloxy)	0
	e) – NR_2, (N – alkyl)	60
	f) – SR (S – alkyl)	30
	g) – CH = CH – additional conjugation i.e. extending conjugation	30
	h) If one double bond is exocyclic to one ring	5
	i) If exocyclic to two rings simultaneously	10

B) Rules for α, β – Unsaturated Enones (Ethanol Solution)

No.	Basic value	λ_{max} (nm)
1)	Ketones : $-\overset{\beta}{C}=\overset{\alpha}{C}-CO-$	
	a) Acyclic or 6 – membered ring	215
	b) 5 – membered ring	202
2)	Aldehydes $-\overset{|}{C}=\overset{|}{C}-CHO$	207
3)	Extended Conjugation	30
	$-\overset{\delta}{C}=\overset{\gamma}{C}-\overset{\beta}{C}=\overset{\alpha}{C}-CO-$ etc.,	
4)	Homodiene component	39
5)	a) If one double bond is exocyclic to one ring	5
	b) If exocyclic to two rings simultaneously	10
6)	Addition for substituents	

Substituents		Position			
		α	β	γ	δ
a)	- R alkyl (including part of carbocyclic ring)	10	12	18	18
b)	- OR (alkoxy)	35	30	17	31
c)	- OH (hydroxy)	35	30	-	50
d)	- SR (thioether)	-	85	-	-
e)	- Cl (chloro)	15	12	-	-
f)	- Br (bromo)	25	30	-	-
g)	- OCOR (acyloxy)	6	6	-	6
h)	- NH_2, - NHR, - NR_2	-	95	-	-

Solvent correction

	Solvent	
a)	Ethanol	0
b)	Methanol	0
c)	Dioxan	-5
d)	Chloroform	-1
e)	Ether	-7
f)	Water	+8
g)	Hexane	-11
h)	Cyclohexane	-11

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Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
CHEMISTRY (New CGPA Pattern)
Inorganic Chemistry (Paper – IV)

Day and Date : Friday, 27-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labeled diagram* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the most correct alternative for each of the following and rewrite the sentence. **14**

1) In $[Co(NH_3)_6]Cl_3$, chloride ions are present in _____
   a) ionisable sphere b) co-ordination sphere
   c) non-ionisable sphere d) inner sphere

2) Oxalic acid is _____ dentate chelating agent.
   a) mono b) bi
   c) tri d) tetra

3) Lithium ion (Li^+) is _____
   a) hard base b) soft acid
   c) hard acid d) soft base

4) The d-block elements show color property due to _____
   a) paired electrons b) unpaired electrons
   c) non-bonded electrons d) d-d transitions

5) The substances loss their identities in aqueous medium are generally _____
   a) co-ordinate compound b) chelate compound
   c) complexes d) salts

6) The classification of chelating agents is made on the basis of _____
   a) oxygen atoms b) nitrogen atoms
   c) number of donor groups d) number of electrons

P.T.O.

7) The H^+ is called hard acid, whereas H^- is called _____
   a) soft acid b) soft base
   c) hard base d) none of these

8) 4-d transition series start with _____ and ends with _____ element.
   a) yttrium, cadmium b) scandium, cadmium
   c) lanthanum, mercury d) yttrium, zinc

9) In the formation of NH_4^+, H^+ is act as _____
   a) Lewis acid b) Lewis base
   c) Donor d) Chelating agent

10) In EDTA molecule _____ acidic groups are present.
   a) Four b) Three
   c) Two d) Six

11) Pearson principle used to explain _____ concept of acid and bases.
   a) Chelate b) HSAB
   c) HASB d) Hybridisation

12) Electronic configuration of mercury is _____
   a) [Xe] $4f^{14}$ $5d^9$ $6s^2$ b) [Xe] $4f^{14}$ $5d^{10}$ $6s^2$
   c) [Xe] $6d^{10}$ $7s^2$ d) [Xe] $5d^{10}$ $6s^2$

13) The IUPAC nomenclature of $[Cu(NH_3)_4]SO_4.H_2O$ is _____
   a) Copper tetraamine (II) sulphate monohydrate
   b) Tetraamine copper (II) sulphate
   c) Tetraamine copper (II) sulfate monohydrate
   d) Tetraamine copper II sulphate monohydrate

14) The number of unpaired electrons present in Zn^{2+} are _____
   a) four b) two
   c) one d) zero

2. Solve **any seven** of the following : **14**

1) Define double salt with suitable example.

2) State and explain term co-ordination sphere with example.

3) Draw the structure of cis-trans isomers of $[PtCl_2(NH_3)_2]$.

4) State any four applications of EDTA as a chelating agent.

5) Give the name and structure of two bidentate chelating agents.

6) Define acid and base according to Lewis concept, with example.

7) What are the limitations of Pearson's acid-base concept ?

8) As compare to 4d and 5d transition series elements 3d transition series elements are reactive, why ?

9) In brief explain position of d-block elements in periodic table.

3. A) Attempt **any two** of the following : **10**

1) Write name, symbol, atomic number of 4d transition series elements.

2) Describe the postulates of Werner theory with suitable example.

3) Explain the complex forming ability of d block elements with suitable example.

3. B) What are the limitations of valence bond theory ? **4**

4. Attempt **any two** of the following : **14**

1) Explain the applications of hard and soft acid base principle.

2) Explain the complex of Fe(III) on the basis of VBT with cyanide ligands. Comment on the stability and magnetic property of the complexes.

3) What are transition elements ? Discuss the oxidation states of 3d transition elements.

5. Attempt **any two** of the following : **14**

1) Distinguish between metal chelate and metal complex.

2) Write a detail note on color property of the 3d block element.

3) Define isomerism. Discuss optical isomerism in co-ordination compounds with CN=6.

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Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PHYSICS Paper – III (New CGPA Pattern)
General Physics, Heat and Sound

Day and Date : Saturday, 28-11-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) Draw ***neat*** *diagram* ***wherever*** *necessary*
iv) ***Use*** *of calculator or log table is* ***allowed****.*

1. Choose the correct alternative : **14**

I) The gradient of scaler function is _____ rate of change of function in space.

a) minimum b) maximum c) slow d) constant

II) Curl of vector field is

a) vector b) scaler c) always zero d) none of these

III) The rifling of barrels of guns provides the stability in _____ of the bullet.

a) speed b) mass c) direction d) force

IV) The change in plane of rotation of rotating disc is called

a) rotation b) vibration c) precession d) nutation

V) A spiral spring is said to be flat if the angle made by the plane of spiral to the horizontal is

a) zero b) equal to 90°

c) less than 90° d) equal to 45°

VI) Bending moment of beam is

a) directly proportional to modulus of rigidity

b) inversely proportional to radius of curvature

c) directly proportional to radius of curvature

d) inversly proportional to modulus of rigidity

VII) The relation between magnitudes of precessional torque (τ_1), gravitational torque (τ_2) and centripetal torque (τ_3) is

a) $\tau_1 = \tau_2 - \tau_3$ b) $\tau_1 = \tau_2 + \tau_3$

c) $\tau_1 = \tau_3 - \tau_2$ d) $\tau_2 = \tau_1 - \tau_3$

VIII) The critical velocity of disc of radius 30 cm rolling over a horizontal surface is _____ ($g = 980$ cm/s^2).

a) 240 cm/s b) 140 cm/s c) 240 m/s d) 140 m/s

IX) If the height of liquid in rotation viscometer is increased, the rotation torque will be

a) decreased b) increased c) same d) no affected

X) The viscosities of two liquids may be compared with the help of

a) Searl's viscometer b) Ostwald viscometer

c) Rotation viscometer d) Rankin's method

XI) Decay of sound energy in hall is

a) linear b) exponential c) constant d) zero

XII) The carbon microphone is _____ microphone.

a) velocity b) pressure c) temperature d) mass

XIII) Entropy is the measurement of

a) perfect order b) liquid

c) disorder d) available energy

XIV) Entropy remains constant in

a) adiabatic process b) isothermal process

c) isochoric process d) isolated process

2. Write **any seven** of the following : **14**

I) What is significance of curl ?

II) What is nutation ?

III) Explain the terms neutral axis and neutral surface.

IV) What are the applications of Ostwald's viscometer ?

V) What is T.S. diagram ?

VI) What is reverberation time ?

VII) What is cantilever ?

VIII) Show that $\vec{\nabla}(\phi + \psi) = \vec{\nabla}\phi + \vec{\nabla}\psi$ where ϕ and ψ are scaler functions.

IX) The bending moment of wire is determine when radius of wire is 0.4 mm and radius of curvature is 5 cm in bent position.

3. A) Attempt **any two** of the following : **10**

I) For vector triple product show that $\vec{A}\times\left(\vec{B}\times\vec{C}\right)=\vec{B}\left(\vec{A}.\vec{C}\right)-\vec{C}\left(\vec{A}\ .\vec{B}\right)$.

II) Explain various factors affecting on acoustics of building.

III) Write change in entropy of perfect gas interms of temperature and volume.

B) An auditorium of volume 1982 m^3 has a reverberation time of 0.95 when empty. Find the area of empty hall. **4**

4. Attempt **any two** of the following : **14**

I) Describe Searl's method for determining the viscosity of highly viscous liquid.

II) Derive an expression of Young's modulus of spiral spring.

III) A flat spiral spring has a diameter of 2 cm, 20 turns and mass 50 gm. The radius of wire of spring is 2 mm. When the mass of 100 gm is attached to it, it makes vertical oscillations of time period of 0.038 s. Calculate the modulus of rigidity of the wire.

5. Attempt **any two** : **14**

I) Explain the method of piezoelectric effect for production of ultrasonic waves.

II) What is gyrostatic pendulum ? Obtain expression for time period.

III) Derive the expression for coefficient of viscosity with the help of rotating cylinder method.

SLR-Z – 55

Seat No.	

B.Sc. II (Semester – III) Examination, 2015
COMPUTER SCIENCE (New CGPA Pattern)
Paper – III : Object Oriented Programming Using C++

Day and Date : Thursday, 26-11-2015 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B.: *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose and write a correct answer from given four alternatives. **14**

1) _____ is an instance of a class.
   a) Friend Functions b) Object
   c) Member Functions d) Member Variables

2) Constructor is executed when _____
   a) an object is created b) an object is used
   c) a class is declared d) an object goes out of scope

3) _____ can be overloaded.
   a) Object b) Functions c) Operators d) Both b and c

4) _____ provides a reuse mechanism.
   a) Abstraction b) Inheritance
   c) Dynamic binding d) Encapsulation

5) _____ access specifier is used as a default in a class definition.
   a) protected b) public c) private d) friend

6) _____ keyword is used to overload an operator.
   a) overload b) operator c) friend d) override

7) _____ header file includes definition of cin and cout.
   a) istream.h b) ostream.h c) iomanip.h d) iostream.h

8) _____ is not a type of inheritance.
   a) Multiple b) Multilevel c) Distributive d) Hierarchical

9) _____ constructor is not a type of constructor.
   a) Copy b) Friend c) Default d) Parameterized

10) << operator is called as _____ operator.
   a) Main b) Output
   c) Input d) Scope resolution

11) _____ means wrapping up of data and functions together.
   a) Abstraction b) Encapsulation
   c) Inheritance d) Polymorphism

12) _____ is an invalid visibility mode while inheriting a class.
   a) public b) private c) protected d) friend

13) cin is a/an _____
   a) operator b) function c) object d) macro

14) _____ term is used for a function defined inside a class.
   a) Member Variable b) Member function
   c) Class function d) Classic function

2. Solve **any seven** of the following. **14**

1) Define Keywords.
2) Define Call by value method.
3) What is OOP ?
4) Define Output stream operator.
5) Define any two modifiers.
6) What is parameterized constructor ?
7) Define syntax of Class.
8) Define New operator in C++.
9) What is Inheritance ?

3. A) Attempt **any two** of the following. **10**

   1) What is difference between OOP and POP ?

   2) Explain Constructor overloading with example.

   3) Explain Pointer arithmetic operations.

   B) Write a program for calculate the factorial number of a given number by using OOP concept. **4**

4. Attempt **any two** of the following. **14**

   1) Explain Multilevel Inheritance with example.

   2) Explain Unary operator overloaded by friend function with example.

   3) Explain Pure virtual function.

5. Attempt **any two** of the following. **14**

   1) Explain Destructor with example.

   2) Explain Run time polymorthism with example.

   3) Explain Datatypes in C++.

SLR-Z – 56

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2015
COMPUTER SCIENCE
RDBMS (Paper – IV)
(New CGPA Pattern)

Day and Date : Friday, 27-11-2015 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **All** questions carry **equal** marks.*

1. Choose correct alternative : **14**

1) Data is a _____
   a) Raw fact and figure b) Meta Data
   c) Information only d) None of these

2) A repository of information about a database is known as a
   a) Data Dictionary b) Distributed database
   c) File d) None of the above

3) Anything which exists and is distinguishable from one another is known as
   a) Entity b) Attribute
   c) Relationship d) None of the above

4) The number of tuples in a relation is known as
   a) Cardinality b) Degree c) Modality d) None of the above

5) The overall description of the database is known as
   a) Instance b) Schema c) Snapshot d) None of the above

6) The relationship between a weak entity-set is called as the
   a) Weak relationship b) Identifying relationship
   c) Connecting relationship d) Associative relationship

7) A NULL means
   a) Unknown b) Known
   c) Know Partially d) None of the above

P.T.O.

8) A virtual relation is also known as a
   a) View b) Table c) Snapshot d) None of the above

9) When we want to display records with attributes from many relations then we use
   a) SELECT operation b) PROJECT operation
   c) JOIN operation d) None of the above

10) Group of procedures, functions, variables, constants, cursors are put in a single unit called as
   a) Class b) Package
   c) PL/SQL d) None of the above

11) % and _(underscore) are
   a) Relational operators b) Arithmetic operators
   c) Like operators d) None of the above

12) ROLLBACK, COMMIT AND SAVEPOINT are
   a) DMLs b) DDLs c) VDLs d) TCLs

13) A query within a query is called as
   a) Sub query b) New query
   c) Parent query d) None of the above

14) A buffer use to store results of the recent query
   a) Cursor b) Triggers c) Packages d) Exceptions

2. Solve **any seven** of the following : **14**

1) What is difference between DBMS and RDBMS ?
2) What is stored procedure ?
3) What is Online Transaction Processing (OLTP) ?
4) What is cross-join ?
5) What is Constraint ?
6) What is difference between Delete and Truncate command ?
7) What is query ?
8) What is view ? Types of view.
9) What are the DML statements.

3. A) Attempt **any two** of the following : **10**
   1) Write note on components of a DBMS.
   2) Explain aggregate functions with example.
   3) What is meant by PL/SQL ? Explain its advantages.

   B) Write pl/sql block to find given number is odd or even. **4**

4. Attempt **any two** of the following : **14**
   1) Write procedure to find greatest number from given two numbers.
   2) What are the advantages and disadvantages of a DBMS ?
   3) What is meant by sub query ? Explain it's type with example.

5. Attempt **any two** of the following : **14**
   1) What is meant by cursor ? Explain it's type and attributes.
   2) Create trigger which allow to insert records into Employees table only in working day and hour.
   3) Define Join. It's types with suitable example.

SLR-Z – 57

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2015
BIOCHEMISTRY (Paper – I) (New CGPA Pattern)
Biomolecules

Day and Date : Saturday, 28-11-2015 Total Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Write chemical reactions ***where*** *involved.*
3) Figures to the ***right*** *indicate* ***maximum*** *marks.*

1. Write following sentences by selecting most correct answer from the following : **14**

i) Fructose is a _____
a) aldohexose b) ketohexose c) aldopentose d) ketopentose

ii) _____ amino acid contains sulphur in its structure.
a) Glycine b) Valine c) Proline d) Mithionine

iii) Each enzyme name ends with word _____
a) ose b) ate c) ase d) yse

iv) Vitamin _____ is fat soluble vitamin.
a) B1 b) B2 c) B6 d) A

v) _____ is an example of ketotriose.
a) Glucose b) Fructose
c) Lactose d) Dihydroxy acetone

vi) Terpenes are the lipids derived from _____
a) Isoprene b) Waxes
c) Phospholipids d) Sterols

vii) Isoelectric pH (pI) for aspartic acid is _____
a) = 7.0 b) > 7.0 c) < 7.0 d) = 0.0

viii) Galactose is a component of _____
a) sucrose b) cellulose c) lactose d) amylose

P.T.O.

ix) Fumarase enzyme show _____ specificity for fumaric acid.
a) geometric b) group c) optical d) absolute

x) Deficiency of Vitamin A results _____
a) night blindness b) beriberi c) cheilosis d) glossitis

xi) _____ reagent is used for osazone formation.
a) Phenyl hydrazine b) Alk. Copper sulphate
c) $NaBH_4$ d) Ninhydrin

xii) Terpenes are the lipids derived from _____
a) isoprenes b) waxes
c) phospholipids d) sterols

xiii) Vitamin B6 is also called as _____
a) riboflavin b) thiamine c) pyridoxine d) niacin

xiv) Pantothenic acid also occurs as _____ Carrier Protein (ACP).
a) Acid b) Amide c) Acyl d) Aldehyde

2. Attempt **any seven** of the following : **14**

i) Draw the structures of pyridoxine and riboflavin.

ii) Define the terms :
a) Enzyme
b) Enzyme inhibitors.

iii) Explain albumins and globulins.

iv) Write two differences between cellulose and amylopectin.

v) Write two types of simple lipids with one example each.

vi) Write the structures of two hydroxyl amino acids.

vii) Draw structures of stearic acid and lauric acid.

viii) What are deficiency disorders of niacin ? What are enantimoers ? Explain with suitable examples.

ix) Why sucrose is a non reducing sugar ?

3. A) Attempt **any two** of the following : **10**
   i) What are the characteristics of an active site of enzyme ?
   ii) Classify compound lipids with example.
   iii) Describe the secondary structure of protein.

   B) Explain quaternary structure of protein. **4**

4. Attempt **any two** of the following : **14**
   i) What are polysaccharides ? Explain in detail starch, glycogen and cellulose.
   ii) Write structure, biochemical role, deficiency disorders of riboflavin.
   iii) What are carbohydrates ? Classify oligosaccharides with examples.

5. Attempt **any two** of the following : **14**
   i) Write note on factors affecting enzyme activity.
   ii) Explain in detail complex proteins with sub classification.
   iii) Write note on Line Weaver-Burk Plot.

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SLR-Z – 58

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PLANT PROTECTION (New CGPA Pattern)
Paper – I : Major Crops and Methods of Integrated Plant Protection

Day and Date : Saturday, 28-11-2015 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) **All** questions carry **equal** marks.*

1. Choose and write the correct answer from the given alternatives : **(1×14=14)**

i) *Cajanus cajan* is the scientific name of _____
a) Cotton b) Tur c) Jowar d) Groundnut

ii) _____ are used as biofertilizers.
a) Azolla b) BGA c) Mycorrhizae d) All the above

iii) Antagonism involves _____
a) amenalism b) competition
c) parasitism and predation d) all the above

iv) *Verticillium lecanii* is used as _____ pesticide.
a) Fungal b) Bacterial c) Viral d) Both (a) and (b)

v) The trade name 'Biotrol' is applied to the source of _____ pesticide.
a) Fungal b) Viral c) Bacterial d) None of these

vi) Sanitation and crop rotation are the _____ methods of plant protection.
a) Chemical b) Physical c) Cultural d) Mechanical

vii) Prevention of entry of any pest or pathogen in to any country along with plant material is called _____
a) Resistance b) Introduction c) Quarantine d) Accommodation

P.T.O.

viii) Mechanical methods of plant protection include _____
a) Shaking of plants b) Netting
c) Bagging d) All the above

ix) _____ is a vegetable crop.
a) Mango b) Grape c) Cabbage d) Wheat

x) _____ are cultivated as ornamental plants.
a) Roses b) Mango c) Sugarcane d) Wheat

xi) Applications of dry heat during hot summer kill _____ in seeds.
a) Bacteria b) Pests c) Fungi d) Both (b) and (c)

xii) Light traps are used for the _____ of insects.
a) Attraction b) Mass killing c) Repellent d) Both (a) and (b)

xiii) The main object of proper spacing of crops is to _____
a) Increase yield b) Decrease yield
c) Increase attraction d) All the above

xiv) The type and timing of tillage influences the _____
a) Soil environment b) Survival of insect pest
c) Crop longevity d) Both (a) and (b)

2. Attempt **any seven** of the following : **(7×2=14)**

i) Give the scientific name of cotton with family.

ii) Describe the morphology of sunflower.

iii) Give the fertilizers required for Sugarcane.

iv) State the economic importance of grape.

v) Define biofertilizers.

vi) What is antagonism ?

vii) State the use of sticky bands in plant protection.

viii) What is biological control ?

ix) Define floriculture.

3. A) Attempt **any two** of the following : **(2×5=10)**
   i) Give the soil type and fertilizers requirements for the Jowar.
   ii) Explain the role of organic farming in Agriculture.
   iii) Give the importance of crop rotation in plant protection.

   B) Add a note on biological control of pests and diseases. **4**

4. Attempt **any two** of the following : **(2×7=14)**
   i) Explain the role of resistant varieties in the management of pests and diseases.
   ii) Give the cultural practices of groundnut with respect to soil types, fertilizers and disease management.
   iii) Explain the role of fungicides in disease management.

5. Attempt **any two** of the following : **(2×7=14)**
   i) Describe any two types of biocontrol agents of pests.
   ii) Add a note on plant quarantine.
   iii) Describe the cultural methods of plant protection with respect to tillage and planting dates.

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SLR-Z – 59

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PHYSICS (Paper – IV) (New) (CGPA Pattern)
Electronics

Day and Date : Monday, 30-11-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw the circuit diagram ***wherever*** *necessary.*
4) ***Use*** *of calculator/logtable is* ***allowed****.*

1. Choose and write a correct answer from given **four** alternatives : **14**

1) In common mode differential amplifier
   a) both the inputs are grounded
   b) both the outputs are connected together
   c) an identical signal appears on the both inputs
   d) an input signals are 180° phase to each other

2) Negative Feedback in amplifier circuit
   a) increases the distortion
   b) increases the bandwidth
   c) increases the noise
   d) increases the instability

3) _____ oscillators are used as timing device in electronic clocks.
   a) Phase shift
   b) Colpitt's
   c) Crystal
   d) Hartley

4) In a practical LC tank circuit the oscillations are
   a) undamped sinusoidal
   b) damped triangular
   c) undamped sawtooth
   d) damped sinusoidal

5) A voltage at which drain current (Id) levels off is called
   a) breakdown voltage
   b) reverse saturation voltage
   c) pinch off voltage
   d) ohmic voltage

6) In unijuction transistor the n region is _____ doped than the p region.
   a) heavily b) moderately
   c) lightly d) positively

7) In the R – S Flip-flop using NAND gate, R = 0 and S = 0 gives _____ of flip-flop.
   a) setting state b) not allowed state
   c) resetting state d) no change state

8) A logical circuit used to perform addition of three binary bits is called as
   a) half adder b) full adder
   c) multiple adder d) single adder

9) IC 79XX provides _____ fixed output voltage.
   a) positive b) negative
   c) dual d) pulsed

10) A simple transistorised series voltage regulator is also called
   a) base - follower regulator b) emitter follower regulator
   c) collector follower regulator d) shunt regulator

11) A simple capacitor filter circuit connected after the rectifier circuit
   a) regulates the a.c voltage
   b) blocks the d.c. and passes a.c. voltages
   c) Converts d.c. voltage into a.c. voltages
   d) blocks a.c. and pass d.c. voltages

12) In Cathode Ray Tube (CRT) the control grid is kept at _____ potential with respect to the Cathode.
   a) positive b) negative
   c) zero d) positive variable

13) ACRO is used to measure
   a) voltage b) frequency
   c) phase d) all of these

14) Differential amplifier has _____ output impedance than ordinary amplifier.
   a) high b) low
   c) moderate d) powerful

2. Answer **any seven** of the following : **14**

   1) What are the drawbacks associated with a RC coupled amplifier ?

   2) What are the advantages of a differential amplifier ?

   3) What do you mean by Feedback ? Write the advantages of negative Feedback.

   4) Explain the Backhausen's criterion for sustained oscillations.

   5) State the DeMorgan's theorems.

   6) Construct the logic diagram for half adder using XOR and AND gate.

   7) Write any four uses of CRO.

   8) Define the terms line regulation and load regulation.

   9) Draw an equivalent circuit of UJT.

3. A) Attempt **any two** of the following : **10**

      1) What are the different methods of biasing the transistor ? Explain voltage divider bias method with circuit analysis.

      2) Draw the logic diagram for RS flip-flop using NAND gates and explain its working with truth table.

      3) What is an oscillator ? Draw the circuit diagram of Hartley oscillator and explain its working.

   B) Determine the series resonant and parallel resonant frequencies of the crystal oscillator with L = 3H, C = 0.05 pF, R = 2000 Ω , Cm = 10 pF. **4**

4. Attempt **any two** of the following : **14**

   1) Explain the two stage transistorised RC coupled amplier with circuit diagram and write its advantages.

   2) Explain the principle, construction and working of n – channel JFET with output characteristics.

   3) What do you mean by forbidden state of flip-flop ? Explain the working of J – K flip-flop with logic diagram and truth table.

5. Attempt **any two** of the following : **14**

   1) Explain the principle, construction and working of CRO with block diagram.

   2) Explain the principle, construction and working of UJT. Draw the circuit for UJT relaxation oscillator and derive an expression for frequency of an oscillation.

   3) What do you mean by rectification and regulation ? Explain the function of filter in d.c. power supply. Draw the circuit of transistor series voltage regulator and explain its working.

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SLR-Z – 60

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2015
BIOCHEMISTRY (Paper – II) (New CGPA Pattern)
Biochemical Techniques

Day and Date : Monday, 30-11-2015 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Write chemical reactions **where** involved.*
*3) Figures to the **right** indicate maximum marks.*

1. Write following sentences by selecting most correct answer from the following : **14**

i) In spectrophotometric measurements generally _____ bulb is used as a source of radiation.

a) Tungsten b) Sodium vapours
c) Helium d) Mercury

ii) Whole cells are immobilised by _____ method.

a) Ionic binding b) Physical adsorption
c) Gel entrapment d) Covalent binding

iii) In thin layer chromatography, glass is used as _____

a) An adsorbent b) A stationary phase
c) A support d) A binder

iv) A person can apply for a patient when he claims that he is the _____ inverter of that invention.

a) Second b) Third
c) First d) Fourth

v) In electrophoresis the effect of the electrophoresis can be minimised by _____

a) Applying low voltage
b) Applying high voltage
c) Passing more current
d) Increasing buffer concentration of electrolytes

vi) In spectrophotometer _____ converts light signal into electrical signal.

a) Galvanometer b) Diagonal mirror

c) Photocell d) Mercury lamp

vii) Saccharomyces cereviceae is used for production of _____ using immobilization technique.

a) Penicillin b) Ethanol

c) Steroids d) Vitamins

viii) Diazo binding method is prepared by treating aromatic amino group with _____ in acidic medium.

a) Nitrate b) Nitrile

c) Nitrite d) Nitro

ix) In chromatographic separation mobile phase cannot be a _____

a) Solid b) Liquid

c) Gas d) Mixture of gases

x) _____ blotting is not a blotting technique.

a) Western b) Estern

c) Northern d) Southern

xi) The instrument used for PCR is called _____

a) RNA electrical cycler b) DNA electrical cycler

c) RNA thermal cycler d) DNA thermal cycler

xii) According to Beer's law absorbance of coloured solution depends on its _____

a) Length of medium b) pH of medium

c) Nature of colour d) Concentration of colouring solution

xiii) Sephadex gel beads are prepared from _____

a) Acrylamide b) Starch gel

c) Agarase d) Dextran

xiv) In starch gel electrophoresis proteins are separated according to their _____

a) Concentration of buffer b) Charge and size

c) Only charge d) Only molecular weight

2. Attempt **any seven** of the following : **14**

   i) What is the principle for gel permeation chromatography ?

   ii) What is the effect of change in voltage on electrophoretic mobility ?

   iii) State and explain Lambert's law.

   iv) Define PCR and ELISA.

   v) Explain production of antibiotics.

   vi) Define chromatography. Give the formula of R_f value.

   vii) What is intellectual property ?

   viii) Write advantages of immobilised enzymes.

   ix) Write uses of thin layer chromatography.

3. A) Attempt **any two** of the following : **10**

   i) Write note on adsorption on carriers and covalent binding to carriers.

   ii) Explain principle and technique of starch gel electrophoresis.

   iii) Draw schematic diagram and applications of southern blotting.

   B) Explain applications and advantages of HPLC. **4**

4. Attempt **any two** of the following : **14**

   i) What is the principle of SDS-PAGE ? How is SDS-PAGE is used to find the molecular weight of proteins ?

   ii) Explain applications of PCR.

   iii) Write the column packing, elution and working of gel permeation chromatography.

5. Attempt **any two** of the following : **14**

   i) With suitable diagram explain the construction of spectrophotometer.

   ii) Explain procedure, advantages, disadvantages of patient. What do you mean by trade secretes and trade mark ?

   iii) Write the industrial applications of immobilised enzymes.

SLR-Z – 61

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PLANT PROTECTION (CGPA Pattern) (New)
Paper – II : Crop Diseases and their Management

Day and Date : Monday, 30-11-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw a **neat** labelled diagram **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) **All** questions carry **equal** marks.*

1. Rewrite the correct answer from the given alternatives : **(1×14=14)**

i) The abnormal increase in the size of the cell which is known as _____
   a) symptoms b) hyperplasia
   c) hypertrophy d) hypoplasia

ii) The branch of pathology in which plant diseases are studied in relation to their occurance is called as _____
   a) epidemiology b) hypodemiology
   c) etiology d) all the above

iii) The infection is the process of beginning of disease was shown by Chester in _____
   a) 1953 b) 1954
   c) 1955 d) 1956

iv) Grassy shoot of sugarcane was reported from Maharashtra in _____
   a) 1945 b) 1944
   c) 1943 d) 1942

v) Yellow vein mosaic of bhendi is native of _____
   a) Australia b) India
   c) Thailand d) Madagascar

vi) Citrus canker disease is controlled by using _____ chemical.
   a) Streptomycin b) Copper
   c) Zink d) Chlorine

vii) Powdery mildew of cucurbits is caused by the member of
   a) Basidiomycetes b) Oomycetes
   c) Ascomycetes d) Zygomycetes

viii) Causal organism of downy mildew of grapes is _____
   a) *Cercospora personata* b) *Xanthomonas citri*
   c) *Hibiscus viras – 10* d) *Plasmopara viticola*

ix) The decrease in yield or productivity per unit plant is called as _____ loss.
   a) Quantitative b) Qualitative
   c) Cumulative d) Competitive

x) In incubation methods, thermophilic bacteria require _____ temperature for multiplication.
   a) 52°C b) 53°C
   c) 54°C d) 55°C

xi) Early blight of tomato is a _____ disease.
   a) Fungal b) Bacterial
   c) Viral d) Mycoplasma

xii) *Sphacelotheca sorghi* causes grain smut disease of _____
   a) Sugarcane b) Jowar
   c) Bhendi d) Brinjal

xiii) Groundnut rust disease is caused by the species of _____
   a) *Puccinia* b) *Albugo*
   c) *Cercospora* d) *Alternaria*

xiv) Rust of soybean is a _____
   a) Bacterial b) Fungal
   c) Viral d) Phytoplasma

2. Answer **any seven** of the following : **(7×2=14)**

i) Define the etiology.

ii) Write the symptoms of citrus canker.

iii) What is hypersensitivity ?

iv) Give the control measures of leaf curl of chilli.

v) Define plant disease.

vi) What is reproduction of disease ?

vii) Give the symptoms of GSD of sugarcane.

viii) What is incubation ?

ix) What disease triangle ?

3. A) Answer **any two** of the following : **(2×5=10)**

i) Define pathogenesis and explain the eradication studied by you.

ii) Explain the symptoms, causal organism and control measures of early blight of tomato.

iii) Give the qualitative method of assessment of crop loss studied by you.

B) Explain the classification of plant disease based on symptoms. **4**

4. Answer **any two** of the following : **(2×7=14)**

i) Write symptoms, causal organism and control measures of little leaf of brinjal.

ii) Define immunity and write a note on Koch's postulates.

iii) Describe the symptoms, causal organism and control measures of rust of Soybean.

5. Answer **any two** of the following : **(2×7=14)**

i) Define susceptibility and explain the factor affecting the infection.

ii) Give the symptoms and control measures of rust of groundnut.

iii) Discuss any two methods of isolation.

SLR-Z – 62

Seat No.	

B.Sc. II (Semester – III) Examination, 2015
STATISTICS (Paper – III) (CGPA Pattern) (New)
Continuous Probability Distributions – I

Day and Date : Tuesday, 1-12-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory** and carry **equal** marks.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative. **14**

1) $E[Y \mid X = x]$ is called the

a) regression line of Y on X b) regression line of X on Y
c) Both (a) and (b) d) none of these

2) Which of the following sample space is not a continuous sample space ?

a) $\{x \mid x \geq 0\}$ b) $\{x \mid -\infty < x < \infty\}$
c) $\{x \mid -5 \leq x \leq 5\}$ d) $\{x \mid x$ is a positive integer$\}$

3) If X and Y are independent random variables with respective means 5 and 4 respective variances 4 and 9, then corr(X, Y) = _____

a) 20/12 b) $20 / \sqrt{(12)}$ c) 0 d) 9/12

4) If $M_X(t)$ is m.g.f. of a continuous r.v.X then $M_X(0)$ = _____

a) 0 b) 1 c) t d) 2

5) Let (X, Y) be a continuous bivariate r.v. with joint pdf

$$f(x,y) = \begin{cases} x+y & ; \ 0 < x < 1 \text{ and } 0 < y < 1 \\ 0 & ; \ \text{otherwise} \end{cases}$$ then the marginal pdf of Y is

a) 2y – 1 b) 2y c) 2y+1 d) $\frac{2y+1}{2}$

P.T.O.

6) Uniform distribution is

a) +vely skewed b) – vely skewed

c) symmetric d) none of these

7) If X is an U(0, 1) r.v. then $-\log_e x$ has _____

a) Exponential distribution with mean 1

b) U(0, 1) distribution

c) Exponential distribution with mean 0.5

d) None of these

8) If X~exp(θ), then distribution of $Z = e^{-\theta x}$ is _____

a) U(0, 1) b) exp(1) c) exp(θ) d) none of these

9) For exponential variate with parameter θ, the coefficient of variation is

a) 1% b) 100% c) 0% d) 10 %

10) If X and Y are independent continuous r.v.s. then their joint c.d.f. F(x,y) =

a) $F_X(x)\ F_Y(x)$ b) $P(X \le x)\ P(Y \le y)$

c) both a) and b) d) none of these

11) If X is an exponential variate with parameter 2 then

a) mean = variance b) mean > variance

c) mean < variance d) none of these

12) The distribution function of X is

$$F(x) = \begin{cases} 0 ; & x < 0 \\ x^2/4 ; & 0 \le x < 2 \\ 1 ; & x \ge 2 \end{cases}$$

then $P(0 < X < 1) =$

a) 0 b) 1/4 c) 1/3 d) 1/2

13) If X ~ U (–1, 1) then $\mu_2 =$

a) 1/6 b) 0 c) 1/3 d) 1

14) If X is an exponential variate with mean 2 then quartile deviation of X is

a) $\log_e 3$ b) $\log_3 e$ c) $\log_e 2$ d) $\log_2 e$

2. Attempt **any seven**. **14**

a) For a continuous bivariate r.v. (X, Y), define conditional distribution of X given Y = y.

b) If X ~ U (–1/2, 1/2) then state mean and variance of X.

c) State m.g.f. of exponential distribution with mean 5.

d) Let r.v. X~ exp(1). State median of X.

e) Define H.M. of a continuous r.v.

f) If X is a continuous r.v. with p.d.f. $f(x) = x^2/3 \; ; -1 \le x \le 2$

$= 0 \quad ;$ otherwise

find median of X.

g) Suppose that (X, Y) is a bivariate r.v. with joint p.d.f.

$$f(x,y) = C \; ; \; 5 \le x \le 10, \; 4 \le y \le 6$$
$$= 0 \; ; \text{ otherwise}$$

find the value of C.

h) Define m.g.f. of a bivariate continuous r.v.s. (X, Y).

i) Define C.D.F. of a continuous r.v. X.

3. A) Attempt **any two**. **10**

a) A continuous r.v. X has pdf

$$f(x) = \begin{cases} 2x, & 0 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$, obtain probability distribution of Y = 2X + 3.

b) If $f(x) = \begin{cases} 6x(1-x), & 0 < x < 1 \\ 0 \quad\quad , & \text{otherwise} \end{cases}$

then check whether f(x) is pdf, if yes obtain its c.d.f.

c) Let X and Y be two continuous random variables, then show that E(XY) = E(X) + E(Y).

B) The joint p.d.f. of (X, Y) is given by

$$f(x,y) = \begin{cases} kxe^{-y}, & 0 < x < 1,\ 0 < y < \infty \\ 0, & \text{otherwise} \end{cases}$$

find k and marginal distributions of x and Y. **4**

4. Attempt **any two**. **14**

a) If X is a continuous random variable with p.d.f.,

$$f(x) = x/2 \ ; \quad 0 < x < 2$$
$$= 0 \quad ; \quad \text{otherwise}$$

find mean, variance and H.M. of X.

b) State and prove lack of memory property of exponential distribution.

c) If X and Y are two r.v.s. of continuous type, define conditional expectation of Y given X = x and prove that $E[E(Y \mid X = x)] = E(Y)$.

5. Attempt **any two**. **14**

a) The p.d.f. of a r.v. X is given by

$$f(x) = ax^2 + bx \ ; \quad 0 < x < 1$$
$$= 0 \quad ; \quad \text{otherwise}$$

If A.M. = 0.5, find values of a and b. Also find H.M. of X.

b) Define exponential distribution with parameter θ find its m.g.f. and hence or otherwise obtain its mean and variance.

c) The joint p.d.f. of a bivariate continuous r.v. (X, Y) is

$$f(X,Y) = x + y \ ; \quad 0 \le x \le 1 \ , \quad 0 \le y \le 1$$
$$= 0 \quad ; \quad \text{otherwise}$$

Obtain $E(Y \mid X = x)$ and $Var(Y \mid X = x)$.

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Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2015
METEOROLOGY (Paper – I)
Climatology
(New CGPA Pattern)

Day and Date : Tuesday, 1-12-2015 Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** diagrams **wherever** necessary.*
*3) **Use** of stencils is **allowed**.*

1. Choose the correct alternative : **14**

1) Climatology is the study of _____ conditions over a long period.
(temperature, pressure, weather, climate)

2) Isobars are the lines joining places of equal
(pressure, temperature, humidity, salinity)

3) The winds which blow under the influence of planetary pressure distribution are called as _____ winds.
(seasonal, variable, planetary, local)

4) Blizzards are the winds which bring _____ to the region by lowering temperatures.
(rain, fog, hails, snow)

5) Warm and moist conditions prevail in the _____ airmasses.
(meritime equatorial, meritime temperate, polar meritime, polar continental)

6) There are _____ major source regions of the airmasses.
(10, 8, 6, 4)

7) The term 'Monsoon' is derived from _____ word mausim.
(greek, Arabic, French, Hindi)

P.T.O.

8) India receives rainfall during _____ season.
(summer, summer and winter, winter, monsoon)

9) Tamil Nadu receives rainfall during winter due to _____ monsoon.
(Advancing, Retreating, Southwest, Northeast)

10) 40° South latitude is called as _____ forties.
(furious, roaring, screaming, monsoon)

11) The low pressure belt of equatorial areas experiences _____ of air.
(convergence, divergence, subsidence, stability)

12) The cyclones of Pacific ocean are called as _____ in China and Japan.
(hurricane, cyclone, typhoon, storm)

13) The high pressure cells of the North Atlantic Ocean are called as _____ high.
(atlantic, Pacific, Azores, Indian)

14) In Indian Monsoon, there is a complete _____ reversal of wind direction.
(daily, yearly, seasonal, monthly)

2. Answer the questions in short (**any 5**) : **15**

1) Define climate.

2) What is a cyclone ?

3) Define the term airmass.

4) What is a monsoon ?

5) What is a weather ?

6) Define the term front.

3. Answer in short (**any 3**) : **15**

1) Tertiary winds

2) Continental airmass

3) Tornado

4) Humidity.

4. Write short answers (**any 3**) : **15**

   1) Describe the vertical structure of atmosphere.

   2) Explain in brief the secondary circulations of the atmosphere.

   3) What are the source regions of the airmasses ?

   4) Write in brief any one theory of origin of cyclonic depressions.

5. A) Answer **any one** of the questions : **6**

      1) Describe the upper air circulations.

      2) Write in brief the nature of climatology.

   B) Write answer of **any one** question : **5**

      1) Explain in short the modifications of airmasses.

      2) Describe the circulation pattern of atmosphere in Southern hemisphere.

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Seat No.	

B.Sc. II (Semester – III) (New – CGPA Pattern) Examination, 2015
GEOCHEMISTRY (Paper – I)
Introduction to Geochemistry

Day and Date : Tuesday, 1-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagrams **wherever** necessary.*

1. Choose and write answer from given **four** alternatives. **14**

1) Goldschmidt's mineralogical phase rule is
   a) P = F b) P = C c) F = C d) P = T

2) Complete order is present only in perfect crystal at _____ temperature.
   a) room b) high c) zero d) absolute

3) The bond in NaCl crystal is
   a) ionic b) covalent c) polar d) nonpolar

4) A solid solution is a
   a) single crystal b) mixed solution
   c) mixed crystal d) none of these

5) The polymorphous of calcium carbonate is
   a) calcite b) α – quartz c) β – quartz d) kyanite

6) The number of triple points in sulphur system is
   a) one b) two c) three d) four

7) Only one type of bond is present in single compound is called as
   a) heterodesimic b) homodesimic
   c) graphite d) ionic

P.T.O.

8) The radius ratio of NaCl crystal is

a) 0.92 b) 0.73 c) 0.56 d) 0.12

9) The maximum number of oppositly charged ions surrounded by particular ion is called as

a) Co-ordination number b) Radius ratio

c) Geometry of crystal d) Unit cell

10) In sulphur system, there are _____ phases.

a) 1 b) 2 c) 3 d) 4

11) In ice, the number of component is

a) 1 b) 2 c) 3 d) 4

12) The electronegativity difference in NaCl is

a) 1.2 b) 2.1 c) 3.1 d) 4.1

13) Gibb's phase rule is

a) P + F = C + 1 b) P + C = F + 2

c) P + F = C + 2 d) P = F + C + 2

14) In a single chain silicate structure the ratio of Si : O is

a) 1 : 2 b) 1 : 3 c) 1 : 4 d) 2 : 3

2. Solve **any seven** of the following : **14**

1) Define Unit cell.

2) Define mineral. Give one example.

3) State and explain Gibb's phase rule.

4) Draw the frame work structure of silicate.

5) Define radius ratio.

6) Draw the structure of Zinc Sulphide.

7) Show that $CaCO_3 \rightleftharpoons CaO + CO_2$ is a two component system.

8) Which are the state of matter ? Give one example of each.

9) Define lattice energy.

3. A) Attempt **any two** of the following : **10**
   1) Write a note on isomorphism.
   2) Give the general rules of bond type.
   3) State and explain Goldschmidt's mineralogical phase rule.

   B) Discuss in detail electronegativity. **4**

4. Attempt **any two** of the following : **14**
   1) Discuss Sulphur system.
   2) Discuss the principles of crystal structure.
   3) Write a short note on Atomic substitution.

5. Attempt **any two** of the following : **14**
   1) Discuss water system.
   2) Give an account of formation of crystal.
   3) Explain polymorphism.

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Seat No.	

B.Sc. II (Semester – III) (New CGPA Pattern) Examination, 2015
ZOOLOGY (Paper – III)
Animal Diversity – III

Day and Date : Tuesday, 1-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw neat, labelled diagrams ***wherever*** *necessary.*
3) ***All*** *questions carry* ***equal*** *marks.*

1. Choose and write a correct answer from given four alternatives. **14**

1) Tornaria is the larval stage of
a) Annelida b) Arthropoda c) Mollusca d) Hemichordata

2) Peripatus is connecting link between
a) Annelida and Arthropoda b) Annelida and Mollusca
c) Arthropoda and Mollusca d) Annelida and Echinodermata

3) Anal styles are found in
a) Female cockroach b) Male cockroach
c) Butterfly d) Both a and b

4) Numbers of teeth present in gizzard of cockroach are
a) 7 b) 5 c) 6 d) 8

5) In radula of pila _____ teeth are present in single row.
a) 7 b) 6 c) 5 d) 9

6) In Pila, statosyst is organ for
a) Hearing b) Equilibrium c) Vision d) Olfactory

7) Lacinia and galea are the parts of
a) Mandible b) Hypopharynx c) 1^{st} maxilla d) 2^{nd} maxilla

8) Byssus threads are present in
   a) Unio b) Pila c) Sepia d) Mytilus

9) Dengue fever is caused by
   a) Aedes aegypti b) P. vivax c) P.ovalis d) Ascaris

10) Piercing and sucking types of mouth parts are found in
   a) Cockroach b) Butterfly c) Mosquito d) Housefly

11) Bipinnaria is the larval stage of
   a) Annelida b) Echinodermata c) Mollusca d) Hemichordata

12) Swimming types of foots are present in
   a) Aplasia b) Pila c) Sepia d) Mytilus

13) Malpighian tubules in cockroach are used for
   a) Excretory b) Reproductive c) Digestion d) Nervous

14) In cockroach number of ovariols are
   a) 3 b) 4 c) 9 d) 16

2. Solve **any seven** of the following : **14**

1) Crop chamber of cockroach.
2) Systematic position of Pila.
3) Mouth parts of butterfly.
4) Labium of cockroach.
5) Foot in chiton.
6) Digestive gland of Pila.
7) Sexual dimorphism in cockroach.
8) Mushroom gland of cockroach.
9) Control measures of Malaria.

3. A) Attempt **any two** of the following : **10**
   1) Affinities of hemichordate.
   2) Nervous system of cockroach.
   3) Mouth parts housefly

   B) Describe digestive system of Pila. **4**

4. Attempt **any two** of the following. **14**
   1) Heart of Pila.
   2) Circulatory system of cockroach.
   3) Mosquito as disease vector.

5. Attempt **any two** of the following : **14**
   1) Explain digestive system of **P. american**.
   2) Mouth parts of mosquitoes.
   3) Explain male reproductive system of cockroach.

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Seat No.	

B.Sc. – II (Semester – III) (C.G.P.A. Pattern) Examination, 2015
STATISTICS (Paper – IV) (New)
Discrete Probability Distributions and Statistical Methods

Day and Date : Wednesday, 2-12-2015 Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

Instructions: *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative. **14**

i) If X~P(λ), then $P\left[X = 1 \middle/ X > 1 \right] =$ _____

a) $e^{-\lambda}$ b) 1 c) 0 d) $\frac{e^{-\lambda}}{1-e^{-\lambda}}$

ii If X is a Poisson variate with P[X=1] = P[X=2], then the second moment about origin μ_2' is

a) 2 b) 6 c) 4 d) 1

iii) Binomial distribution tends to Poisson distribution if

a) $n \to \infty$ b) $p \to 0$ c) $np = \lambda$ d) all the above

iv) If X ~ Geo(0.9), then the distribution of X + 1 is _____ distribution.

a) Poisson b) Geometric c) Waiting time d) None of these

v) If X ~ NB(r, p) such that E(X) = 15 and V(X) = 60, then

a) $r = 5,\ p = \frac{3}{4}$ b) $r = 5,\ p = \frac{1}{4}$ c) $r = 15,\ p = \frac{1}{2}$ d) $r = 3,\ p = \frac{1}{5}$

vi) If X is a geometric r.v. then $P\left[X \geq 6 \middle/ X \geq 2 \right]$ is equal to

a) $P[X \geq 2]$ b) $P[X \geq 6]$

c) $P[X \geq 6]/P[X \geq 2]$ d) $P[X \geq 4]$

P.T.O.

vii) Let (X_1, X_2, X_3, X_4) be a random vector follows multinomial distribution with usual notations, then $V(X_3)$ is

a) nP_3 b) $4P_3$ c) $P_3(1 - P_3)$ d) $nP_3(1 - P_3)$

viii) The range of partial correlation coefficient is

a) –1 to 1 b) 0 to 1 c) $-\infty$ to ∞ d) 0 to ∞

ix) If $V(X_{1.23}) = 0$ then

a) $R_{1.23} = 1$ b) $R_{1.23} = 0$

c) $R_{1.23} = 0.5$ d) $R_{1.23}$ cannot be determined

x) The necessary and sufficient condition for the three planes X_1 on X_2 and X_3; X_2 on X_1 and X_3 and X_3 on X_1 and X_2 are coincident is

a) $r_{12} + r_{13} + r_{23} - 2r_{12}r_{13}r_{23} = 1$ b) $r_{12}^2 + r_{13}^2 + r_{23}^2 - 2r_{12}r_{13}r_{23} = 0$

c) $r_{12}^2 + r_{13}^2 + r_{23}^2 - 2r_{12}r_{13}r_{23} = 1$ d) $r_{12} + r_{13} + r_{23} - 2r_{12}r_{13}r_{23} = 0$

xi) With usual notations, the regression equation X_3 on X_1 and X_2 is

a) $X_3 = b_{31.2}X_1 + b_{32.1}X_2$ b) $X_3 = b_{13.2}X_1 + b_{23.1}X_2$

c) $X_3 = b_{12}X_1 + b_{31}X_2$ d) None of these

xii) A measure of linear association of a variable say X_1 with number of other variables $X_2, X_3, \ldots\ldots X_k$ is

a) partial correlation b) simple correlation

c) multiple correlation d) auto correlation

xiii) If $R_{1.23} = 1$, then $R_{2.13}$ is equal to

a) 0 b) 0 to 1 c) 1 d) None of these

xiv) The partial correlation coefficient $r_{13.2}$ is called

a) first order partial correlation b) zero order partial correlation

c) second order partial correlation d) none of these

2. Attempt **any seven** of the following. **14**

i) For a Poisson distribution $P[X = 1] = 0.03$ and $P[X = 2] = 0.15$. Find $P[X = 0]$.

ii) State and prove the recurrence relation for probabilities of negative Binomial distribution.

iii) Define geometric distribution and state its mean.

iv) Define multinomial distribution and state its m.g.f.

v) Find the mean of residual.

vi) Write the equation of regression plane of X_3 on X_1 and X_2 in terms of co-factors.

vii) Define Multiple correlation coeficient.

viii) If $r_{13.2} = 0$, then prove that $r_{12.3} = r_{12}\sqrt{\frac{1-r_{23}^2}{1-r_{13}^2}}$.

ix) With usual notations, show that $r_{13.2} = \sqrt{b_{13.2} \times b_{31.2}}$.

3. A) Attempt **any two** of the following. **10**

i) If X and Y are two independent Poisson variates with parameters λ_1 and λ_2 respectively, then find the conditional distribution of X given (X + Y) = n.

ii) Let X be geometric variate with parameter p, then

a) Show that $P[X \geq x] = (1 - p)^x$

b) Find the distribution of X + 1.

iii) With usual notations, prove that $b_{12.3} = \frac{b_{12} - b_{13}.b_{32}}{1 - b_{23}.b_{32}}$.

B) If $r_{12} = r_{13} = r_{23} = \rho$, then show that $1 - R_{1.23}^2 = \frac{(1-\rho)(1+2\rho)}{(1+\rho)}$. **4**

4. Attempt **any two** of the following. **14**

i) Define negative binomial distribution with parameters r and p and give two real life situations where it is observed. Also find its mean and variance.

ii) Derive the equation of regression plane of X_1 on X_2 and X_3 by method of least square.

iii) If X_1 and X_2 are two independent variables with unit variances, then find multiple correlation coefficient of X_1 on $X_1 + X_2$ and $X_1 - X_2$.

5. Attempt **any two** of the following. **14**

i) Define Poisson distribution; find its probability generating function (p.g.f.) hence or otherwise find its mean and variance.

ii) Suppose $X_1, X_2, X_3, ...X_r$ are independent and identically distributed random variables having geometric distribution with parameter p, then show that $\sum_{i=1}^{r} X_i$ follow Negative Binomial Distribution (NBD). Also find p.g.f. of NBD with parameters r and p.

iii) Define partial correlation coefficient. Derive an expression of partial correlation coefficient in terms of simple correlation coefficients.

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Seat No.	

B.Sc. – II (Sem. – III) (CGPA Pattern) (New) Examination, 2015
METEOROLOGY
Paper – II : General Meteorology

Day and Date : Wednesday, 2-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) Draw neat diagrams wherever ***necessary****.*

1. Choose and write a correct answer from given alternatives : **14**

i) Rayleigh's scattering is also known as _____
   a) coherent scattering
   b) incoherent scattering
   c) coherent as well as incoherent
   d) incoherent but not coherent

ii) Blue appearance of sky is due to _____
   a) scattering of light or sunlight
   b) diffused reflection of sunlight or light
   c) absorption of sunlight
   d) refraction of sunlight

iii) If i is angle of incidence and r is angle of reflection then the correct relation between them for diffused reflection is _____
   a) $i < r$ b) $i = r$ c) $i > r$ d) $i \geq r$

iv) In isochoric process _____ remains constant.
   a) temperature b) pressure c) entropy d) volume

v) The ozone layer in the earth's atmosphere absorbs _____ sunlight.
   a) infrared b) visible c) ultraviolet d) microwave

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vi) Smog formation is due to ozone in the _____
a) thermosphere b) photosphere
c) troposphere d) stratosphere

vii) Centrifugal force is given by F = _____
a) $-mr\omega^2$ b) $-mr^2\omega^2$ c) $-mr\omega$ d) $-mr$

viii) A frame of reference rotating with respect to the fixed frame is known as _____ frame of reference.
a) an inertial b) non-inertial c) fixed d) pseudo

ix) _____ force is a pseudo force.
a) Gravity b) Pressure c) Coriolis d) Frictional

x) "To every action there is equal and opposite reaction and the two acts simultaneously on two different bodies" is statement of Newton's _____ law of motion.
a) First b) Second c) Third d) Zeroth

xi) Period of geo-synchronous satellite is equal to _____ hour.
a) 3 b) 6 c) 12 d) 24

xii) A photovoltaic cell converts solar energy into _____ energy.
a) Mechanical b) Thermal c) Electrical d) Kinetic

xiii) For the formation of water droplets _____ nuclei are necessary.
a) condensation b) central c) evaporation d) peripheral

xiv) Bergeron-Findeisen theory is used to explain _____
a) condensation b) raindrop formation
c) evaporation d) photosynthesis

2. Solve **any seven** of the following : **14**

i) What is global warming ?

ii) Explain formation of smog.

iii) Mention effects of scattering.

iv) Mention uses of artificial satellites.

v) What is non-inertial frame of reference ?

vi) What are effects of depletion of ozone layer ?

vii) How chain and modules are formed using a solar cell ?

viii) Explain the need of condensation nuclei.

ix) Draw neat diagram of a solar cell.

3. A) Attempt **any two** of the following : **10**

i) Explain “Artificial rain”.

ii) Discuss effects of scattering.

iii) Explain absorption of solar radiation by ozone.

B) Why multistage rockets are used while launching satellites ? **4**

4. Attempt **any two** of the following : **14**

i) Discuss geostrophic wind.

ii) Explain depletion of ozone layer and formation of ozone hole.

iii) Explain the radiation budget of earth and its atmosphere in relation with scattering, reflection and absorption.

5. Attempt **any two** of the following : **14**

i) Bergeron-Findeisen theory of precipitation.

ii) What do you mean by ‘geo-stationary satellite’ ?

iii) How rotation of earth gives rise to Coriolis force ? Obtain the necessary expression.

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Seat No.	

B.Sc. – II (Semester – III) (New CGPA Pattern) Examination, 2015
GEOCHEMISTRY (Paper – II)
Introduction to Solar System and Geo-Spheres

Day and Date : Wednesday, 2-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m..

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*

1. A) Choose and write a correct answer from given **four** alternatives. **14**

1) The main gaseous constituents of present day atmosphere are _____
a) H_2O, H_2, CO_2 b) N_2, O_2, Ar c) N_2, O_2, CO_2 d) N_2, O_2, O_3

2) _____ protects troposphere from the UV radiations.
a) O_2 b) O_3 c) O_4 d) H_2O

3) The most variable constituent of the atmosphere is
a) O_2 b) SO_2 c) CO_2 d) H_2O

4) Which one of the following is NOT included as particulate matter in the atmosphere ?
a) Dust particles b) Salt particles
c) Pollen grains d) Sand particles

5) The lower most atmosphare layer is
a) Troposphere b) Stratosphere
c) Mesosphere d) Thermosphere

6) _____ are responsible for the important temperature controlling mechanism known as the green house effect.
a) H_2O & O_2 b) H_2O & O_3 c) H_2O & CO_2 d) H_2O & O_4

7) The addition of 40_{Av} in the atmosphere by the radioactive decay of _____ took place through out geologic time.
a) ^{38}K b) ^{40}Na c) ^{40}K d) ^{38}Na

8) Loss of hydrogen and helium in the atmosphere took place by _____ from the earth.
   a) formation of coal and petroleum
   b) locked in carbonate sediments
   c) escape in space
   d) combustion of coal

9) The major dissolved constituent in the sea water is
   a) Br b) Cl c) SO_4 d) HCO_3

10) The chemical composition of river is a function of
   a) amount of rainfall b) rock types
   c) relief d) all of these

11) Which planets revolve in retrograde motion ?
   a) Earth & Mars b) Uranus & Venus
   c) Neptune & Pluto d) Mercury & Jupiter

12) In cosmic abundance of elements; elements of _____ atomic number are more abundant than those of _____ atomic number.
   a) even------- odd b) odd ------ even
   c) high ------- low d) low----- high

13) The gaseous composition of terrestrial water is
   a) $CO_3 > SO_4 > Cl$ b) $Cl > SO_4 > CO_3$
   c) $SO_4 > Cl > CO_3$ d) $CO_3 < SO_4 < Cl$

14) Nitrogen from the atmosphere is removed by _____ processes.
   a) organic b) inorganic
   c) both organic& inorganic d) none of these

2. Solve **any seven** of the following : **14**

1) At what depths Mohorovicic discontinuity occurs below ocean and continental base ?

2) What is pyrolite ?

3) What is composition of lower mantle ?

4) What is composition of troilite ?

5) Chondrites and achondrites are types of which meteorite ?

6) Role of river water and rain in salinity of ocean.

7) What is transition zone ?

8) Contribution of volcanoes in evolution of atmosphere.

9) Who coined the concept of geochemical classification of the elements ?

3. A) Attempt **any two** of the following : **10**

1) Gains and losses of elements in oceanic water.

2) Composition of terrestrial water.

3) Why meteorites are important to study cosmic abundance of elements ?

B) What is composition of crust ? **4**

4. Attempt **any two** of the following : **14**

1) Describe meteorites. What are their types ?

2) Evolution of atmosphere in its second stage.

3) Describe composition of sea water.

5. Attempt **any two** of the following : **14**

1) Explain in brief Geochemical classification of elements.

2) Describe cosmic abundance of elements.

3) Composition of the earth as a whole.

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Seat No.	

B.Sc. – II (Semester – III) (CGPA Pattern) (New) Examination, 2015
ZOOLOGY (Paper – IV)
Cell Science, Genetics, Biological Chemistry and Economic Zoology

Day and Date : Wednesday, 2-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *neat labelled diagrams* ***wherever*** *necessary.*

1. Complete the sentence selecting appropriate answer : **14**

1) Mitosis is _____ cell division.
   a) Equational
   b) Reductional
   c) Equational as well as reductional
   d) Reduce to half

2) Incomplete linkage is found in _____
   a) Male Drosophila b) Female Drosophila
   c) Both a) and b) d) None of these

3) Replication of DNA takes place in _____
   a) G_1-phase b) G_2-phase
   c) M-phase d) S-phase

4) Ratio of complementary factor is _____
   a) 9 : 7 b) 9 : 3 : 3 : 1
   c) 9 : 3 : 4 d) 9 : 6 : 1

5) The simple carbohydrates containing single monomeric unit is called _____
   a) Disaccharide
   b) Oligosaccharide
   c) Monosaccharide
   d) Polysaccharide

P.T.O.

6) Amino acids in protein are linked to one another by _____ bond.
   a) Peptide b) Glycosidic
   c) Ester d) Hydrogen

7) RNA contains _____ sugars.
   a) Starch b) Glucose
   c) Deoxyribose d) Ribose

8) Rearing of birds for production of egg and meat is called as _____
   a) Dairy science b) Pearl science
   c) Poultry science d) Fishery science

9) Worker bee is _____
   a) Sterile female
   b) Sterile male
   c) Fertile female
   d) Fertile male

10) Fibroin is found in _____
   a) Feathers b) Silk
   c) Skin d) Hairs

11) Waxes are chemically _____
   a) Proteins b) Nucleic acid
   c) Lipids d) Carbohydrates

12) Silk-moth belongs to phylum _____
   a) Annelida b) Mollusca
   c) Arthropoda d) Echinodermata

13) Jaffarabadi is breeds of _____
   a) Cow b) Buffalo
   c) Goat d) Poultry

14) W.B.Cs. are useful for _____
   a) Blood clotting b) O_2 carrier
   c) CO_2 carrier d) Immunity

2. Answer **any seven** of the followings : **14**
   i) Telophase
   ii) Leucocytes
   iii) Repulsion
   iv) Polysaccharides
   v) Food value of fish
   vi) Silk-moth
   vii) Queen bee
   viii) Goat breeds
   ix) Egg.

3. A) Attempt **any two** of the following : **10**
      i) Explain supplementary interaction.
      ii) Give mechanism of crossing-over.
      iii) Explain economic importance of honey and bee-wax.
   B) Explain complete linkage. **4**

4. Attempt **any two** of the following : **14**
   i) Describe economic importance of sericulture.
   ii) Explain breeds of cow.
   iii) Describe housing of goat.

5. Attempt **any two** of the following : **14**
   i) Describe structure of DNA.
   ii) Explain milk and milk product.
   iii) Explain aquarium and ornamental fishes.

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Seat No.	

B.Sc. (Part – II) (Semester – III) (CGPA Pattern) (New) Examination, 2015
MATHEMATICS (Paper – III)
Differential Calculus

Day and Date : Thursday, 3-12-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N. B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose and write correct answer from given four alternatives : **14**

1) If the equation of the curve is $y = a\cosh\left(\frac{x}{a}\right)$ then $\frac{ds}{dx}$ = _____

a) $\sinh\left(\frac{x}{a}\right)$ b) $-a\sinh\left(\frac{x}{a}\right)$ c) $\cosh\left(\frac{x}{a}\right)$ d) $a\sinh\left(\frac{x}{a}\right)$

2) Radius of curvature at any point on the curve s = c.log$\sec\psi$ is _____

a) $\rho = c.\cos\psi$ b) $\rho = c.\sin\psi$ c) $\rho = \tan\psi$ d) $\rho = c.\tan\psi$

3) Radius of curvature of the curve $x^2 + y^2 = a^2$ at any point is _____

a) $\rho = a$ b) $\rho = \frac{1}{a}$ c) $\rho = 2a$ d) $\rho = a^2$

4) Radius of the curvature at any point on the curve $x = at^2$, $y = 2at$ is _____

a) $\rho = 2a\left(1+t^2\right)$ b) $\rho = 2a\sqrt{1+t^2}$

c) $\rho = 2a\left(1+t^2\right)^{3/2}$ d) $\rho = a\left(1+t^2\right)$

5) If $u = x^2$, $v = y^2$ then $\frac{\partial(u,v)}{\partial(x,y)}$ = _____

a) xy b) 4xy c) x^2y^2 d) 2xy

6) If $J = \frac{\partial(x, y)}{\partial(u, v)}$ and $J' = \frac{\partial(u, v)}{\partial(x, y)}$ then $J \cdot J' =$ _____

a) – 1 b) 1 c) 0 d) 2

7) If $u_1, u_2, \ldots u_n$ are functions of $x_1, x_2, \ldots x_n$ then they are dependent functions if _____

a) $J(u_1, u_2, \ldots u_n) = 0$ b) $J(u_1, u_2, \ldots u_n) = 1$

c) $J(x_1, x_2, \ldots x_n) = 0$ d) $J(x_1, x_2, \ldots x_n) = 1$

8) A function f(x) have extreme value f(c) at x = c if _____

a) $f'(c) = 0$ b) $f'(c) > 0$ c) $f'(c) < 0$ d) None of these

9) If $r = \frac{\partial^2 f}{\partial x^2}$, $s = \frac{\partial^2 f}{\partial x \partial y}$, $t = \frac{\partial^2 f}{\partial y^2}$ for f(x, y) when x = a, y = b then Lagrange's condition for minimum value of f(x, y) is _____

a) $rt - s^2 > 0, r < 0$ b) $rt - s^2 > 0, r > 0$

c) $rt - s^2 < 0$ d) $rt - s^2 < 0, r = 0$

10) The maximum value of (sinx + cosx) is _____

a) 2 b) $\sqrt{2}$ c) 1 d) – 1

11) If p is the perpendicular distance of the tangent from the origin, ϕ is the angle between radius vector and tangent at a point on the curve then _____

a) $p = r\sin\phi$ b) $p = r\cos\phi$ c) $p = r\tan\phi$ d) $p = r\cot\phi$

12) If $u = f_1(x)$, $v = f_2(x, y)$, $w = f_3(x, y, z)$ functions of x, y, z then Jacobian $\frac{\partial(u, v, w)}{\partial(x, y, z)} =$ _____

a) $\frac{\partial u}{\partial x}$ b) $\frac{\partial u}{\partial x} \cdot \frac{\partial v}{\partial y}$ c) $\frac{\partial u}{\partial x} \cdot \frac{\partial v}{\partial y} \cdot \frac{\partial w}{\partial z}$ d) None of these

13) The necessary conditions for a function f(x, y) to have maximum or minimum value at a point (a, b) are _____

a) $\frac{\partial f}{\partial x} = \frac{\partial f}{\partial y}$ at (a, b) b) $\frac{\partial f}{\partial x} > \frac{\partial f}{\partial y}$ at (a, b)

c) $\frac{\partial f}{\partial x} < \frac{\partial f}{\partial y}$ at (a, b) d) $\frac{\partial f}{\partial x} = 0 = \frac{\partial f}{\partial y}$ at (a, b)

14) The extreme value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$ is _____

a) a^2 b) $2a^2$ c) $3a^2$ d) 3a

2. Solve **any seven** of the following : **14**

1) Find the radius of curvature at any point of the curve $x = ae^t\sin t$, $y = ae^t\cos t$.

2) If ψ is the angle made by the tangent at a point on the curve with X -axis for the curve Y = f(x) then find $\tan\psi$, $\cos\psi$, $\sin\psi$ as a function of arc length.

3) Find $\frac{ds}{d\theta}$ for the curve $r = a(1+\cos\theta)$.

4) If $u = x + y$, $v = \frac{x}{x+y}$, find $\frac{\partial(u,v)}{\partial(x,y)}$

5) If $x = r\cos\theta$, $y = r\sin\theta$ then find $\frac{\partial(x,y)}{\partial(r,\theta)}$ and $\frac{\partial(r,\theta)}{\partial(x,y)}$.

6) Investigate the maximum and minimum values of the function $f(x) = 2x^3 - 15x^2 + 36x + 10$.

7) Find the points on the surface $z^2 = xy + 1$ which are at the least distance from the origin.

8) Prove that the stationary value of $u = xyz$ subject to $x + y + z = 1$ is $\frac{1}{27}$.

9) If $u = e^x\cos y$, $v = e^x\sin y$, find $\frac{\partial(u,v)}{\partial(x,y)}$.

3. A) Attempt **any two** of the following : **10**

1) Show that the radius of curvature at any point on the curve $r^2 = a^2\cos 2\theta$ is $\rho = \frac{a^2}{3r}$.

2) If p and q are the roots of the quadratic equation $\frac{x}{a+z} + \frac{y}{b+z} = 1$, find Jacobian $\frac{\partial(p,q)}{\partial(x,y)}$.

3) Find the stationary values of $x^2+y^2+z^2$ subject to the conditions $x + 3y + 2z = 0$ and $2x^2 + 6y^2 + 3z^2 = 12$.

B) If the curve is defined by pedal equation then obtain an expression for the radius of curvature at a point on it. **4**

4. Attempt **any two** of the following : **14**

1) Define the radius of curvature and obtain an expression for radius of curvature at any point on the curve y = f(x). Hence find ρ for $y^2 = 4ax$ at any point.

2) If u, v, w are functions of x, y, z and x, y, z are them selves functions of p, q, r then show that $\frac{\partial(u,v,w)}{\partial(p,q,r)} = \frac{\partial(u,v,w)}{\partial(x,y,z)} \times \frac{\partial(x,y,z)}{\partial(p,q,r)}$. Hence if $x = \sqrt{vw}$, $y = \sqrt{uw}$, $z = \sqrt{uv}$ and $u = r\sin\theta\cos\phi$, $v = r\sin\theta\sin\phi$, $w = r\cos\theta$, find $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}$.

3) Explain Lagrange's method of undetermined multipliers to determine extreme values of u = f(x, y, z) subject to d(x, y, z) = 0. Hence if $d = \sqrt{x^2+y^2+z^2}$ and x + y +z = 30, find the values of x, y, z for which D is minimum.

5. Attempt **any two** of the following : **14**

1) Obtain an expression for radius of curvature at any point on the curve $r = f(\theta)$. Hence show that $\rho = \frac{4a}{3}\sin\theta/2$ for the curve $r = a(1 - \cos\theta)$.

2) If J is the Jacobian of (u, v) w.r.t. (x, y) and J′ is the Jacobian of (x, y) w.r.t.(u, v) then prove that $J \cdot J' = 1$. Hence if x = uv and $y = \frac{u}{v}$ then prove that $\frac{\partial(x,y)}{\partial(u,v)} \times \frac{\partial(u,v)}{\partial(x,y)} = 1$.

3) Prove that the stationary values of $u = x^2 + y^2 + z^2$ subject to the conditions lx + my + nz = 0 and $ax^2+by^2+cz^2 = 1$ are the roots of the equations $\frac{l^2}{1-au} + \frac{m^2}{1-bu} + \frac{n^2}{1-cu} = 0$.

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Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
BOTANY (Paper – III) (New CGPA Pattern)
Structural Botany and Taxonomy of Angiosperms

Day and Date : Thursday, 3-12-2015 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions: *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose and write a correct answer from given **four** alternatives. **14**

1) The complex tissue are of _____ type.
   a) homogenous b) heterogenous
   c) both d) none of these

2) Motor cells are found in the epidermis of _____ plants.
   a) gymnosperm b) monocot c) dicot d) none of these

3) Thick cuticle found in _____ plants.
   a) hydrophytic b) mesophytic c) xerophytic d) epiphytic

4) Ranunculous stomata is also known as _____ stomata.
   a) anomocytic b) anisocytic c) paracytic d) diacytic

5) Trichomes are get developed from _____
   a) epidermis b) cuticle c) hypodermis d) none of these

6) _____ is living mechanical tissue.
   a) Vesseles b) Tracheids c) Collenchyma d) Sclerenchyma

7) On the basis of origin the meristems are classified into _____ groups.
   a) One b) two c) three d) four

8) The apical meristem is responsible for increase in _____
   a) height b) width c) both d) none of these

9) The apical cell theory was proposed by _____
   a) Schmidt b) Nageli c) Hanstein d) Hofmeister

10) The scattered vascular bundles are found in _____ stem.
   a) monocotyledonous b) dicotyledonous
   c) both d) none of these

11) Sieve tubes are found in _____
   a) meristem b) phloem c) xylem d) parenchyma

12) The phellum is also known as _____
   a) Cork cells b) Secondary cortex
   c) Non vascular cambium d) None of these

13) Non-porous wood is found in _____
   a) bryophyta b) pteridophyta
   c) gymnosperms d) angiosperms

14) *Quisqualis indica* belongs to family
   a) Combretaceae b) Asclepidacee
   c) Amranthaceae d) Liliaceae

2. Solve **any seven** of the following. **14**

i) Sketch and define aerenchyma.

ii) Give the Functions Collenchyma.

iii) Define the epidermal tissue system.

iv) Sketch and define stinging Hairs.

v) Give the characteristic features of meristematic cells.

vi) Give the functions of parenchyma.

vii) Describe the sap wood/alburnum.

viii) Give the reason behind anomalous growth of stem.

ix) Give the class of family combretaceae with reasons.

3. A) Attempt **any two** of the following. **10**

   i) Describe the different types of parenchyma.

   ii) Sketch and describe the hydathode.

   iii) Classification of meristem based on position.

   B) Describe the Tunica-Corpus theory. **4**

4. Attempt **any two** of the following. **14**

   i) Describe the different elements of Xylem.

   ii) Describe in brief the secretory tissue system.

   iii) Describe the internal primary structure with reference to tissues and functions in dicotyledonous stem.

5. Attempt **any two** of the following. **14**

   i) Anomalous secondary growth in *Bignonia* stem.

   ii) Describe types of vascular bundles.

   iii) Give the distinguishing characters of any one of the following family, and mention plants of economic importance from family with their uses.

      a) Asclepidacee

      b) Amaranthaceae.

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Seat No.	

B.Sc. II (Semester – III) Examination, 2015
MATHEMATICS (Paper – IV) (New CGPA Pattern)
Real Analysis

Day and Date : Friday, 4-12-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure to the **right** indicates **full** marks.*

1. Choose correct alternative for each of the following : **14**

1) Let a and b be two positive real numbers $\exists$ n > 0 such that na > b. This property is entitled as
   a) Peano's b) Dedekinds
   c) Archimedian d) None of these

2) Between any two distinct real numbers there exist
   a) Only one rational number b) Finite number of rational number
   c) Infinitely many rational number d) None of these

3) Which is complete ordered field ?
   a) N b) R c) I d) Q

4) Any non empty subset of real number which is bounded below has
   a) Infimum b) Suprimum
   c) Both a) and b) d) None of these

5) Sequence $\{x^n\}$ is convergent if and only if
   a) $-1 < x < 1$ b) $x < -1$ c) $x > 1$ d) None of these

6) $\lim_{n\to\infty}$ inferior $S_n = -\infty$ iff $\{S_n\}$ is
   a) Not bounded above b) Not bounded below
   c) Bounded d) None of these

P.T.O.

7) $\lim_{n\to\infty} \frac{1}{\sqrt{n!}} =$

a) 0 b) ∞
c) 1 d) None of these

8) $\lim_{n\to\infty} n^{1/n} =$

a) 0 b) ∞ c) 1 d) None of these

9) The glb of the sequence $\left\{1+\frac{1}{n}\right\}$ is

a) 0 b) 1 c) 2 d) None of these

10) The series $\sum \frac{1}{n^p}$ is convergent if

a) P < 1 b) P > 1 c) P = 1 d) P $\leq$ 1

11) The series $1+\frac{3}{1!}+\frac{5}{3!}+\frac{7}{4!}+\ldots$ is

a) Convergent b) Divergent
c) Oscillatory d) None of these

12) The series $1 + r + r^2 + r^3 + \ldots$ is oscillatory if

a) r < 1 b) r > 1 c) r = 1 d) r = – 1

13) If $\sum a_n$ is a positive term series such that $\lim_{n\to\infty} \frac{a_{n+1}}{a_n} = L$ then the series diverges if

a) L = 1 b) L < 1
c) L > 1 d) None of these

14) $\sum u_n$ is the series of positive terms and $\lim_{n\to\infty}(u_n)^{1/n} > 1$ then the series is

a) Divergent b) Convergent
c) Oscillatory d) None of these

2. Attempt **any seven** of the following : **14**

1) Show that the series $\frac{1}{2}+\frac{2}{3}+\frac{3}{4}+\ldots$ is not convergent.

2) Investigate the behaviour of the series whose n^{th} term is $\sin\left(\frac{1}{n}\right)$.

3) Test the convergence of the series $\sum \frac{1}{n^1+1/n}$.

4) Show that $\lim_{n\to\infty}\frac{(3n+1)(n-2)}{n(n+3)}=3$.

5) If $\lim_{n\to\infty} S_n=-1$ then prove that $\lim_{n\to\infty}|S_n|=|-1|$.

6) Show that $\{S_n\}$ where $S_n=\frac{(-1)^n}{n}$ is convergent sequence.

7) If a, b are any two real number then prove that |ab| = |a|.|b|.

8) State Archimedean property of real number.

9) Let a, b $\in$ R show that if $a \le b+\frac{1}{n}\ \forall n\in N$ then $a \le b$.

3. A) Attempt **any two** of the following : **10**

1) Show that $\sqrt{8}$ is not rational number.

2) Test the convergence of series $\sum \frac{n^2-1}{n^2+1}x^n,\ x>0$.

3) Show that the sequence $\{S_n\}$ defined by the recursion formula $S_{n+1}=\sqrt{3S_n}$, $S_1=1$ converges to 3.

B) Prove that a necessary condition for convergence of an infinite series $\sum u_n$ is that $\lim_{n\to\infty} u_n = 0$. **4**

4. Attempt **any two** of the following : **14**

   1) State and prove D'Alembert's ratio test.

   2) Show that the sequence $\{S_n\}$ where $S_n = \left(1+\frac{1}{n}\right)^n$ is convergent and that $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ lies between 2 and 3.

   3) For all real numbers x, y show that :
      i) $|x + y| \leq |x| + |y|$ and
      ii) $|x - y| \geq ||x| - |y||$.

5. Attempt **any two** of the following : **14**

   1) If a, b are real numbers then show that $\frac{|a+b|}{1+|a+b|} \leq \frac{|a|}{1+|a|} + \frac{|b|}{1+|b|}$.

   2) If $\{a_n\}$ and $\{b_n\}$ are two sequences such that $\lim_{n\to\infty} a_n = a$ and $\lim_{n\to\infty} b_n = b$ then prove that $\lim_{n\to\infty}(a_n.b_n) = \lim_{n\to\infty} a_n . \lim_{n\to\infty} = ab$.

   3) Test the behaviour of the following series $1+\frac{x}{1!}+\frac{2^2x^2}{2!}+\frac{3^3x^3}{3!}+\ldots$ for $x > 0$.

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SLR-Z – 73

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2015
BOTANY (Paper – IV) (New CGPA Pattern)
Plant-Ecology

Day and Date : Friday, 4-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** and labelled diagrams **wherever** necessary.*
*3) Figures to right indicate **full** marks.*

1. Rewrite the sentence by choosing correct alternatives : **14**

1) The _____ ecosystem show detritus types of food chain.
a) Ponds b) Lakes c) Grassland d) Mangroove

2) The disease jaundice is caused by _____ pollution.
a) Air b) Water c) Soil d) Land

3) Raunkiaer recognized _____ frequency classes depending upon the frequency value.
a) four b) five c) six d) seven

4) Wind is an _____ factor.
a) Climatic b) Physiographic
c) Biographic d) Edaphic

5) The plant growing in extremely dry habbit are known as
a) Xerophyte b) Hydrophyte c) Mesophyte d) Oxalophyte

6) _____ shows poorly developed root system.
a) Mesophyte b) Hydrophyte c) Xerophyte d) Epiphyte

7) _____ is important external character of community.
a) Physiognomy b) Phenology c) Vitality d) All of these

8) _____ succession takes place in water.
a) Hydrosere b) Xerosene c) Lithosere d) None of these

9) In air concentration of toxic gases increases is called _____ pollution.
a) Air b) Water c) Thermal d) Soil

10) _____ stomata is character of xerophyte.
a) Sunken b) Superficial c) Water d) External

P.T.O.

11) Increasing concentration of _____ in air causes green house effect.
a) CO_2 b) NO_2 c) SO_2 d) O_2

12) _____ are shade loving plants.
a) Heliophyte b) Sociophyte c) Cryptophyte d) Xerophyte

13) Green plants are _____ of the ecosystem.
a) Consumer b) Producer c) Decomposer d) Parasite

14) Flow of energy is
a) Unidirectional b) Multidirectional
c) Circular d) All of these

2. Solve **any seven** of the following : **14**
1) Enlist the biotic and aboic factors of the ecosystem.
2) Define xerophytes and any two adaptations of xerophyte.
3) Define pollution, write any two sources of water pollution.
4) What is meant by primary succession ?
5) Write components of grassland ecosystem.
6) Define food chain.
7) State causes of air pollution.
8) Enlist the edaphic factors.
9) Define stratification of plant community.

3. A) Attempt **any two** of the following : **10**
1) What is life form ? Write brief account of phenerophytes.
2) Describe morphological adaptation in xerophyte.
3) Define succession and its process.

B) General characters of ecosystem. **4**

4. Attempt **any two** of the following : **14**
1) Green house effect.
2) What is ecological pyramids ? Add a note pyramid number.
3) Explain pond ecosystem.

5. Attempt **any two** of the following : **14**
1) Define biogeochemical cycles ? Write a note on carbon cycle.
2) Describe quantitative characters of plant community.
3) Write a note on abiotic and biotic components of ecosystem.

_____

SLR-Z – 74

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (Paper – III) (New CGPA Pattern)
Electronics Circuits

Day and Date : Saturday, 5-12-2015 Max. Marks : 70
Time :10.30 a.m. to 1.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) ***Draw*** *the figures* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of calculator is* ***allowed.***

1. Choose and write a correct answer from given alternatives : **14**

i) Ripple factor of full wave rectifier is _____
a) 0.482 b) 0.604 c) 1.21 d) 0.812

ii) Zener diode is used in _____ mode in regulator circuit.
a) Forward bias b) Reverse bias
c) Only positive bias d) None of these

iii) The transistor biasing methods are_____
a) Fixed bias b) Emitter bias
c) Voltage divider bias d) All of above

iv) To obtain operating point of transistor amplifier, it is operated in _____
a) Cut-off region b) Active region
c) Saturated region d) None of these

v) Current gain of CB amplifier is _____
a) < 1 b) > 1 c) ≈ 1 d) None of these

P.T.O.

vi) Emitter follower circuit has _____

a) High current gain b) High voltage gain

c) High output impedance d) All of the above

vii) _____ amplifier has ability to amplify very low frequency signals.

a) RC coupled b) LC coupled

c) Transformer coupled d) Direct coupled

viii) Two stages of multistage amplifier have gains 30 dB and 10 dB, then overall gain is _____dB.

a) 20 b) 300 c) 3 d) 40

ix) Cross over distortion is observed in _____ amplifier.

a) Class – A b) Class – B c) Class – C d) Class – AB

x) In Class – C power amplifier, transistor conducts for_____

a) 180° b) < 180° c) 360° d) None of these

xi) Stability of the circuit_____ with negative feedback.

a) Decreases b) Remain same c) Increases d) None of these

xii) In phase-shift oscillator, each RC network introduces _____ phase shift.

a) 60° b) 120° c) 180° d) 0°

xiii) Inductor is tapped in _____ oscillator.

a) Hartley b) Colpitt's c) Wienbridge d) All of these

xiv) _____ oscillator is most stable oscillator.

a) Hartley b) Wienbridge c) Crystal d) Colpitt's

2. Attempt **any seven** of the following : **14**

i) Give formulae of ripple factor and efficiency of rectifier.

ii) Draw the circuit diagram for Emitter bias for transistor.

iii) Draw the circuit diagram of FET as CS amplifier.

iv) What is cross over distortion ?

v) What is multistage amplifier ? Give different types of multistage amplifiers.

vi) Draw circuit diagram of Class – B push-pull power amplifier.

vii) What is the effect of negative feedback on gain and bandwidth ?

viii) What is Barkhausen criterion for sustained oscillations ?

ix) Draw the circuit diagram of phase-shift oscillator.

3. A) Attempt **any two** of the following : **10**

i) Explain capacitor filter circuit.

ii) Explain DC load line and operating point.

iii) Explain the working of Wienbridge oscillator.

B) Explain complementary-symmetry amplifier. **4**

4. Attempt **any two** of the following : **14**

i) Explain Zener regulator circuit.

ii) Explain voltage divider bias circuit.

iii) Draw the equivalent circuit of CE amplifier. Derive expressions for voltage gain, input impedance and output impedance.

5. Answer **any two** of the following : **14**

i) Explain Class – B push-pull amplifier.

ii) What is feedback ? Give its types. Derive expression for gain of the amplifier with feedback.

iii) Explain Hartley oscillator.
Derive frequency of oscillator for $L_1 = 25\ \mu H$, $L_2 = 75\ \mu H$ and $C = 0.01\ \mu F$.

SLR-Z – 75

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
GEOGRAPHY (Paper – III) (New CGPA Pattern)
Biogeography – I

Day and Date : Saturday, 5-12-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Use of stencil is ***allowed****.*

1. Choose and write correct alternative from the following : **14**

1) _____ is considered as single giant ecosystem on the earth.
   a) Lithosphere b) Atmosphere
   c) Hydrosphere d) Biosphere

2) A moderate size food chain having many trophic levels is known as
   a) Food pyramid b) Energy pyramid
   c) Food waves d) Food chain

3) Phytogeography is a branch of science which studies
   a) Animals b) Plants
   c) Bacteria d) Algae

4) The planet _____ long with the air land and water sustains all living beings known as biosphere.
   a) Mars b) Jupiter
   c) Venus d) Earth

5) Poaching of animals is considered as a threat to _____ diversity.
   a) Genetic b) Species
   c) Racial d) Bio

6) The growth of life requires three basic elements _____ hydrogen and oxygen.
   a) Calcium b) Potassium
   c) Magnesium d) Carbon

P.T.O.

7) If one travels from the equator towards pole, the variety of plants
   a) increases b) decreases
   c) changes d) remain same

8) The $\leftrightarrow$ ecosystem are specially studied due the changes in satinity.
   a) marine b) tidal
   c) ponds d) terrestrial

9) Saranna grassland of _____ are known as hunters paradise.
   a) Australia b) Asia
   c) Africa d) America

10) The uniterrupted source of energy for the biosphere is
   a) Moon b) Sun
   c) Earth's interior d) Galaxy

11) NASA states that _____ are present in the atmosphere upto 15 km above the surface of the earth.
   a) Fungus b) Bacterias
   c) Virus d) Algae

12) The interlinking of number of food chains forms _____ in the given ecosystem.
   a) Food web b) Cob web
   c) Food net d) Inter web

13) _____ national park is located in Tamilnadu.
   a) Kaziranga b) Madumalai
   c) Bandipur d) Gir

14) Thar desert is present in
   a) Gujarat b) Rajasthan
   c) Bihar d) Punjab

2. Answer **any five** of the following : **15**

1) What is a producer ?

2) What is a food chain ?

3) Explain the energy pyramid.

4) State the types of marine ecosystem.
5) Discuss the hot spot of biodiversity.
6) Discuss the water cycle.

3. Answer **any three** of the following : **15**
1) Describe the nitrogen cycle.
2) State the types of biodiversity.
3) Explain the energy flow in the ecosystem.
4) State the nature of biogeography.

4. Answer **any three** of the following : **15**
1) Explain climate as a factor influencing biogeography.
2) Describe the classification of ecosystem.
3) Explain the laws of energy exchange.
4) Explain the branches of biogeography.

5. A) Write **any one** of the following : **6**
1) State the importance of decomposers in the ecosystem.
2) Discuss the freshwater ecosystem.

B) Write **any one** of the following : **5**
1) Describe anthropogenic factors influencing biogeography.
2) Discuss the importance of biogeochemicals.

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SLR-Z – 76

Seat No.	

B.Sc. (Part – II) (Semester – III) (New CGPA Pattern) Examination, 2015
PSYCHOLOGY (Paper – III)
Experimental Psychology

Day and Date : Saturday, 5-12-2015 Total Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Multiple Choice Questions : **14**

1) Experimental method was successfully applied to several area of _____
   A) Psychology B) Sociology
   C) Physics D) Research

2) Wundt is founder of psychology _____
   A) experimental B) cognitive C) social D) behavioural

3) Ebbinghaus was the first psychologist to experimentally investigate higher _____ process.
   A) mental B) physical
   C) psychological D) social

4) Wundt is founder of experimental _____
   A) Sociology B) Psychology
   C) Economics D) Geography

5) Watson was the founder of the _____ of behaviourism.
   A) school B) college C) home D) canteen

6) The problem expresses the relation between _____ variables.
   A) one B) two C) three D) four

7) _____ psychology being scientific in nature is highly factual.
   A) Experimental B) Social C) Cognitive D) Abnormal

P.T.O.

8) Experimental _____ is an approach to that treats it as one of the natural science.
   A) Psychology B) Sociology
   C) Economics D) Political Science

9) Experiments provide the experimenter with new data for describing and interpreting _____ behaviour.
   A) animal B) human C) cognitional D) mental

10) _____ psychology is scientific in nature.
   A) Experimental B) Behaviour C) Society D) Body

11) Weber was an anatomist and _____
   A) Physiologist B) Psychologist
   C) Sociologist D) All

12) The first psychology laboratory in Leipzig in _____
   A) 1879 B) 1979 C) 2000 D) 2015

13) Wundt used the method of _____
   A) introspection B) experimental
   C) survey D) case study

14) Helmholtz was a _____ Physicist.
   A) German B) Indian C) China D) American

2. Answer **any seven** of the following : **14**

i) How to formulate the hypothesis ?

ii) Explain the formulating problem.

iii) Discuss on variables.

iv) Explain the method of constancy of conditions.

v) Discuss on application in organizations.

vi) Describe the application in the research on motivation.

vii) Discuss on Difference Threshold (DL).

viii) What is meant by Control Group Method ?

ix) What is experimental psychology ?

3. A) Answer **any two** of the following : **10**

   i) Explain the method of average error.

   ii) Explain the method of constant stimuli.

   iii) Discuss on application in the field of education.

   B) Explain the work of Edward Thorndike. **4**

4. Answer **any two** of the following : **14**

   i) Discuss on Cattell's work.

   ii) What is contribution of Watson in psychology ?

   iii) Discuss on Wilhelm Wundt's contribution in Psychology.

5. Write short notes on **any two** : **14**

   i) Weber's law.

   ii) Fechner's law.

   iii) Application in clinical settings.

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SLR-Z – 77

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
GEOLOGY
Optics and Mineralogy (Paper – III) (New CGPA Pattern)

Day and Date : Saturday, 5-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Choose and write a correct answer from given four alternatives : **14**

1) Which one of the following minerals is NOT a member of garnet family ?
   a) Pyrope b) Almandine
   c) Andalusite d) Grossularite

2) Cross hatched twinning is shown by _____ mineral.
   a) Plagioclase b) Microcline
   c) Orthoclase d) Garnet

3) Unequal absorption of E-and O-ray causes _____ property of the mineral under microscope.
   a) Pleochroism b) Relief
   c) Twinning d) Alteration

4) Which one of the following minerals is isotropic ?
   a) Calcite b) Biotite
   c) Muscovite d) Garnet

5) When difference between refractive indices of mineral and Canada balsam in highest, then the mineral has _____ relief.
   a) Low b) Medium
   c) High d) Very high

6) The isolated tetrahedron , which do not shared with other tetrahedron, then the structure is _____
   a) Nesosilicate
   b) Sorosilicate
   c) Inosilicate
   d) Phylosilicate

7) Repeated twinning is shown by _____ mineral.
   a) Microcline
   b) Calcite
   c) Orthoclase
   d) Plagioclase

8) Which of the following are allumino-silicate minerals ?
   a) Andalusite
   b) Kyanite
   c) Sillimanite
   d) All of these

9) Fibrous variety of tremolite is _____
   a) Chlorite
   b) Gypsum
   c) Actinolite
   d) Asbestos

10) Olivine alters into _____ mineral.
   a) Spessartine
   b) Serpentine
   c) Sillimanite
   d) Silica

11) Nepheline is the member of _____ family.
   a) Felspar
   b) Felspathoid
   c) Plagioclase series
   d) Alkali Felspars

12) Lepidolite is variety of _____ group of minerals.
   a) Mica
   b) Pyroxene
   c) Amphibole
   d) Silica

13) Cleavage angle in the amphiboles is about _____ degrees.
   a) 90
   b) 123
   c) 160
   d) 180

14) Beryl is the best example of _____ silicates.
   a) Cyclo
   b) Neso
   c) Soro
   d) Phylo

2. Solve **any seven** of the following : **14**
   1) Name the crypto crystalline silicas.
   2) What is composition of andalusite, sillimanite and kyanite ?
   3) What is forsterite ?
   4) What are elements that causes difference in colours of muscovite and biotite ?
   5) Name any four minerals in plagioclase series.
   6) What is extinction ?
   7) Which minerals have single refraction ?
   8) What is plane polarised light ?
   9) What is upper polariser called as ? And what is its use ?

3. A) Attempt **any two** of the following : **10**
      1) Distinguish between pyroxenes and amphiboles.
      2) Why mica group of minerals show phyllosilicate structure ?
      3) Describe clay minerals.

   B) Describe any three types of pseudomorphism. **4**

4. Attempt **any two** of the following : **14**
   1) Describe upper assembly of petrological microscope.
   2) What are k-felspars ? Describe their physical, chemical and optical properties with occurrences.
   3) Explain cyclo and double chain silicates.

5. Attempt **any two** of the following : **14**
   1) What is extinction ? How extinction angle is measured ?
   2) Describe in brief construction of Nicol's prism.
   3) Describe zoning, inclusion and alteration.

SLR-Z – 78

Seat No.	

B.Sc. – II (Semester – III) (CGPA Pattern) Examination, 2015
MICROBIOLOGY (Paper – III) (New)
Cytology and Physiology of Microorganisms

Day and Date : Saturday, 5-12-2015 Max.Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *labelled diagram* ***wherever*** *required.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose correct answer from the alternatives given below : **14**

1) Small solute molecules like H_2O, CO_2, O_2 enters in cell by
   a) Passive diffusion b) Facilitated diffusion
   c) Active transport d) Group translocation

2) Carboxysomes are involved in activity of
   a) CO_2 evolution b) Photosynthesis
   c) CO_2 fixation d) Nitrification

3) Clostridium titani is an example of_____ spore forming organism.
   a) Aerobic b) Anaerobic
   c) Facultative anaerobic d) Microaerophilic

4) _____ is responsible for giving resistance to endospore.
   a) Acetic acid b) Peptidoglycan
   c) Diaminopimellic acid d) Ca-dipicolinate complex

5) _____ provide the means of chromosome transfer during conjugation.
   a) Flagella b) Pili
   c) Sex pili d) Cell wall

6) _____ is absent in cell wall of gram negative bacteria.
   a) Peptidoglycan b) Teichoic acid
   c) Lipoprotein d) Phospholipid

7) Final electron acceptor in anaerobic respiration is
   a) CO_2 b) O_2
   c) N_2 d) SO_4

8) Double stranded DNA is genetic material of
   a) TMV b) HIV
   c) T_4 phage d) Retro virus

9) The most effective bactericidal wave length of U.V. light is
   a) 2550 A° b) 2450 A°
   c) 2650 A° d) 2850 A°

10) Percentage of peptidoglycan in gram negative cell wall is
   a) 10 – 20 b) 5 – 10
   c) 75 d) 25

11) _____ discovered structure of TMV.
   a) Ivanowsky b) Stanley
   c) Blackmore d) Crick

12) Cytochromes are _____ carriers.
   a) Electron b) Protons
   c) Neutrons d) Protons and neutrons

13) The major function of bacterial cell membrane is
   a) Locomotion b) Protection
   c) Cell division d) Transport

14) _____ is an example of thermophilic organism.
   a) E-coli b) Staphylococcus
   c) Bacillus subtilis d) Thermus aquaticus

2. Solve **any 7** of the following : **14**

i) Thermophiles

ii) Oxidoreductases

iii) Photoreactivation

iv) Carboxysomes.

v) Sex pili

vi) Structure of T_4 bacteriophage

vii) Direct microscopic count.

viii) Thermal death point and thermal death time.

ix) Functions of flagella.

3. A) Attempt **any two** of the following : **10**

i) Cell wall of gram positive bacteria.

ii) Effect of pH on growth of m-orgs.

iii) Cyclic photophosphorylation.

B) Batch and continuous growth. **4**

4. Attempt **any two** of the following : **14**

i) Oxidative phosphorylation.

ii) Describe sporulation process.

iii) Lytic cycle of infection.

5. Attempt **any two** of the following : **14**

i) Tactic behaviour in bacteria.

ii) Effect of heavy metals and hydrostatic pressure on growth of m-orgs.

iii) Give an account of homolactic and heterolactic bacteria.

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SLR-Z – 79

Seat No.	

B.Sc. II (Semester – III) (New CGPA Pattern) Examination, 2015
ELECTRONICS
Pulse and Switching Circuits (Paper – IV)

Day and Date : Monday, 7-12-2015 Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw the neat diagram ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Use of log tables or calculators are ***allowed****.*

1. Select the correct alternative for the following : **14**

1) In clamping circuit _____ elements are used.
   a) Diode and capacitor b) Diode and resistor
   c) Resistor and capacitor d) Diode and inductor

2) IC 74121 can be used as _____
   a) Multiplexer b) Decoder c) Multivibrator d) Memory

3) The circuit which convert square wave into triangular wave is _____
   a) Differentiator b) Integrator
   c) Schmitt trigger d) Flip-flop

4) The monostable multivibrator is also known as _____
   a) Free running multivibrator b) One shot multivibrator
   c) Flip-flop d) None of these

5) Linear sweep circuit is obtained with _____
   a) Constant current source b) Constant voltage source
   c) Constant resistor d) Constant capacitor

P.T.O.

6) A Bistable multivibrator can be used as _____
   a) To generate square wave b) Divide by two circuit
   c) Sequential operation d) Battery charger

7) If UJT oscillator circuit is provided by constant voltage source then _____ type of waveforms are generated.
   a) Triangular b) Square c) Positive ramp d) Saw tooth

8) In which IC the three resistors of five kilo ohms are connected in series _____
   a) IC 74121 b) IC 7400 c) IC 555 d) IC 810

9) _____ circuit converts sine wave into square wave at the output.
   a) Schmitt trigger b) Integrator
   c) Differentiator d) Bistable multivibrator

10) The LED is connected at the output of astable multivibrator using IC 555. The LED is ON for 6 sec. and off for 4 sec. then frequency of the circuit is _____
   a) 10 Hz b) 6 Hz c) 4 Hz d) 0.1 Hz

11) The differentiator circuit converts sine wave into _____
   a) Spikes b) Cosine wave
   c) Triangular wave d) Square wave

12) Clipping circuit is _____
   a) Linear wave shaping ckt. b) Non linear wave shaping ckt.
   c) Time base circuit d) None of the above

13) Application of IC 555 are _____
   a) Astable multivibrator b) Bistable multivibrator
   c) Battery charger d) All of the above

14) The sweep speed of time base circuit is _____
   a) I/C b) C/I c) C/R d) V/C

2. Solve **any seven** of the following (**two** marks **each**) : **14**
   1) Draw the diagram of series negative clipper ckt.
   2) Give the applications of differentiator circuits.
   3) Calculate pulse width of monostable multivibrator using BJT, when R = 10 KΩ and C = 100 μf are connected.
   4) Draw the circuit diagram of monostable multivibrator using NAND gate.
   5) Give the advantages of using timer IC 555.
   6) Write the pin names of IC 555.
   7) Differentiate between linear and non-linear wave shaping circuits.
   8) Calculate the duty cycle of astable multivibrator using IC 555 when R_A = 1 KΩ and R_B = 2 KΩ and C = 10 μf connected.
   9) Define the term sweep speed error and displacement error of time base circuit.

3. A) Attempt **any two** of the following : **10**
      1) Explain RC differentiator circuit.
      2) Discuss negative clampper circuit.
      3) Explain basic time base circuit.

   B) Explain how UJT can be used for generating positive ramp waveform. **4**

4. Attempt **any two** of the following : **14**
   1) Explain Astable multivibrator using BJT. Calculate frequency when timing resistor is 1 KΩ and capacitor at 0.1 μf are connected.
   2) Explain Bistable multivibrator using BJT for ac and dc triggering.
   3) Explain Schmitt trigger circuit.

5. Attempt **any two** of the following : **14**
   1) Explain the astable multivibrator using NAND gate.
   2) How IC 555 can be used as sequential timer ?
   3) Explain how to design the astable multivibrator using IC 555 for ON time 7 sec and OFF time 3 sec. Hence calculate frequency and duty cycle.

SLR-Z – 80

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
GEOGRAPHY
Soil Science – I (Paper – IV) (New CGPA Pattern)

Day and Date : Monday, 7-12-2015 Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw neat diagrams ***wherever*** *necessary.*
3) Use of stencil is ***allowed****.*

1. Choose and write a correct from given four alternatives : **14**

1) Scientific study of soil is known as _____

(Pedology, Hydrology, Zoology, Biology)

2) Red colour of the soil is a result of _____ in the soil.

(Al_3O_4, Fe_2O_3, CaO, NaO)

3) Soil contents humas matter in the form of _____

(Decompose material, Living organism, Fresh material, Bacteria)

4) The tundra region experiences a thin layer of soil due to _____

(High temperature, Low temperature, Low humidity, Wet climate)

5) Alluvial soils are classified as _____

(Bog, Intrazonal, Zonal, Azonal)

6) In marses soils are associated with water logging so known as _____

(Halomorphic, Hydromorphic, Zonal, Azonal)

7) Very steep slopes do not support soil _____

(Conservation, Protection, Formation, Antigradation)

8) In mountains areas soil forming process depends upon _____ of the region.

(Climate, Slope, Vegetation cover, Human activities)

P.T.O.

9) Overgrazing is responsible for _____

(Forestry, Soil degradation, Soil conservation, Soil formation)

10) Soil orders are classified on the basis of _____ major factors.

(6, 8, 2, 4)

11) Soil depth depends upon _____

(Slope of the land, Bacterial activities, Temperature of the land, Age of the soil)

12) Which of the _____ soil does not develop in situ.

(Alluvial, Saline, Laterite, Podzol)

13) Porosity of the soil is a function of its _____

(Depth, Chemical composition, Texture, Colour)

14) _____ soils have well differentiated horizon resulting from a strong climatic and biological influences.

(Intrazonal, Azonal, Zonal, Transported)

2. Answer **any five** of the following : **15**

1) What are zonal soils ?
2) Classify soil according to texture.
3) What is wilting point ?
4) What is soil degradation ?
5) Mention the factors influencing soil formation.
6) Write the need of conservation of soil.

3. Answer **any three** of the following : **15**

1) What is the importance of a soil profile ?
2) Explain the importance of parent material in soil formation.
3) Explain the characteristics of regur soil.
4) Describe the universal soil loss equation.

4. Write **any three** of the following : **15**

   1) What is a field capacity ?

   2) State the characteristics of alluvial soil.

   3) Explain the role of nala bands in soil conservation.

   4) Describe the estimation of soil erosion.

5. A) Answer **any one** of the following long answer questions : **6**

      1) State the factors of the soil formation and explain any one of them.

      2) Classify the soils into major group.

   B) Answer **any one** of the following long answer question : **5**

      1) Define the soil and state the scope of the soil geography.

      2) Describe the methods of soil conservation.

SLR-Z – 81

Seat No.	

B.Sc. (Part – II) (Semester – III) (New CGPA Pattern) Examination, 2015
PSYCHOLOGY (Paper – IV)
Social Psychology

Day and Date : Monday, 7-12-2015 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Multiple Choice Questions : **14**

1) There are _____ approaches of the Social Psychology.
A) 2 B) 4 C) 6 D) 8

2) There are _____ keys areas in Social Psychology.
A) 2 B) 4 C) 6 D) 8

3) _____ is the world's largest democracy.
A) India B) America C) Japan D) China

4) _____ opposed the concept of group mind.
A) Allport B) Jung C) Miller D) Freud

5) Social Psychologists proposed _____ models of urban life.
A) 3 B) 6 C) 9 D) 12

6) Social Identity Theory developed by _____
A) Tajfel's B) Stephan C) Miller D) Freud

7) _____ term was coined by Robert Butler.
A) Sexism B) Ageism C) Mind D) Racism

8) The term stereotype was coined in _____
A) 1798 B) 1799 C) 1800 D) 2015

9) _____ was specifically interested in racial prejudice.
A) Likert B) Allport C) Miller D) La Pierre

10) _____ developed Social Distance Scale.
A) Likert B) Boqardus C) Guttmann D) Freud

P.T.O.

11) There are _____ components of attitudes.
A) 3 B) 6 C) 9 D) 12

12) _____ has created first attitude measurement.
A) Frued B) Munn C) Thurstone D) Pavlov

13) _____ refers to negative attitude towards people.
A) Stereotypes B) Prejudice
C) Sex D) Mind

14) _____ as a mental and neural state of redness.
A) Attitude B) Learning C) Interest D) Sex

2. Answer **any seven** of the following : **14**
i) What is Balance Theory ?
ii) Give components of attitudes title only.
iii) Give the only titles of competing approaches to social psychology.
iv) What is meant by Cognitive measures ?
v) States the importance of social psychology in modern India.
vi) Give the main characteristics of attitudes.
vii) How the physiological measure ?
viii) Who developed Social Distance Scale ?
ix) Define Social Psychology.

3. A) Answer **any two** of the following : **10**
i) Explain the concept of prejudice.
ii) Explain the concept of Stereotypes.
iii) Explain the concept of Discrimination.

B) Explain the concept of Racism. **4**

4. Answer **any two** of the following : **14**
i) What is term of xenophobia ?
ii) What is term of Tokenism ?
iii) Explain the concept of Cognitive Dissonance.

5. Write short notes on **any two** : **14**
i) Scope of Social Psychology.
ii) Sociology and Social Work.
iii) Rating Scales.

SLR-Z – 82

Seat No.	

B.Sc. – II (Semester – III) (CGPA Pattern) Examination, 2015
GEOLOGY (Paper – IV) (New)
Structural Geology

Day and Date : Monday, 7-12-2015 Total Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Write a correct answer from given **four** alternatives. **14**

1) The rock block present above the fault plane is called
   a) Foot wall b) Hanging wall
   c) Heave d) Throw

2) The _____ are boundaries along which plates move away from each other.
   a) Convergent Boundaries b) Divergent Boundaries
   c) Transform Boundaries d) Destructive Boundaries

3) Wavy undulations in the rock beds are called
   a) Unconformity b) Joints c) Fault d) Fold

4) The highest point on the arch of an anticline is called the
   a) Trough b) Crest c) Limb d) None of these

5) A _____ is an upright fold in which both the limbs are overturned.
   a) Fan fold b) Recumbent fold
   c) Open fold d) Close fold

6) A series of faults that have the same strike and dip are called the
   a) Parallel faults b) Gravity faults
   c) Oblique slip fault d) Tension fault

7) Major breaks in sedimentation are called
   a) Confirmable b) Unconformities
   c) Stratification d) None of these

P.T.O.

8) When bedded sedimentary rocks overlie the non bedded igneous mass, then it is called as
   a) Nonconformity b) Disconformity
   c) Angular Unconformity d) None of these

9) _____ are those which are formed due to compressional forces involved in the folding and faulting of rocks.
   a) Tension Joints b) Strike Joints c) Shear Joints d) Dip Joints

10) Sheet Joints are often seen in the exposures of
   a) Basalt b) Sandstone c) Granite d) Shale

11) An _____ is the area where the bed rock is exposed on the ground surface.
   a) Outcrop b) Landscape c) Landform d) None of these

12) The width of outcrop of a bed depend/s on
   a) the thickness of bed b) the angle of dip
   c) topographic scale d) all of these

13) Folds can be recognized in the field by studying the
   a) Topography b) Drainage pattern
   c) Attitude of strata d) All of these

14) Joints can be developed by
   a) Tectonic stresses b) Residual stresses
   c) Surfacial movement d) All of these

2. Solve **any seven** of the following : **14**

1) What is foliation ?
2) What is Strike ?
3) Define Joints.
4) Define Fault.
5) What is Hade in the fault ?
6) What is Limb in fold ?
7) Define Axial plane.
8) Define Throw of fault.
9) What is Fault plane ?

3. A) Attempt **any two** of the following : **10**
   1) Explain Lineation.
   2) Explain Outliers and Inliers.
   3) Explain any two types of fold.

   B) How to determine width of outcrop ? **4**

4. Attempt **any two** of the following : **14**
   1) Explain criteria for the recognition fold in the field.
   2) Explain genetic classification of Joints.
   3) Explain types of Unconformities.

5. Attempt **any two** of the following : **14**
   1) Explain any four types of fault.
   2) Explain concept of Plate tectonics.
   3) Explain recognition of unconformities in the field.

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SLR-Z – 83

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
MICROBIOLOGY (Paper – IV)
Bacterial Genetics (New CGPA Pattern)

Day and Date : Monday, 7-12-2015 Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) **All** questions are **compulsory**.*
*3) Draw **neat** labelled diagrams **wherever** required.*

1. Rewrite the sentences after choosing correct answer from the given alternatives : **14**

i) B form of DNA consists of _____ base pairs per turn of helix.
a) 9 b) 11 c) 10 d) 12

ii) _____ RNA is found in the ribosomes.
a) r-RNA b) m-RNA c) t-RNA d) Sn RNA

iii) A minimal genetic unit responsible for mutation is called _____
a) Recon b) Cistron c) Intron d) Muton

iv) Split genes consists of _____
a) Exon b) Intron
c) Both a) and b) d) None of these

v) A mutation which results in replacement of one amino acid by another amino acid in polypeptide chain is called _____ mutation.
a) Misense b) Silent
c) Frame shift d) None of these

vi) _____ is base analogue of Thymine.
a) Nitrous oxide b) 5BU c) Proflavine d) EMS

vii) _____ nm wavelength is called microbicidal wavelength.
a) 265 b) 320 c) 420 d) 600

viii) Splitting of pyrimidine dimmers in photoreactivation is carried out by _____ enzyme.
a) Endonuclease b) Photolyase c) DNA ligase d) Exonuclease

P.T.O.

ix) _____ is a nonsense codon.

a) AUG b) UUU c) GUG d) UAG

x) The antibiotic resistance in the bacteria is conferred by _____ plasmids.

a) F b) Col c) R d) Ti

xi) _____ phage mediate specialized transduction.

a) λ b) T4 c) P22 d) P1

xii) The cells in which the 'F' factor integrates into bacterial chromosome is called _____

a) F^+ b) F^- c) F' d) Hfr

xiii) _____ plasmid gives sex pili to bacterial cell.

a) Col b) F c) Cryptic d) R

xiv) _____ enzyme plays important role in sealing of Okazaki fragments of lagging strand.

a) DNA polymerase b) Topoisomerase

c) Helicase d) DNA ligase

2. Answer in **one** or **two** sentences (**any seven**) : **14**

i) Define – Gene

ii) Define conservative replication

iii) Wobble hypothesis

iv) Forms of DNA

v) Transversion and transition

vi) Exogenote

vii) Define plasmid

viii) U.V. radiation

ix) Define genotype and phenotype.

3. A) Attempt **any two** of the following : **10**
   i) What is genetic code ? Explain different properties of genetic code.
   ii) Discuss in brief induced mutation caused by base analogues and Acridine dyes.
   iii) What is plasmid ? Give in detail applications of plasmids.
   B) Describe in detail structure of Watson-Crick model of DNA. **4**

4. Attempt **any two** of the following : **14**
   i) Define spontaneous mutation. Describe in detail fluctuation test.
   ii) Define conjugation. Explain in detail process of bacterial conjugation.
   iii) Describe in detail dark repair mechanism and photoreactivation.

5. Attempt **any two** of the following : **14**
   i) Define DNA replication. Give detail account of DNA replication w.r.t. semiconservative, rolling circle.
   ii) Define Recombination. Explain in detail process of bacterial transformation.
   iii) Justify fate of exogenote and add a note on generalised transduction.

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SLR-Z – 84

Seat No.	

B.Sc. (Part – II) (Semester – III) (Old) Examination, 2015
CHEMISTRY (Paper – V)
Organic Chemistry

Day and Date : Thursday, 26-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

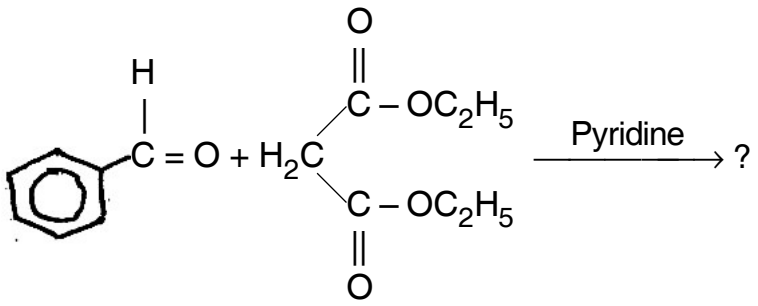
N.B. : *1) **All** questions are **compulsory**.*
*2) Draw neat diagram and give equations **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) Use of log table or calculator is **allowed**.*
5) Atomic weight H = 1, C = 12, N = 14, O = 16, Cl = 35.5, I = 127, Ag = 108.
*6) Spectroscopic chart is **supplied**.*

1. Choose correct alternative from each of the following : **10**

i) The aldoximes and ketoximes shows _____ isomerism.
a) optical b) conformational
c) geometrical d) positional

ii) Glycerol when heated with $KHSO_4$ gives
a) Dinacol b) Pinacolone
c) Ethanol d) Acrolein

iii) What is the product of following reaction ?



a) Cinnamic acid b) Salicylic acid
c) Phthalic acid d) Benzoic acid

P.T.O.

iv) Shift of absorption maxima ($\lambda - max$) to a longer wavelength is known as

a) Hypsochromic shift
b) Hyperchromic shift
c) Hypochromic shift
d) None of the above

v) Among the following which is malic acid ?

a) $CH_2 - COOH$ / $CH_2 - COOH$
b) $CH - COOH$ / $CH - COOH$
c) $OH - CH - COOH$ / $CH_2 - COOH$
d) $CH_3 - CH - COOH$ / OH

vi) Methyl orange is synthesised by coupling of diazotised sulphanilic acid with

a) Aniline
b) P-nitroaniline
c) P-nitrophenol
d) N-N-dimethyl aniline

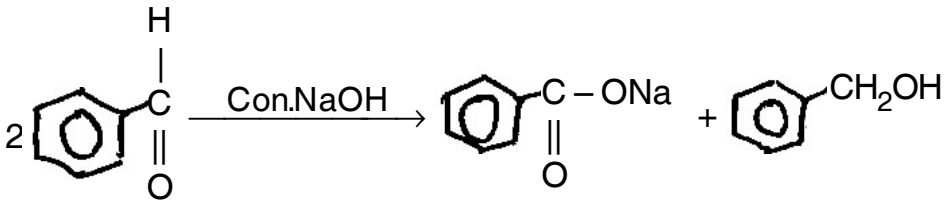
vii) Which type of electronic transitions required highest energy ?

a) $\sigma \rightarrow \sigma^*$
b) $\pi - \pi^*$
c) $n \rightarrow \sigma^*$
d) $n - \pi^*$

viii) Epoxides are

a) open chain ethers
b) three membered cyclic ethers
c) crown ethers
d) aromatic ethers

ix) Name the following reaction



a) Aldol condensation
b) Perkin's condensation
c) Benzoin condensation
d) Canizzaro's reaction

x) Phthalic acid on heating with ammonia forms

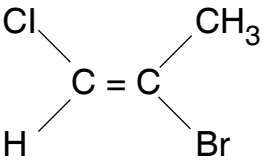
a) Phthaliamide
b) Benzamide
c) Acetamide
d) None of these

2. Answer **any five** of the following : **10**

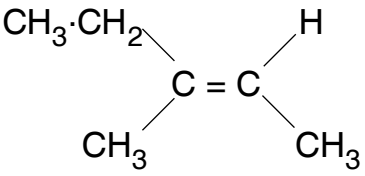
i) Give any one method of preparation succinic acid and mention its uses.

ii) Assign E and Z nomenclature of the following compound

a)

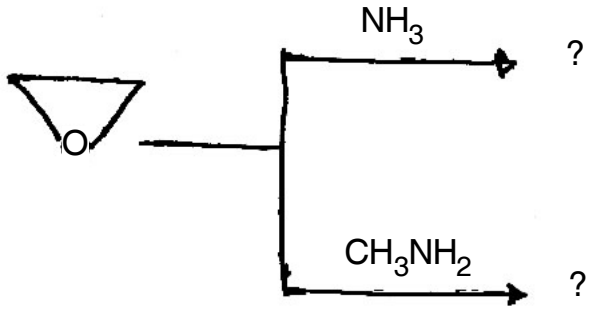


b)

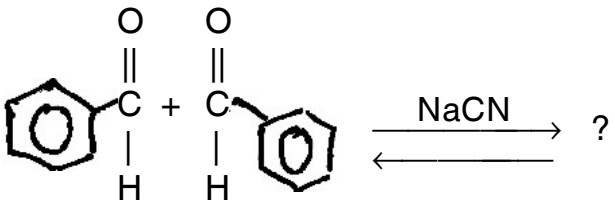


iii) Give synthesis of methyl orange.

iv) Predict the products



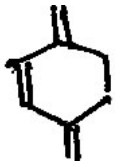
v) Complete the reaction and name it

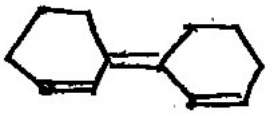


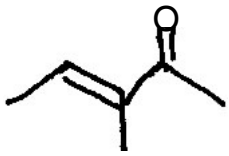
vi) Mention the different types of electronic transitions involved in UV spectroscopy.

3. A) Answer **any two** of the following : **6**

i) Calculate the λ-max of the following dienes and enones by using-Woodward Fischer rule.

a) 

b) 

c) 

ii) Write a note on Beackmann transformation.

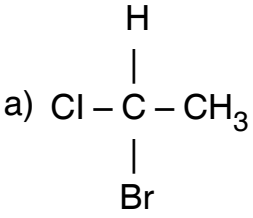
iii) How Benzenediazonium chloride prepared ? Starting it with prepare iodobenzene.

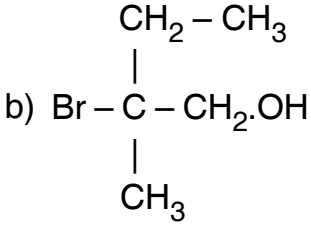
B) How will you estimate methoxy group in an organic compound by Zeisel's method. **4**

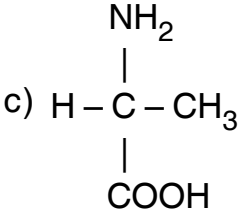
4. Answer **any two** of the following : **10**

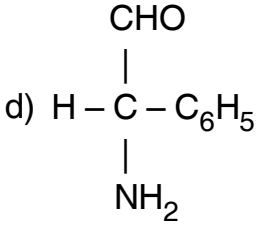
i) Discuss Kolbe's reaction.

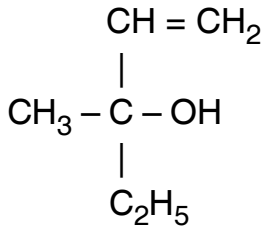
ii) Assign R and S configuration of the following.

a) 

b) 

c) 

d) 

e) 

iii) Explain why Aniline shows blue shift in acidic medium and phenol shows red shift in alkaline medium.

5. Answer **any two** of the following : **10**

i) Give any two methods of preparations of ethyleneglycol. What is the action of nitric acid on it ?

ii) Discuss aldol condensation reaction with mechanism.

iii) Give any two methods of preparation of cinnamic acid. What is the effect of following reagent on it ?

a) Br_2

b) $KMnO_4/CrO_3$

Spectroscopic Chart

Woodward's-Fieser's rules for calculating ultraviolet absorption maxima

A) For substituted dienes (Ethanol solution)

No.	Basic Value	λ_{max} (nm)
1)	Acyclic and heteroannular dienes	214
2)	Homoannular dienes	253
3)	**Addition for each substituent**	
	a) – R alkyl (including part of carbocyclic ring)	5
	b) – OR (alkoxy)	6
	c) – Cl, –Br	5
	d) – OCOR (acyloxy)	0
	e) – NR_2, (N – alkyl)	60
	f) – SR (S – alkyl)	30
	g) – CH = CH – additional conjugation i.e. extending conjugation	30
	h) If one double bond is exocyclic to one ring	5
	i) If exocyclic to two rings simultaneously	10

B) Rules for α, β – Unsaturated Enones (Ethanol Solution)

No.	Basic value	λ_{max} (nm)
1)	Ketones : $-\overset{\beta}{C}=\overset{\alpha}{C}-CO-$	
	a) Acyclic or 6 – membered ring	215
	b) 5 – membered ring	202
2)	Aldehydes $-C=C-CHO$	207
3)	Extended Conjugation	30
	$-\overset{\delta}{C}=\overset{\gamma}{C}-\overset{\beta}{C}=\overset{\alpha}{C}-CO-$ etc.,	
4)	Homodiene component	39
5)	a) If one double bond is exocyclic to one ring	5
	b) If exocyclic to two rings simultaneously	10
6)	Addition for substituents	

Substituents		Position			
		α	β	γ	δ
a)	- R alkyl (including part of carbocyclic ring)	10	12	18	18
b)	- OR (alkoxy)	35	30	17	31
c)	- OH (hydroxy)	35	30	-	50
d)	- SR (thioether)	-	85	-	-
e)	- Cl (chloro)	15	12	-	-
f)	- Br (bromo)	25	30	-	-
g)	- OCOR (acyloxy)	6	6	-	6
h)	- NH_2, - NHR, - NR_2	-	95	-	-

Solvent correction

	Solvent	
a)	Ethanol	0
b)	Methanol	0
c)	Dioxan	-5
d)	Chloroform	-1
e)	Ether	-7
f)	Water	+8
g)	Hexane	-11
h)	Cyclohexane	-11

SLR-Z– 85

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
CHEMISTRY
Inorganic Chemistry (Paper – VI) (Old)

Day and Date : Friday, 27-11-2015 Max.Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *diagram and give equations* ***wherever*** *necessary.*
iii) Figures to ***right*** *indicates* ***full*** *marks.*

1. Select the correct alternative for the following and rewrite the sentences : **10**

1) Effective atomic number of Co in $[CO(NH_3)_6]Cl_3$ is
   a) 32 b) 28 c) 36 d) 54
2) Optical isomerism is also called _____ isomerism.
   a) Cis-trans b) Mirror image
   c) Geometrical d) Symmetric
3) In complex salt, complex ion retain its identity in _____ state.
   a) Only solid b) Only liquid
   c) Solid and liquid d) None of these
4) Classification of chelating agent is made on the basis of
   a) Oxygen atom b) Nitrogen atom
   c) Number of donor group d) Carbon atoms
5) EDTA is used as
   a) Food preservation b) Water softner
   c) Masking agent d) All of these
6) Sodium ion (Na^+) is the
   a) Soft base b) Soft acid c) Hard base d) Hard acid
7) According to HSAB concept acids and bases all classified as
   a) Hard b) Soft c) Border line d) All of these

P.T.O.

8) Highest oxidation state +7 is shown by
   a) Hafnium b) Copper c) Manganese d) Zinc
9) Geometry of complex depends on
   a) Nature of ligand b) Coordination number
   c) Type of hybridization d) Coordination number and hybridisation
10) The magnetic measurement are carried out of using
   a) Analytical balance b) Digital balance
   c) Gouy's magnetic balance d) None of these

2. Answer **any five** of the following : **10**
   i) Show the geometrical isomerism of $[pt(NH_3)_2Cl_2]$.
   ii) Define chelation with example.
   iii) Explain Pearson's principle with example.
   iv) Give merits of Lewis concept.
   v) Find out oxidation state of transition element in $KMnO_4$ and $K_2Cr_2O_7$.
   vi) Why chromium and copper shows abnormal configuration.

3. A) Answer **any two** of the following : **6**
   i) Give difference between double salt and complex salt.
   ii) Explain magnetic properties of 3d-block elements.
   iii) Discuss complex formation ability of first transition series elements.

   B) Discuss applications of HSAB principle. **4**

4. Write notes on **any two** : **10**
   i) Postulates of Werner's theory.
   ii) Structural requirement of chelate formation.
   iii) Oxidation states of 3d-block elements.

5. Answer **any two** of the following : **10**
   i) Explain the formation of $[Cu(NH_3)_4]^{2+}$ complex.
   ii) What is geometrical isomerism ? Explain it with CN = 4.
   iii) Give the names, symbol and electronic configuration of 4d transition series elements.

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SLR-Z – 86

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
COMPUTER SCIENCE
Object Oriented Programming Using C++ (Paper – V) (Old)

Day and Date : Thursday, 26-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Each** question carries **equal** marks.*
*3) Figures to the **right** place indicate **full** marks.*

1. Choose correct alternatives : **10**

1) To request dynamic memory which operator is used
   a) Destructor b) Delete c) Free d) New

2) A variable declared inside the block is called
   a) Constant b) Global variable
   c) Local variable d) None of these

3) The C++ language developed by
   a) Wats b) Bijarne straw stroup
   c) Newton d) Balgurusami

4) The default access specifier of class is
   a) Private b) Public c) Protected d) None

5) Destructor can be overloaded.
   a) True b) False

6) The operator that release previously allocated memory is
   a) Release b) Return c) Delete d) Destroy

7) A base class may be called a
   a) Child class b) Subclass
   c) Derived class d) Parent class

P.T.O.

8) Having more than one function with same name is called
   a) Overloading b) Defaulting c) Casting d) None of these

9) _____ function works like macro in C++ language.
   a) Friend b) Virtual c) Inline d) Static

10) The member declared under _____ visibility mode are hidden from external use.
   a) Private b) Protected c) Both a) and b) d) Public

2. Answer the following : **10**

1) Define inline function.

2) Define constructor overloading.

3) Explain the keyword : public, private.

4) Define friend function.

5) Define virtual function.

3. A) Answer **any two** of the following : **6**

1) Explain history of C++.

2) Write the difference between C and C++.

3) Explain input and output stream.

B) Write a program in C++ to check entered number is armstrong or not by using default constructor. **4**

4. Answer **any two** of the following : **10**

1) What is function overloading ? Explain with suitable example.

2) Write the object oriented program to check entered number is palindrome or not.

3) What is class ? How does it accomplish data hiding ?

5. Answer **any two** of the following : **10**

1) What is operator overloading ? Explain rules for operating overloading.

2) Explain the term reference variable and pointer variable with example.

3) What is inheritance ? Define base class and derived class.

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SLR-Z – 87

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
COMPUTER SCIENCE (Old)
RDBMS (Paper – VI)

Day and Date : Friday, 27-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions carry* ***equal*** *marks.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) ***All*** *question are* ***compulsory****.*

1. Choose the correct alternative : **10**

1) A virtual relation is known as
   a) view b) table c) snapshot d) none of these

2) _____ operation is an extension of join.
   a) Self join b) Equal join c) Outer join d) None of these

3) Select '3 * 2' from dual ;
   a) 3 b) 2 c) 6 d) 3 * 2

4) Create, alter, drop are
   a) data definition language b) data manipulation language
   c) data control language d) all of above

5) _____ is assignment operator is PLISQL.
   a) == b) = c) := d) +

6) A query with in query is called
   a) sub query b) new query
   c) parent query d) none of above

7) A buffer used to store result of recent query is
   a) cursor b) trigger c) package d) exception

8) The out parameter behave like
   a) constant b) uninitialized variable
   c) regular variable d) none of these

P.T.O.

9) The column of table is referred to as
   a) Tuple b) Attribute c) Entity d) Degree

10) _____ constraint can only applied at column level.
   a) NOT NULL b) Primary key c) Foreign key d) None of these

2. Answer **any five** : **10**
   1) Write any two date functions with example.
   2) Define subquery.
   3) Explain in, out parameters.
   4) Write a syntax of for loop in PLISQL.
   5) Write advantages of PLISQL.
   6) Write different data type's used in SQL.

3. A) Answer **any two** of the following : **6**
      1) Write a note on index.
      2) What is self join ? Explain.
      3) Write a PLISQL block for addition of three number.

   B) Write applications of trigger. **4**

4. Answer **any two** of the following : **10**
   1) Write steps used in cursor.
   2) Explain sequence with e.g.
   3) Write a note on Group_by_having.

5. Answer **any two** : **10**
   1) Write a note on outer join.
   2) Write a function to check given number is odd or even.
   3) Write aggregate functions used in SQL any 3.

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SLR-Z – 88

Seat No.	

B.Sc. II (Semester – III) Examination, 2015
PHYSICS (Paper – V) (Old)
General Physics, Heat and Sound

Day and Date : Saturday, 28-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Use*** *of log table or calculator is* ***allowed****.*
iv) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*

1. Select the correct alternative. **10**

i) If $\vec{A}.(\vec{B}\times\vec{C}) = 0$ then the vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are
a) co-planar b) not co-planar c) equal d) all zero

ii) The divergence of a vector field is a _____ quantity
a) scalar b) vector c) constant d) non-zero

iii) In pure precessional motion, nutation is _____
a) absent b) very small c) large d) very large

iv) Bicycle is an example of _____
a) statistical stability b) statistical instability
c) permanent instability d) none of these

v) A spiral spring is said to be flat, if the angle made by the plane of its turn to the horizontal is _____
a) less than 90° b) equal to 90°
c) greater than 90° d) zero

vi) When the spring is given vertical oscillations, the quantity which comes into picture is
a) Young's' modulus b) Bulk modulus
c) Modulus of rigidity d) None of these

P.T.O.

vii) The dimensions of coefficient of viscosity are
a) $[M^1L^1T^{-1}]$ b) $[M^1L^{-1}T^{-1}]$ c) $[M^{-1}L^{-1}T^{-1}]$ d) $[M^0L^{-1}T^{-1}]$

viii) In a reversible process, the entropy of the system _____
a) increases b) decreases
c) becomes zero d) remains constant

ix) The audibility of human ear is _____
a) 20 Hz to 2 KHz b) 20 Hz to 20 KHz
c) 20 Hz to 200 KHz d) 20 Hz to 2000 KHz

x) Microphone converts _____energy into electrical energy.
a) light b) mechanical c) gravitational d) sound

2. Answer **any five** of the following. **10**

i) What is del operator ?

ii) Explain the term precession.

iii) What is change in entropy when 10 kg of water at 100°C is converted into vapour ?
(Given latent heat of vapourisation = 540 cal/gm)

iv) Define the term coefficient of viscosity.

v) Define entropy. State its unit.

vi) What is transducer ? State its characteristics.

3. A) Attempt **any two** of the following. **6**

i) What is scalar field ? Give any two examples of scalar field.

ii) What is gyroscope ? Obtain the expression for time period of precession of gyroscope.

iii) Explain the terms-reverberation and reverberation time. State Sabine's formula for it.

B) Show that the vectors $4\hat{i}-2\hat{j}+2\hat{k}, \hat{i}+2\hat{j}-3\hat{k}$ and $3\hat{i}-4\hat{j}+5\hat{k}$ are coplanar. **4**

4. Answer **any two** of the following. **10**

   i) For a rolling disc, obtain an expression for angle of lean of the disc.

   ii) Explain various factors affecting the acoustics of building.

   iii) Obtain an expression for change in entropy of a perfect gas.

5. Attempt **any one** of the following. **10**

   i) Derive the expression for Young's modulus of the material of the wire of a flat spiral spring.

   ii) How coefficient of viscosity of a liquid is determined by Searle's viscometer ? Derive the necessary formula.

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SLR-Z – 89

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
BIOCHEMISTRY (Paper – I) (Old)
Biomolecules

Day and Date : Saturday, 28-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw structural formulae ***wherever*** *possible.*

1. Write following sentences selecting most correct answer from given options. **10**

1) Aldotetrose has _____ number of carbon atoms in its structure.
a) 3 b) 4 c) 5 d) 6

2) _____ is a non-reducing disaccharide.
a) Lactose b) Maltose c) Cellobiose d) Sucrose

3) _____ is a basic amino acid.
a) Valine b) Arginine c) Cysteine d) Glycine

4) _____ is not a fibrous protein.
a) Keratin b) Elastin c) Globulin d) Collagen.

5) Xyrophthalmia is caused due to deficiency of vitamin
a) retinol b) thiamine c) riboflavin d) pyridoxine

6) Oxygenases enzyme belong to _____ class of enzymes.
a) oxidoreductases b) transferases
c) isomerases d) hydrolases

7) Monoterpenes contain _____ carbon atoms in their structure.
a) 5 b) 10 c) 15 d) 20

8) When an enzyme requires coenzyme for its catalysis, the protein part of enzyme is called as

a) holoenzyme b) isoenzyme c) abenzyme d) apoenzyme

9) Triglycerides are formed due to _____ linkage between fatty acids and glycerol.

a) ether b) ester c) glycoside d) peptide

10) In decarboxylation of α-keto acids, _____ coenzyme is involved.

a) thiamine b) riboflavin c) retinol d) niacin

2. Answer **any five** from following : **10**

1) What are scleroproteins ? How are they classified ?
2) What is meant by pI value ? How is it calculated ?
3) Which type of reactions are catalysed by NAD^+ ? Give one example.
4) Define carbohydrates. Give two examples of pentoses.
5) Explain the term spingolipids.
6) What do you understand by geometric specificity of enzymes ?

3. A) Attempt **any two** : **6**

1) What are amino sugars ? Give two examples.
2) How hydrogen bonds stabilise the β-sheet structure of protein ?
3) What is the role of pantothenic acid as coenzyme A ?

B) What is the role of carbohydrate in the structure of nucleic acids ? **4**

4. Solve **any two** : **10**

1) Derive Michaelis-Menten equation for enzyme catalysed reaction.
2) Write biochemical reactions involving FAD as a coenzyme.
3) Discuss about structure of myoglobin.

5. Attempt **any two** : **10**

1) Classify lipids with suitable examples. Add a note on fatty acids.
2) Write an account of polysaccharides from plant origin.
3) Classify amino acids and write ninhydrin reaction.

SLR-Z – 91

Seat No.	

B.Sc. II (Semester – III) (Old) Examination, 2015
PHYSICS
Electronics (Paper No. – VI)

Day and Date : Monday, 30-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct alternative from the following : **10**

i) A differential amplifier amplifies the difference between _____
   a) input and output signals b) two input signals
   c) two supply voltages d) input signal and supply voltage

ii) The value of feedback factor is _____
   a) less than unity b) greater than unity
   c) equal to unity d) equal to zero

iii) Barkhausen criterion for sustained oscillation is _____
   a) $|\beta Av| = 1$ b) $|\beta Av| < 1$ c) $|\beta Av| < 2$ d) None of the above

iv) In phase shift oscillator, the phase shift in each RC network is
   a) 180° b) 120° c) 60° d) 360°

v) The intrinsic stand-off ratio (η) of a UJT is given by
   a) $RB_1 + RB_2$ b) $\frac{RB_1 + RB_2}{RB_1}$ c) $\frac{RB_1}{RB_1 + RB_2}$ d) $\frac{RB_1 + RB_2}{RB_2}$

vi) In a FET, there are _____ P-N junctions at the sides.
   a) three b) four c) five d) two

P.T.O.

vii) In toggle mode of J-K flip-flop both j and k inputs must be

a) low b) high

c) compliments of each other d) none of these

viii) A logical circuit which gives output in '1' state, if at least any one of the input is in '1' state is called _____

a) AND gate b) OR gate c) NAND gate d) NOR gate

ix) IC 7905 is _____ voltage regulator.

a) +5 b) –5 c) ± 5 d) 79

x) The inner surface of CRT screen is coated with _____ material.

a) zinc b) phosphor bronze

c) fluorescent d) carbon

2. Answer **any five** of the following : **10**

i) Write any four advantages of negative feedback.

ii) Define the term intrinsic stand-off ratio and write it's limit.

iii) Construct the R-S flip-flop using NAND gate and draw its truth table.

iv) Define the term line regulation and load regulation.

v) Write any four uses of CRO.

vi) Construct the logic circuit for Half adder using XOR and AND gate.

3. A) Answer **any two** of the following : **6**

i) Draw the two stage R-C coupled transistor amplifier and explain it's working.

ii) What is feedback ? Show that the voltage gain of an amplifier is expressed as

$$Avf = \frac{Av}{1 - \beta Av}$$

iii) Draw the circuit for transistor series voltage regulator and explain it's working.

B) Calculate the oscillating frequency and feedback fraction in Colpitt's oscillator with $C_1 = 20$ PF, $C_2 = 30$ PF and $L = 12\ \mu H$. **4**

4. Answer **any two** of the following : **10**

   i) Draw the circuit of phase-shift oscillator and explain it's working.

   ii) What is flip-flop ? Explain the construction and working of J-K flip-flop with logic diagram and truth table.

   iii) State and prove De Morgan's theorems.

5. Answer **any one** of the following : **10**

   i) Explain the principle, construction and working of n-channel JFET with output characteristics.

   ii) Explain principle, construction and working of CRO with block diagram in detail.

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SLR-Z – 92

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
BIOCHEMISTRY (Paper – II) (Old)
Biochemical Techniques

Day and Date : Monday, 30-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw labelled diagrams ***wherever*** *necessary.*

1. Write the following sentences selecting most correct answer from given options. **10**

1) According to Lambert's law absorbance of coloured solution depends on _____ through which radiations pass.

a) length of medium

b) pH of solution

c) nature of colour

d) concentration of coloured substance in solution

2) Value of extinction coefficient ($\in$) in colorimetry is equal to one when concentration of solution is _____ and the length of the medium is one cm.

a) 1 mole/litre b) 1 g/litre

c) 1% W/W d) 1N

3) Migration of charged particles in solution toward electrodes under the influence of electric field is called as

a) ion exchange chromatography

b) electrophoresis

c) paper chromatography

d) gel permeation chromatography

4) _____ is used for industrial production of ethanol.
   a) Thermophilus acquaticus
   b) Corynebacterium simplex
   c) Escherichia coli
   d) Saccharomyces cereviceae

5) Southern blotting technique is used for blot transfer of
   a) Proteins
   b) RNA
   c) DNA
   d) Lipids

6) _____ is an intellectual property.
   a) Farm
   b) House
   c) Car
   d) Genetically modified vector

7) ELISA technique is used to detect very minute quantity of
   a) proteins
   b) lipids
   c) carbohydrates
   d) nucleic acids

8) Hybridoma technology was developed first by _____ in 1975.
   a) Kerry Mullis
   b) G. Kohler and C. Milstein
   c) Southern
   d) Alwin, Kemp and Stark

9) Vent DNA-polymerase is used for production of multiple copies of DNA because it is reactive at _____ temperature at which E-Coli DNA polymerase is inactive.
   a) 0 – 4° C
   b) 37 – 40° C
   c) 70 – 73° C
   d) 95 – 98° C

10) In SDS-PAGE _____ is used to reduce disulphide bonds in protein.
   a) acrylamide
   b) sodium dodecyl sulphate
   c) β-mercapto ethanol
   d) ammonium persulphate

2. Answer **any five** : **10**

1) What is role of Sodium Dodecyl Sulphate (SDS) in SDS-PAGE ?
2) What is elution volume in gel permeation chromatography ?
3) Why are myeloma cells used in hybridoma technology ?
4) What is effect of electric cloud on electrophoretic mobility ?
5) What is trade mark ? Give two examples.
6) What for DNA probe is used ?

3. A) Solve **any two** : **6**
   1) What is trade secrete ?
   2) How are proteins stained after SDS-PAGE ?
   3) What are limitations of colorimetric analysis ?

   B) Draw labelled diagram of colorimeter. **4**

4. Answer **any two** : **10**
   1) Explain hybridoma technique in brief.
   2) Describe immobilisation of enzymes by gel entrapment method.
   3) Illustrate the process of Western blotting.

5. Attempt **any two** : **10**
   1) Describe various applications of SDS-PAGE.
   2) Write about the technique of Thin Layer Chromatography (TLC).
   3) What are applications of immobilised enzymes ?

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SLR-Z – 94

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
STATISTICS (Paper – V) (Old)
Continuous Probability Distributions – I

Day and Date : Tuesday, 1-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1) **All** questions are **compulsory** and carry equal marks.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative : **10**

1) If X is a continuous random variable with p.d.f. f(x), then $\int_{-\infty}^{\infty} f(x)\,dx$ is equal to

a) 0 b) 1 c) ∞ d) None of these

2) If X is a continuous random variable having p.d.f. f(x), then E(X) is called

a) AM b) GM c) HM d) None of these

3) Let X be continuous random variable with pdf f(x), then $P(X < Q_1) =$

a) $\frac{1}{4}$ b) $\frac{1}{2}$ c) $\frac{3}{4}$ d) None of these

4) If $F_x(x)$ is the c.d.f. of a continuous random variable X, then $F_x(-\infty) =$

a) 1 b) 0 c) 0.5 d) None of these

5) The moment generating function (mgf) of X; $M_X(t)$, is defined as

a) $E(e^{tX})$ b) $E(e^{X})$ c) $E(e^{t})$ d) None of these

6) If X and Y are independent r.v.'s with m.g.f.'s $M_X(t)$ and $M_Y(t)$ respectively, then the mgf of (X + Y) will be

a) $M_X(t) + M_Y(t)$ b) $M_X(t) \cdot M_Y(t)$
c) Both a) and b) d) None of these

P.T.O.

7) If $F_{X, Y}(x, y)$ is the cdf of bivariate random variable (X, Y), then

$F_{X, y}(+\infty ; +\infty) =$

a) 0 b) 1 c) ∞ d) None of these

8) If X has uniform distribution over 0 to 1 with pdf $f(x) = \begin{cases} 1 & ; 0 \le x \le 1 \\ 0 & ; \text{ow} \end{cases}$ then

$-2 \log_e X$ ollows

a) Exponential distribution b) Uniform distribution

c) Normal distribution d) None of these

9) If X follows exponential distribution with parameter θ, then mean of X will be

a) $\frac{1}{\theta}$ b) θ c) $\frac{1}{\theta^2}$ d) None of these

10) If X is a continuous random variable with p.d.f. f(x) given by

$f(x) = \begin{cases} kx & ; 0 \le x \le 1 \\ 0 & ; \text{ow} \end{cases}$ then k must be

a) 1 b) 2 c) 0 d) None of these

2. Attempt **any five** of the following : **10**

For a continuous random variable X with pdf f(x), define :

i) Mean

ii) Median

iii) Mode

iv) Variance

v) Harmonic mean

vi) Co-efficient of Skewness and Kurtosis in terms of moments.

3. a) Attempt **any two** of the following : **6**

i) Define probability density function (p.d.f.) of X. Also state their properties.

ii) A continuous r.v.X. has pdf $f(x) = \begin{cases} 3x^2 & ; 0 \le x \le 1 \\ 0 & ; \text{ow} \end{cases}$ Find mean and variance of X.

iii) The p.d.f. of continuous r.v.X. is given by $f(x) = \begin{cases} 2x & ; 0 \le x \le 1 \\ 0 & ; \text{ow} \end{cases}$

Obtain the p.d.f. of $Y = X + 5$.

b) State and prove multiplication theorem of expectation. **4**

4. Attempt **any two** of the following : **10**

i) State the properties of bivariate cumulative distribution function.

ii) A continuous r.v.x. has p.d.f. $f(x) = \begin{cases} \frac{1}{\pi} & ; -\frac{\pi}{2} < x < \frac{\pi}{2} \\ 0 & ; \text{ow} \end{cases}$

Find the distribution of $Y = \tan x$.

iii) The joint p.d.f. of (X, Y) is given by

$$f(x, y) = \begin{cases} k\,xy & ; \ 0 < x < 1, \ 0 < y < 1 \ \& \ k > 0 \\ 0 & ; \text{ow} \end{cases}$$

Find k, also obtain marginal p.d.f.'s of X and Y.

5. Attempt **any two** of the following : **10**

i) For a bivariate continuous random variable (X, Y). Prove that $E[E(X / Y] = E(X)$.

ii) If X follows continuous uniform distribution over (a, b). Find its cdf and hence find median.

iii) For exponential distribution with scale parameter θ, obtain mean and median of the distribution.

SLR-Z – 96

Seat No.	

B.Sc. II (Semester – III) (Old) Examination, 2015
GEOCHEMISTRY
Introduction to Geochemistry (Paper – I)

Day and Date : Tuesday, 1-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions carries* ***equal*** *marks.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Draw neat diagrams ***wherever*** *necessary.*

1. Choose the correct alternative **each** of the following. **10**

1) Gibb's phase rule is

a) $P + F = C + 1$ b) $P + F = C + 2$ c) $P + F = C - 2$ d) $P + F = C$

2) The radius ratio of ZnS is

a) 0.1 b) 0.2 c) 0.3 d) 0.4

3) In co-valent bond, there is _____ of electrons.

a) sharing b) transfer c) accept d) none of these

4) The polymorphous of $CaCO_3$ is

a) calcite b) α-quartz c) β-quartz d) Kyanite

5) The number of phases in water system is

a) one b) two c) three d) four

6) The same compound having more than one different form is known as

a) isomorphism b) polymorphism

c) co-ordinate d) none of these

7) The number of triple points in sulphur system is

a) one b) two c) three d) four

P.T.O.

8) If the co-ordination number of molecule is four, its geometry is

a) linear b) tetrahedral c) octahedral d) triangular

9) The number of atoms per unit cell in B.C.C. crystal is

a) 2 b) 1 c) 3 d) 4

10) The basic unit of silicate structure is

a) $(SiO_4)^{-1}$ b) $(SiO_4)^{-2}$ c) $(SiO_4)^{-3}$ d) $(SiO_4)^{-4}$

2. Answer **any five** of the following. **10**

1) Define : triple point.

2) Draw a single chain structure of silicate.

3) Define : Unit cell

4) Define : Lattice energy.

5) Discuss the trends of ionic radii in a periodic table.

6) Define : Lattice energy.

3. A) Attempt **any two** of the following. **6**

i) Distinguish between homogeneous and heterogeneous system.

ii) State and explain atomic substitution.

iii) Define isomorphism. Give one example.

B) State and explain Goldschmidt's mineralogical phase rule. **4**

4. Answer **any two** of the following. **10**

i) Discuss water system.

ii) Write a short note on Principles of Crystal structure.

iii) Discuss the crystal formation of CSCI.

5. Answer **any two** of the following. **10**

i) Discuss Sulphur system.

ii) Discuss the structure of ZnS.

iii) Explain states of matter.

SLR-Z – 97

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2015
ZOOLOGY (Paper – V) (Old)
Animal Diversity – III

Day and Date : Tuesday, 1-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to be **right** indicate **full** marks.*
*3) Draw neat and labelled diagrams **wherever** necessary.*
*4) Write question number attempted in **margin**.*

1. Select the appropriate answer from those given below each question and rewrite the sentences : **10**

i) Pila belongs to the class _____
a) Cephalopoda b) Gastropoda c) Pelecypoda d) Amphinura

ii) The chambers in heart of cockroach are _____
a) 8 b) 12 c) 13 d) 10

iii) Aquatic respiratory organ in Pila is _____
a) Mantle b) Pulmonary sac
c) Ctenidium d) Osphradium

iv) Piercing and sucking type of mouth parts are found in _____
a) Butterfly b) Honeybee c) Mosquito d) Cockroach

v) Byssus threads are present in _____
a) Sepia b) Pila c) Uno d) Mytilus

vi) Bipinnaria is larval stage of _____
a) Echinodermata b) Arthropoda
c) Mollusca d) Hemichordata

vii) Malaria disease is caused by biting of female _____ mosquito.
a) Mansonia b) Anopheles c) Culex d) Aedes

viii) Shell of Pila is _____
a) Internal b) Univalved c) Bivalved d) Multivalved

P.T.O.

ix) Gizzard of cockroach has _____ number of teeth.
a) 4 b) 6 c) 8 d) 2

x) Malpighian tubules in cockroach are concerned with _____
a) Respiration b) Digestion
c) Reproduction d) Excretion

2. Answer **any five** of the following : **10**
a) Give general characters of Phylum Arthropoda.
b) Mandibles of cockroach.
c) Heart of cockroach.
d) Foot in cephalopoda.
e) Mosquito as a disease vector.
f) Leg of cockroach.

3. A) Answer **any two** of the following : **6**
i) Shell of pila
ii) Mouth parts of Honeybee
iii) Sexual dimorphism in cockroach.

B) Write a note on radula of Pila. **4**

4. Write answers to **any two** of the following : **10**
A) Describe the affinities of hemichordates with Annelida and Echinodermata.
B) Describe the labium of cockroach.
C) Give general characters of Phylum Mollusca.

5. Write answer to **any one** of the following : **10**
i) Describe the nervous system of cockroach.
ii) Explain the circulatory system of Pila.

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SLR-Z – 98

Seat No.	

B.Sc. II (Semester – III) (Old) Examination, 2015
STATISTICS (Paper – VI)
Discrete Probability Distributions and Statistical Methods

Day and Date : Wednesday, 2-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory*** *and carry* ***equal*** *marks.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative : **10**

i) If X_1 and X_2 are two independent Poisson variates with parameters λ_1 and λ_2 respectively, the variable $(X_1 + X_2)$ follows.

a) Binomial distribution with parameter $(\lambda_1 + \lambda_2)$

b) Poisson distribution

c) Either of (a) and (b)

d) Neither of (a) and (b)

ii) In usual notations

a) $b_{13.2}^2 \times b_{31.2}^2 = r_{13.2}$

b) $b_{13.2} \times b_{31.2} = r_{13.2}^2$

c) $b_{13.2} + b_{31.2} = r_{31.2}$

d) $b_{13.2} \times b_{13.2} = r_{13.2}$

iii) If X~ NB (k, p) such that E (X) = 15 and V(X) = 60, then

a) k = 5, p = ¾ b) k = 15, p = ½

c) k = 5, p = ¼ d) k = 3, p = $\frac{1}{5}$

P.T.O.

iv) Negative binomial distribution NB (k, p) reduces to geometric distribution when k equal to

a) ∞ b) 1 c) 0 d) None of these

v) If X~ Geo (p) then $P(x \geq 3)$ =

a) q^3 b) p^3 c) pq^3 d) p^3q

vi) The range of a partial correlation coefficient is

a) 0 to ∞ b) 0 to +1 c) –1 to +1 d) $-\infty$ to ∞

vii) If X follows negative binomial distribution with parameters k and p then

a) Mean = Variance b) Mean > Variance

c) Mean < Variance d) Mean = 2 Variance

viii) Let (X_1, X_2, X_3, X_4) be a random vector follows multinomial distribution with usual notations, then CoV $(X_2\ X_3)$ =

a) $4\ p_2\ p_3$ b) $p_2\ (1 - p_3)$ c) $-np_2p_3$ d) $4p_1\ p_2\ p_3\ p_4$

ix) If X is a geometric random variable then $P[X \geq 6 / X \geq 3]$ is

a) $P[X \geq 6]$ b) $P[X \geq 3]$

c) $P[X \geq 6]P[X \geq 3]$ d) $P[X \geq 2]$

x) If X~ Geo (0.8) then the mean of waiting time distribution is

a) 0.32 b) 0.16 c) 0.25 d) 1.25

2. Answer **any five** of the following : **10**

i) Find mean of Poisson distribution with parameter λ.

ii) Show that a multiple correlation coefficient cannot be negative.

iii) In a trivariate data $r_{12} = 0.6$ $r_{13} = -0.4$ $r_{23} = 0.7$

Are these values consistent ?

iv) If X is a Poisson variate such that P[X = 2] = 9 [X = 4] + 90 P[X = 6].

Find λ.

v) Find probability generating function (pgf) of negative binomial distribution.

vi) Find mean of the residual.

3. A) Solve **any two** out of three. **6**

   i) If X and Y are independent Poisson variates, such that P[X = 1] = P[X = 2] and P[Y = 2] = P[Y = 3]. Find mean of (X+Y).

   ii) If $R_{1.23} = 1$ then show that $R_{2.13} = 1 = R_{3.12}$

   iii) With usual notations prove that $1 - R^2_{1.23} = (1 - r^2_{12})\,(1 - r^2_{13.2})$.

   B. With usual notations prove that $R^2_{1.23} = b_{12.3}\, r_{12}\, \frac{\sigma_2}{\sigma_1} + b_{13.2}\, r_{13}\, \frac{\sigma_3}{\sigma_1}$. **4**

4. Answer **any two** of the following. **10**

   i) Derive Poisson distribution as a limiting form of a Binomial distribution.

   ii) State the properties of residual. Prove any one of them.

   iii) Define multinomial distribution and obtain its moment generating function.

5. Solve **any two** out of three. **10**

   i) If $X_1 = Y_1 + Y_2$, $X_2 = Y_2 + Y_3$, $X_3 = Y_3 + Y_1$ where Y_1, Y_2, Y_3 are mutually uncorrelated variables with mean zero and unit standard deviation. Find $R_{1.23}$.

   ii) State and prove lack of memory property of geometric distribution.

   iii) With usual notations prove that $b_{12.3} = \frac{b_{12} - b_{13}\, b_{32}}{1 - b_{23}\, b_{32}}$.

SLR-Z – 100

Seat No.	

B.Sc. II (Semester – III) (Old) Examination, 2015
GEOCHEMISTRY (Paper – II)
Introduction to Solar System and Geo-Sphere

Day and Date : Wednesday, 2-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Fill in the blanks with correct answer from given options : **10**

1) The ozone layer in the atmosphere is present between _____ km altitude.
a) 15-30 b) 20-30 c) 40-50 d) 50-60

2) In the cosmic abundances, the elements show a rapid exponential decrease for elements of the _____ atomic numbers.
a) higher b) lower
c) medium d) no relation with atomic numbers

3) The composition of terrestrial water is _____
a) Na > Ca > Mg b) Ca > Mg > Na
c) Mg > Na > Ca d) Ca > Na > Mg

4) The major dissolved constituent in the sea water is _____
a) Cl b) Br c) SO_4 d) HCO_3

5) Sulphur compounds in the atmosphere are added due to combustion of _____
a) Trees b) Petrol c) Coal d) Gaseous fuels

6) The uppermost atmospheric layer is _____
a) Troposphere b) Stratosphere
c) Mesosphere d) Thermosphere

7) The rivers flowing on _____ terrain is carbonated (CO_2 rich) water.
a) metamorphic b) sedimentary
c) igneous d) secondary

P.T.O.

8) In the primeval atmosphere, at the first stage of its evolution _____ was major constituent.
   a) NH_4 b) N_2 c) O_2 d) CH_4

9) The most variable constituent of the atmosphere is _____
   a) O_3 b) SO_2 c) H_2O d) CH_3

10) The main gaseous constituents of present day atmosphere are _____
   a) H_2O, H_2, CO_2 b) N_2, O_2, Ar c) N_2, O_2, CO_2 d) N_2, O_2, O_3

2. Answer **any five** of the following : **10**
   i) What is the thickness of transition zone present in the upper mantle ?
   ii) At what depth lower mantle occurs ?
   iii) What is the average composition of mantle + crust ?
   iv) What is the composition of Cohenite ?
   v) Who coined the concept of geochemical classification of the elements ?
   vi) Contribution of volcanoes in evolution of atmosphere.

3. A) Answer **any two** of the following : **6**
   i) Distinguish between composition of oceanic and terrestrial water.
   ii) What is composition of the crust ?
   iii) Draw a table of composition of primeval atmosphere.

   B) Write answer of **any one** : **4**
   i) Explain composition of atmosphere.
   ii) Explain structure of atmosphere.

4. Attempt **any two** of the following : **10**
   i) Describe in brief zonal structure of the earth.
   ii) Write an essay on composition of the earth as a whole.
   iii) Describe atmospheric additions and losses during geologic time.

5. Answer **any two** of the following : **10**
   i) Describe in detail, composition of sea water.
   ii) Explain cosmic abundance of elements.
   iii) Explain in brief, geochemical classification of the elements.

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SLR-Z – 101

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2015
ZOOLOGY (Paper – VI) (Old)
Cell Science, Genetics, Biological Chemistry and Economic Zoology

Day and Date : Wednesday, 2-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw a neat and labelled diagrams ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentence by selecting appropriate answer : **10**

1) _____ is a American class of Poultry.
   a) Brahma b) White leg hen
   c) Orpington d) Polymouth Rock

2) Enzymes are basically formed by _____
   a) Carbohydrates b) Proteins
   c) Lipids d) All the above

3) _____ is a English class of Poultry.
   a) Red Carp b) Chittagong c) Minorca d) Rhode Island Red

4) Rearing of Honeybee is known as _____
   a) Sericulture b) Vermiculture
   c) Apiculture d) Aquaculture

5) _____ is a breed of Goat.
   a) Rath b) Ongole c) Deoni d) Bar-Bari

6) Cellulose is _____
   a) Polysaccharide b) Disaccharide
   c) Oligosaccharide d) Monosaccharide

7) Interchange of corresponding segments between the two non-sister chromatids of a pair of homologous chromosomes is called _____
   a) Linkage b) Crossing over
   c) Interaction d) All of the above

P.T.O.

8) The pH 7 is of _____
   a) Acid b) Base c) Pure water d) All the above

9) DNA contains _____ sugar.
   a) Ribose b) Deoxyribose c) Glucose d) Starch

10) Ratio of complimentary factor is _____
   a) 9 : 3 : 3 : 1 b) 9 : 3 : 4 c) 9 : 7 d) 1 : 1 : 1 : 1

2. Answer **any five** of the following : **10**
   i) Nucleotides.
   ii) Starch.
   iii) Define crossing over.
   iv) Drone.
   v) Milk.
   vi) Silk.

3. A) Answer **any two** of the following : **6**
   i) mRNA
   ii) Significance of meiosis
   iii) Honeycomb.

   B) Describe milk and milk product. **4**

4. Answer **any two** of the following : **10**
   i) Describe the Watson and Crick model of DNA.
   ii) Explain complementary interactions.
   iii) Describe fish farm construction.

5. Answer **any one** of the following : **10**
   i) What is linkage ? Describe complete linkage with suitable example.
   ii) Describe life cycle of silkworm.

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SLR-Z – 102

Seat No.	

B.Sc. II (Semester – III) Examination, 2015
MATHEMATICS (Paper – V) (Old)
Differential Calculus

Day and Date : Thursday, 3-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Select the correct alternative for **each** of the following : **10**

1) Polar sub tangent for the curve $r = a(1 + \cos\theta)$ is

a) $2a\cos^2\left(\frac{\theta}{2}\right)\cot\left(\frac{\theta}{2}\right)$ b) $2a\cos^2\left(\frac{\theta}{2}\right)\tan\left(\frac{\theta}{2}\right)$

c) $2a\sin^2\left(\frac{\theta}{2}\right)\tan\left(\frac{\theta}{2}\right)$ d) $2\sin^2\left(\frac{\theta}{2}\right)\cot\left(\frac{\theta}{2}\right)$

2) Polar sub tangent for the curve $r = a\theta$ is

a) r^2/a b) a

c) a/r^2 d) $1/a$

3) Angle of intersection of curves $r = a\cos\theta$, $2r = a$ is

a) $\pi/2$ b) $\pi/4$

c) $\pi/3$ d) 0

4) If $x = r\cos\theta$, $y = r\sin\theta$ then $\frac{\partial(r\theta)}{\partial(x,y)}$ =

a) x b) y

c) r d) $\frac{1}{r}$

P.T.O.

5) If u = p + q and v = p.q then $\frac{\partial(u,v)}{\partial(p,q)}$ =

a) p – q b) q – p

c) 0 d) none of these

6) The radius of curvature at any point on the curve S = 4asinψ at $\psi = 0$ is

a) 4a cosψ b) 4a sinψ

c) 4a d) none of these

7) The radius of curvature of $y = x^2$ at $\left(\sqrt{2}, 2\right)$ is

a) $\frac{27}{2}$ b) $\frac{2}{27}$

c) 2 d) none of these

8) The polar tangential formula for the radius of curvature is

a) $\rho = p + \left(\frac{dp}{d\psi}\right)^2$ b) $\rho = p^2 + \left(\frac{d^2p}{d\psi^2}\right)$

c) $\rho = p + \frac{d^2p}{d\psi^2}$ d) none of these

9) The necessary condition for a function f(x) to have a maximum at x = c is that

a) f′(c) > 0 b) f′(c) = 0

c) f′(c) < 0 d) none of these

10) The minimum value of $xy + \frac{a^3}{x} + \frac{b^3}{y}$ at x = a, y = a is

a) a^2 b) $2a^2$

c) $3a^2$ d) none

2. Attempt **any five** of the following : **10**

1) If $x = e^u \cos v$, $y = e^u \sin v$ then find $\frac{\partial(x,y)}{\partial(u,v)}$.

2) Show that the radius vector is inclined at a constant angle to the tangent at any point on the equiangular spiral $r = a\, e^{b\theta}$.

3) Find $\frac{ds}{dx}$ for parabola $y^2 = 4ax$.

4) Find radius of curvature at any point $S = C \log \sec \psi$.

5) Find the radius of curvature for the curve $y = e^x$ at any point on it.

6) Find the maximum and minimum value of the function

$f(x) = 3x^4 - 2x^3 - 6x^2 + 6x + 1$ in the interval [0, 2].

3. A) Attempt **any two** of the following : **6**

1) For the cycloid $x = a(1 - \cos t)$, $y = a(t + \sin t)$ find $\frac{ds}{dt}, \frac{ds}{dx}, \frac{ds}{dy}$.

2) Show that the radius of curvature for the cycloid

$X = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$ is $4a \cos \theta/2$.

3) Find the minimum value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$.

B) If J be Jacobian of u, v, w with respective to x, y, z and J′ be Jacobian of x, y, z with respective to u, v, w then show that $J \cdot J' = 1$. **4**

4. Attempt **any two** of the following : **10**

1) Find the equation of tangent and normal at the point 't' for the curve whose equation is given by $y = f(t)$ and $x = g(t)$.

2) If $y = f(x)$ be a equation of curve in Cartesian form then show that radius of

curvature $\rho = \frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\frac{d^2y}{dx^2}}$.

3) Determine the points where the function $x^3 + y^3 - 3axy$ has minimum or maximum value.

5. Attempt **any one** of the following : **10**

1) Explain Lagranges method of undetermined multipliers to determine the extreme values of u = f(x, y, z) subject to ϕ (x, y, z) = 0 and hence find the maximum value of xy^2z^3 subject to the condition x + y + z = 6.

2) If the curve is defined by the equation X = f(t), y = ϕ(t) then prove that $\rho = \frac{\left(x'^2 + y'^2\right)^{3/2}}{x'y'' - y'x''}$ and hence find radius of curvature of the curve

x = a (cost + tsint)

y = a (sint – tcost)

SLR-Z – 103

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
BOTANY (Paper – V) (Old)
Structure Botany and Taxonomy of Angiosperms

Day and Date : Thursday, 3-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Draw ***neat*** *and labelled diagram* ***wherever*** *necessary.*

3) Figures to ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternatives. **10**

1) _____ belongs to the family Meliaceae.

a) Azadirachta indica b) Sarraka indica

c) Tamarindus indicus d) Mangifera indica

2) Cork Cambium is _____

a) Primary meristem b) Secondary meristem

c) Promeristem d) None of these

3) Lateral meristem is responsible for increasing _____

a) Height b) Permanent tissues

c) Thickness d) None of these

4) Multilayered epidermis is present in _____ leaf.

a) Maize b) Sunflower c) Jawar d) Nerium

5) _____ are present in Drosera.

a) Stinging hairs b) Bulliform cells

c) Digestive glands d) Peltate hairs

6) _____ is present in vascular bundle of dicot plants.

a) Periderm b) Secondary xylen

c) Cambium d) Secondary phloem

P.T.O.

7) When vessels are absent in the wood, it is considered as _____
   a) Porous wood b) Non-porous wood
   c) Porous and non-porous wood d) None of these

8) The wood elements in the central part of the trunk do not take part in conduction of water but provide mechanical support to the axis is called _____
   a) Heartwood b) Sapwood
   c) Softwood d) None of these

9) The family Liliaceae belongs to the class _____
   a) Dicot b) Monocot c) Both d) None of these

10) _____ corolla present in the family fabaceae.
   a) Bilabiate b) Tubular c) Campanulatae d) Papilion aceous

2. Answer **any five** of the following : **10**

1) List the types of vascular bundles.

2) Stinging hairs.

3) Sanken stomata.

4) What is lateral cambium ?

5) Write any two distinguishing characters of the family Fabaceae.

6) Write any two plant names belong to family Amaranthaceae.

3. A) Answer **any two** of the following : **6**

i) Explain primary structure of Maize stem.

ii) Write structure and functions of sclerenchyma tissue.

iii) Explain mechanical tissue system in plants with suitable diagram.

B) Give an account of annual rings with suitable diagram. **4**

4. Answer **any two** of the following : **10**

   i) Write distinguishing features of the family Acanthaceae with suitable diagram.

   ii) Explain normal secondary growth in dicot stem with suitable diagrams.

   iii) Give an account of basic structure of wood with suitable diagram.

5. Answer **any one** of the following : **10**

   i) Explain anomalous secondary growth in Bignonia with suitable diagram.

   ii) What is meristem ? Give classification and functions of meristem.

SLR-Z – 104

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2015
MATHEMATICS (Paper – VI)
Real Analysis

Day and Date : Friday, 4-12-2015 Max. Marks : 50

Time : 10.30 a..m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Choose correct alternative for **each** of the following : **10**

1) If sequence $\{a_n\}$ is bounded then limit inferior and limit superior are
   a) both finite b) both infinite
   c) one is finite other is infinite d) none of these

2) Every monotonic decreasing sequence which is not bounded below diverges to
   a) ∞ b) $-\infty$
   c) both ∞ and $-\infty$ d) none of these

3) The sequence $\left\{1+\frac{1}{n}\right\} \forall\ n \in N$ is
   a) converges to limit 1 b) converges to limit 0
   c) diverges to ∞ d) diverges to $-\infty$

4) If $\sum u_n$ is positive term series, such that $\lim_{n\to\infty} n\left(\frac{u_n}{u_{n+1}}-1\right)=l$ then the series is convergent if
   a) l = 1 b) l < 1
   c) l > 1 d) l = 0

5) If $\sum u_n$ is positive term series, such that $\lim_{n\to\infty}\left(n \log \frac{u_n}{u_{n+1}}\right)=l$ then series divergent for
   a) l < 1 b) l > 1
   c) l = 1 d) l = 2

P.T.O.

6) The series $\sum_{n=1}^{\infty} \frac{\sin nx}{n^2}$ is

a) divergent b) convergent

c) both a) and b) d) none of these

7) The set {1, 4, 9, 16, . . . } is

a) uncountable b) open

c) closed d) countable

8) If A and B be any subset R then value of $(A \cap B)'$ is

a) $A' \cap B'$ b) $A' \cup B'$

c) $\subseteq A' \cap B'$ d) $\supseteq A' \cap B'$

9) If for any $\varepsilon > 0$, $|b - a| < \varepsilon$ then

a) $a = b$ b) $a \neq b$

c) $a < b$ d) $a > b$

10) For real number x, a, $\varepsilon > 0$ if $|x| < \varepsilon$ then

a) $-\varepsilon < x < \varepsilon$ b) $-\varepsilon \leq x \leq \varepsilon$

c) $\varepsilon < x < -\varepsilon$ d) $\varepsilon \leq x \leq -\varepsilon$

2. Attempt **any five** of the following : **10**

1) For all real numbers x, y show that $|x - y| \geq \big||x| - |y|\big|$.

2) Show that the interior of a set is an open set.

3) Define the term limit point of a sequence.

4) Show that $\lim_{n\to\infty} \frac{(3n+1)(n-2)}{n(n+3)} = 3$.

5) Show that the series $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \ldots$ is not convergent.

6) Investigate the behaviour of the series whose n^{th} term is $\sin \frac{1}{n}$.

3. A) Attempt **any two** of the following : **6**

1) If $\{a_n\}$ be a sequence such that $\lim_{n\to\infty} \frac{a_{n+1}}{a_n} = l$ where $|l| < 1$ then show that $\lim_{n\to\infty} a_n = 0$.

2) If $u > 0$ and $\sum u_n$ is convergent with the sum s, then prove that $\frac{u_n}{u_1 + u_2 + \ldots + u_n} < \frac{2u_n}{s}$.

3) Prove that union of two closed sets is a close set.

B) The Cartesian product of two countable sets is countable. **4**

4. Attempt **any two** of the following : **10**

1) Show that every open interval]a, b[contains a rational number.

2) If $\sum u_n$ and $\sum v_n$ are two positive term series and $k \neq 0$ be a fixed positive real number and $\exists$ a +ve integer m such that $u_n \leq Kv_n \ \forall\ n \geq m$ then show that $\sum u_n$ is convergent if $\sum v_n$ is convergent.

3) If $\{a_n\}$, $\{b_n\}$, $\{c_n\}$ are three sequences such that

i) $a_n \leq b_n \leq c_n \ \forall\ n$ and

ii) $\lim_{n\to\infty} a_n = \lim_{n\to\infty} c_n = l$ then show that $\lim_{n\to\infty} b_n = l$.

5. Attempt **any one** of the following : **10**

1) If $\sum u_n$ is positive term series such that $\lim_{n\to\infty} (u_n)^{1/n} = l$ then show that the series

i) converges if $l < 1$

ii) diverges if $l > 1$ and

iii) test fails if $l = 1$.

2) Prove that a necessary and sufficient condition for the convergence of sequence $\{S_n\}$ is for each $\varepsilon > 0$ $\exists$ + ve integer m such that

$|S_{n+p} - S_n| < \varepsilon \ \forall\ n \geq m \wedge p \geq 1$

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SLR-Z – 105

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2015
BOTANY (Paper – VI)
Plant Ecology

Day and Date : Friday, 4-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*

ii) Figures to the ***right*** *indicate* ***full*** *marks.*

iii) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentence by choosing correct alternative. **10**

i) The _____ ecology is the study of individuals of the same species.

a) Community b) Population

c) Environmental d) None of these

ii) The density is a _____ characteristic of community.

a) Quantitative b) Qualitative c) Simple d) Both a) and b)

iii) _____ are the consumers of first order.

a) Herbiores b) Carnivores

c) Omniores d) None of these

iv) _____ shows poorly developed root system.

a) Mesophytes b) Hydrophytes

c) Xerophytes d) Saprophytes

v) The pioneer colonizes on the bare xeric area are _____ lichens.

a) Crustose b) Foliose c) Fruticose d) Both a) and b)

vi) Domestic sewage causes _____ pollution.

a) Air b) Water c) Soil d) Land

vii) The study of plant community is known as

a) Phytoecology b) Phytosociology

c) Phytogeography d) Geography

P.T.O.

viii) Natality is the _____ rate of individuals.
a) Death b) Survival c) Birth d) Both a) and b)

ix) The pyramid of _____ indicates numerical relationship between producers and consumers.
a) Number b) Biomass c) Energy d) None of these

x) The normal composition of clean atmosphere constitutes _____ % of nitrogen.
a) 78.09% b) 20.94% c) 0.03% d) 0.07%

2. Answer **any five** of the following. **10**

i) Define autotrophs and heterotrophs.

ii) Enlist the quantitative characters of community.

iii) State any two causes of air pollution.

iv) Define polyspecific population.

v) Define abiotic factors of community. Give two examples of it.

vi) Enlist the successional stages of xerosere.

3. A) Answer **any two** of the following. **6**
i) Give an account of detritus food chain.
ii) State any two control measures of water pollution.
iii) Explain inverted pyramid of number.

B) Write a note on 'Nitrogen Cycle'. **4**

4. Answer **any two** of the following. **10**

i) What is adaptation ? Explain morphological adaptations in xerophytes.

ii) Write a note on effects of water pollution.

iii) Give an account of decomposers.

5. Answer **any one** of the following. **10**

i) Explain the significance of age distribution and carrying capacity in population ecology.

ii) Explain the types of ecosystem. Add a note on freshwater pond ecosystem.

_____

SLR-Z – 106

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (Old)
Electronics Circuits (Paper – V)

Day and Date : Saturday, 5-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Draw*** *the figures* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of* ***Calculator*** *is allowed.*

1. Select the correct alternative from the following : **10**

i) X - co-ordinate of operating point is _____

a) V_{CE} b) I_C c) V_{BE} d) I_B

ii) The efficiency of full wave bridge rectifier is _____

a) 0.406 b) 0.812 c) 1.21 d) 100%

iii) Which stage of DC power supply uses a zener diode as the main component ?

a) Rectifier b) Voltage divider
c) Regulator d) Filter

iv) _____ amplifier has ability to amplify very low frequency signals.

a) RC coupled b) LC coupled
c) Transformer coupled d) Direct coupled

v) In class B power amplifier the transistor conducts for _____

a) 90° b) 180° c) 270° d) 360°

vi) _____ amplifier has highest voltage gain.

a) Emitter follower b) Common emitter
c) Common collector d) Common base

P.T.O.

vii) Crystal oscillator employees _____ crystal.

a) Silicon b) Germanium

c) Quartz d) All of these

viii) In oscillator circuit _____ feedback is used.

a) Positive b) Negative

c) Both a) and b) d) None

ix) Negative feedback in an amplifier _____ the voltage gain.

a) Reduces b) Increases

c) Does not affect d) None

x) In positive feedback $A_V = 25$, $\beta = 0.01$, the voltage gain with feedback is _____

a) 333.3 b) 3.333 c) 33.33 d) 3333

2. Answer **any five** of the following : **10**

i) Draw the circuit diagram of full wave bridge rectifier.

ii) What is cross-over distortion ?

iii) Give the conditions for sustained oscillations.

iv) Draw the circuit diagram of fixed bias circuit.

v) What are the advantages of RC coupled amplifier ?

vi) What is stability factor ?

3. A) Answer **any two** of the following : **6**

i) Explain working of capacitor filter.

ii) Explain the effect of negative feedback on bandwidth.

iii) A Hartley oscillator uses C = 200 PF, L_1 = 6 mH, L_2 = 14 mH. Find frequency of oscillator.

B) Explain Darlington pair amplifier. **4**

4. Answer **any two** of the following : **10**

   i) Explain direct coupled amplifier. Give its advantages.

   ii) Explain construction and working of center-tapped full wave rectifier.

   iii) With circuit diagram explain working of Colpitts oscillator. Give the formula for frequency of oscillations.

5. Answer **any one** of the following : **10**

   i) What is meant by transistor biasing ? Explain voltage divider bias circuit. Write the formula for its stability factor(s).

   ii) What is feedback ? Derive the expression for gain of amplifier with feedback. Give the advantages of negative feedback.

SLR-Z – 107

Seat No.	

B.Sc. II (Semester – III) Examination, 2015
GEOGRAPHY (Paper – V) (Old)
Biogeography – I

Day and Date : Saturday, 5-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***Use*** *of stencil is* ***allowed.***
2) Draw ***neat*** *diagram* ***wherever*** *necessary.*
3) ***All*** *question carry* ***equal*** *marks.*
4) ***All*** *questions are* ***compulsory****.*

1. Choose the correct alternative and rewrite. **10**

1) Growth of life require about _____ elements out of which CHO are the basic elements.

(90, 60, 40, 20)

2) Plants depends upon _____ for the nutrition water supply and anchorage.

(Soil, Air, Solar energy, Rock)

3) _____ is considered father of plant Geography.

(Humboltd, Robinson, Taylor, Alexander)

4) Plants provide the primary source of food energy for all living organisms including

(man, rat, bat, monkey)

5) Biodiversity is essential for _____ ecological processes like recycling of nutrients.

(preserving, conserving, distributing, disturbing)

6) According to New begin climatic and geological changes were responsible for _____ changes in plants and animals.

(evolutionary, revolutionary, sudden, slowly)

7) There are two _____ spots of biodiversity in India.

(cool, hot, warm, cold)

8) Illegal trade of wildlife products is called as
(poaching, mulching, killing, hiding)

9) _____ of dams and canals affect the biodiversity.
(construction, destruction, restoration, conservation)

10) The nutrient serve as a store of _____ energy in the form of carbohydrate protein and fats.
(Chemical, Physical, Solar, Lunar)

2. Write short answer (**any five**) : **10**

1) Explain the term ecosystem.
2) Describe food chain.
3) Nutritional cycle.
4) Social forestry.
5) Conservation of plants.
6) Define the concept of biodiversity.

3. A) Answer **any two** : **6**

1) Explain energy pyramid.
2) Briefly discuss the type of ecosystem.
3) What is afforestation ?

B) What is the significance of biogeochemical cycle. **4**

4. Write short answer of **any two** : **10**

1) Nature of biogeography.
2) Grassland ecosystem.
3) Why it is necessary to protect biodiversity ?
4) What is phytogeography ?

5. Answer **two** of the following : **10**

1) What is an ecological balance ?
2) Explain herbivores and carnivores animals.
3) Define the term deforestation.

SLR-Z – 108

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PSYCHOLOGY (Old)
Experimental Psychology (Paper – V)

Day and Date : Saturday, 5-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Fill in the blanks : **10**

1) Psychology is the science of _____
   a) Behaviour b) Mind c) Body d) Soul

2) _____ psychology is that branch of psychology where experimental methods are used.
   a) Social b) Experimental c) Cognitive d) Abnormal

3) The term _____ continues to be used in many university courses of study in psychology.
   a) Experimental psychology b) Mind
   c) Soul d) Describe

4) Modern experimental psychologists are a diverse group who conduct research in the most basic areas of
   a) Psychology b) Economics c) Sociology d) Logic

5) Experimental psychology is scientific in
   a) Nature b) Book c) Ward d) Definition

6) _____ psychology being scientific in nature is highly factual.
   a) Experimental b) Social c) Cognitive d) Positive

7) Description is usually the first step in _____ behaviour.
   a) Understanding b) Studying
   c) General d) Phenomena

P.T.O.

8) _____ attempted to study the quantitative relationship.
   a) Weber b) Freud c) Skinner d) Eysenck

9) _____ research centered on cutaneous sensation.
   a) Weber's b) Maslow's c) Darvin's d) Plato's

10) _____ tried to estimate the speed of nerve conduction.
   a) Helmholtz b) Wundt c) Galton d) Fechner

2. Answer the following (**any four**) : **8**
   1) Define experiment.
   2) State the goals of experimental psychology (only names).
   3) Who established the first psychology laboratory ?
   4) Who was an anatomist and physiologist ?
   5) Who published the book of 'elements of psychophysics' ?
   6) Who was the founder of experimental psychology ?

3. Write short notes (**any four**) : **12**
   1) Application in organization.
   2) Variables.
   3) Types of errors.
   4) Fechner's law.
   5) Meaning and nature of sensation.
   6) Binocular cues to depth.

4. A) Explain the history of experimental psychology. **10**

   OR

   B) Describe the nature of experimental psychology.

5. A) Explain the goals of experimental psychology. **10**

   OR

   B) Discuss on the methods of average error.

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SLR-Z – 109

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2015
GEOLOGY (Paper – V)
Optics and Mineralogy

Day and Date : Saturday, 5-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Draw **neat** diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Fill in the blanks with correct answer from the given option. **10**

1) Dunite is entirely composed of _____
   a) Augite b) Garnet c) Olivine d) Orthoclase

2) The composition of leusite mineral is _____
   a) $KAl_2Si_2O_6$ b) $NaAl_2O_6$ c) $CaAl_2O_6$ d) $CaNaSi_2O_6$

3) _____ substance transmit light with unequal velosity in all direction.
   a) Isotropic b) Anisotropic
   c) Isotropic and Anisotropic d) None of these

4) Concentric compositional variation within a single mineral is called _____
   a) Extension angle b) Twinning
   c) Isotropism d) Zoning

5) The hardness of quartz is _____
   a) 3 b) 5 c) 7 d) 9

6) Mineral lepidolite is a member of _____
   a) Pyroxene group b) Amphibole group
   c) Feldspar group d) Mica group

7) Tectosilicate are also called as _____
   a) Chain silicate b) Framework silicate
   c) Sheet silicate d) Soro silicate

P.T.O.

8) The relief of olivine mineral is _____

a) low b) high to very high

c) medium d) low to medium

9) Flint is usually _____ in colour.

a) green b) red c) black d) white

10) _____ of a mineral is directly related to the refractive index.

a) Cleavage b) Relief c) Form d) Alteration

2. Answer **any five** of the following : **10**

1) Bire fringes.
2) Twinkling
3) Extention angle
4) Zoning
5) Interference colour
6) Optical properties of biotite.

3. A) Answer **any two** of the following : **6**

1) Occurrence of clay mineral.
2) Form of mineral under microscope.
3) Ring silicate structure.

B) Difference between pyroxene and amphibole group. **4**

4. Answer **any two** of the following : **10**

1) Define and describe the isomorphism.
2) Describe any two silicate structure.
3) Twinning and their types.

5. Answer **any two** of the following : **10**

1) Explain chemical and optical properties of feldspar group of mineral.
2) Chemistry of Alumino silicate mineral and their occurrence.
3) Physical and optical properties quartz.

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SLR-Z – 111

Seat No.	

B.Sc.– II (Semester – III) Examination, 2015
ELECTRONICS (Old)
Paper – VI : Pulse and Switching Circuits

Day and Date : Monday, 7-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Use of log table and calculator is ***allowed****.*

1. Select the correct alternative : **10**

1) I/P of differentiator is 2V d.c. then its O/P is
   a) 2V b) 4V c) 0V d) None of these

2) Integrator circuit used to convert square wave into
   a) Rectangular wave b) Triangular wave
   c) Sawtooth wave d) None of these

3) Frequency of U.J.T. sweep circuit is

   a) $f = \dfrac{RC}{2.303 \log_{10}\left(\dfrac{1}{1-\eta}\right)}$ b) $f = \dfrac{R}{2.303\, C \log_{10}\left(\dfrac{1}{1-\eta}\right)}$

   c) $f = \dfrac{1}{2.303\, RC \log_{10}\left(\dfrac{1}{1-\eta}\right)}$ d) None of these

4) In astable multivibrator $R_1 = R_2 = 10\,k\Omega$, $C_1 = C_2 = 0.01\mu F$ and $R_{L_1} = R_{L_2} = 1k\Omega$ then its frequency is
   a) 7.25 KHz b) 8.25 KHz c) 9.25 KHz d) None of these

P.T.O.

5) The pulse width of BJT monostable multivibrator is
   a) 1.1 RC b) 0.707 RC c) 0.693 RC d) RC

6) Application of Schmitt trigger is to convert
   a) Sine to square b) Square to sine
   c) Triangular to square d) Both (a) and (c)

7) The duty cycle of an astable multivibrator using IC-555 is
   a) $\frac{R_A}{R_B}$ b) $\frac{R_A + R_B}{R_A + 2R_B}$ c) $\frac{R_B}{R_A + R_B}$ d) $\frac{R_B}{R_A}$

8) In IC-555 pin-4 is
   a) Reset b) O/P
   c) Control voltage d) Discharge

9) Bistable multivibrator is also called
   a) Flip-flop circuit
   b) Combination astable and monostable multivibrator
   c) Free running multivibrator
   d) None of these

10) Astable multivibrator is formed by using
   a) One NAND gate b) Two NAND gate
   c) Three NAND gate d) Four NAND gate

2. Answer **any five** of the following : **10**

1) Draw circuit diagram of diode as +ve clipper.

2) What is miller integrator circuit ?

3) State general features of time base signals.

4) State different triggering methods of monostable multivibrator.

5) What are the applications of bistable multivibrator ?

6) List the application of IC-555.

3. A) Answer **any two** of the following : **6**
   1) Explain positive and negative clamper circuit using diode.
   2) State the function of each pin in IC 555.
   3) Explain working of astable multivibrator using NAND gate.

   B) Design as monostable multivibrator for pulse width of 100 ms by using IC-555. Choose $C = 0.1\mu F$. **4**

4. Answer **any two** of the following : **10**
   1) Explain the working of exponential sweep circuit.
   2) Define duty cycle. Derive the expression for duty cycle of astable multivibrator using IC-555.
   3) Explain the action of Schmitt trigger circuit.

5. Answer **any one** of the following : **10**
   1) With a neat circuit diagram explain the operation of collector coupled astable multivibrator. Draw I/P and O/P waveform, obtain the expression for its frequency.
   2) Derive the expression for pulse width of monostable multivibrator using IC-555. Draw necessary circuit diagram.

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SLR-Z – 112

Seat No.	

B.Sc. II (Semester – III) (Old) Examination, 2015
GEOGRAPHY (Paper – VI)
Soil Science – I

Day and Date : Monday, 7-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) ***Use*** *of stencils is* ***allowed****.*

1. Choose the correct alternative and rewrite. **10**
   1) Soils are formed above the parent rock in due course of
      (rain, time, tide, wind)
   2) Red colour of a soil is a result of _____ in the soil.
      (aluminium oxide, iron oxide, sodium cloride, calcium sulfate)
   3) Soil texture refers to the _____ in the soil.
      (chemical composition, partical size, organisms, fertility)
   4) Pedology is the science which studies
      (plants, animals, microbes, soil)
   5) The Tundra region experiences a thin layer of soil due to
      (low temperature, dry climate, low humidity, wet climate)
   6) The process of laterization is associated with _____ forests.
      (polar, temperate, semi arid, tropical)
   7) Poorly drained soils are called as _____ soils.
      (halomorphic, hydromorphic, bog, planosols)
   8) The black cotton soils are grouped in
      (oxisols, ultisols, vertisols, histosols)

P.T.O.

9) _____ is one of the methods of soil conservation.
(tali bunding, grazing, forestry, lumbering)

10) Very steep slopes of the mountains do not support
(soil conservation, soil protection, soil formation, soil degradation)

2. Write in short answers (**any 5**) : **10**

1) Define 'a soil'.
2) What is pH of a soil ?
3) Classify the soils according to texture.
4) Define the term 'degradation'.
5) State the 'profile' of a soil.
6) What are the soil organisms ?

3. A) Write in short (**any two**) : **6**

1) State the importance of 'soil air'.
2) What are the major plant nutrients ?
3) What is soil conservation ?

B) State the major types of soils based on their colour. **4**

4. Write in short (**any two**) : **10**

1) Alluvial soils.
2) Effects of soil degradation.
3) Importance of soil fertility.
4) Soil texture.

5. Write in brief (**any two**) : **10**

1) State the characters of regur soils.
2) Describe the soil profile.
3) What are the methods of soil management ?
4) Describe the importance of soil as a resource.

_____

SLR-Z – 113

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
PSYCHOLOGY (Paper – VI) (Old)
Social Psychology

Day and Date : Monday, 7-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Fill in the blanks (Multiple choice) : **10**

1) There are two approaches of _____ psychology.
A) social B) cognitive C) experimental D) abnormal

2) There are eight key areas in _____
A) Economics B) Social psychology
C) Physics D) Sociology

3) All port opposed the concept of group _____
A) mind B) self C) body D) soul

4) _____ psychologists proposed three models of urban life.
A) cognitive B) social C) behavioural D) abnormal

5) Social psychology is the study of the individual's _____ in the context of society.
A) behaviour B) mental process
C) self D) group

6) Boqardus developed _____ distance scale.
A) physical B) economical C) social D) educational

7) There are _____ components of attitudes.
A) three B) four C) five D) six

8) _____ was specifically interested in racial prejudice.
A) Allport B) Watson C) La. Pierre D) Pinel

P.T.O.

9) Ajzen and _____ proposed the theory of planned behaviour.
A) Fishhein B) Freud C) Galton D) Maslow

10) _____ as a mental and neural state of rediness organized through experience.
A) Learning B) Interest C) Attitude D) Process

2. Answer the following of **any four** : **8**
1) State the concept of prejudice.
2) State the concept of discrimination.
3) State the concept of social identity theory.
4) Explain the affective component of prejudice.
5) Give the Authoritarian personality theory.
6) Explain Balance theory.

3. Write short notes **any four** of the following : **12**
1) The key areas in social psychology.
2) Attitude formation by learning.
3) Costs of stereotypes.
4) Rating scales.
5) Functions of attitudes.
6) Scope of social psychology.

4. A) Explain the forms of prejudice. **10**

OR

B) Discuss on attitude formation.

5. A) Discuss the applications of social psychology. **10**

OR

B) Explain the cognitive component of prejudice.

_____

SLR-Z – 114

Seat No.	

B.Sc. – II (Semester – III) Examination, 2015
GEOLOGY (Paper – VI) (Old)
Structural Geology

Day and Date : Monday, 7-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*

*2) Draw **neat** diagrams **wherever** necessary.*

*3) Figures to the **right** indicate **full** marks.*

1. Fill in the blanks with correct answer from the given option. **10**

1) Plunge is the angle which is determined in a fold with respect to _____ of the fold.

a) axial plane b) strike

c) axis d) none of these

2) Unconformity traceable only in small area or in the few rock formation is

a) regional unconformity b) local unconformity

c) disconformity d) non-conformity

3) _____ type of joint typically occur in granite.

a) Mural b) Columinar

c) Prismatic d) None of these

4) Aligned spring occur along the base of a slope is a physiographic evidence for recognition of _____

a) Fold b) Unconformity

c) Fault d) Fracture

5) A _____ fold in which the hinges are sharp and angular.

a) Chevron b) Box c) Fan d) None of these

P.T.O.

6) _____ is a foliated rock.
   a) Basalt b) Granite c) Marble d) Hornfels

7) The pressure on small body immersed in liquid is described as _____
   a) Hydrostatic pressure b) Lithostatic pressure
   c) Confining pressure d) None of these

8) Change in the size and shape under the influence of stress in known as _____.
   a) Dialation b) Brittleness
   c) Distortion d) Formation

9) Bellow the elastic limit deformation obey's _____ law.
   a) Newton's b) Young's c) Lobo's d) Hook's

10) _____ fault in which displacement is cheifly parallel to the strike of the fault .
   a) dip-slip fault b) strike slip fault
   c) net-slip fault d) none of these

2. Answer **any five** of the following **:** **10**

1) Shear joint.
2) Fracture cleavage.
3) Mylonite.
4) Outlier.
5) Plunge.
6) Non conformity.

3. A) Answer **any two** of the following **:** **6**

1) Width of outcrop.
2) Normal fault.
3) Isoclinal fold.

B) Explain parts of faults. **4**

4. Answer **any two** of the following **:** **10**

   1) Explain importance of graded bedding in determination of top of beds in inverted limb.

   2) What is lineation ? Describe mineral and intersection lineation types.

   3) Explain the criteria for recognition of fault in the field.

5. Answer **any two** of the following **:** **10**

   1) Explain the parts of folds.

   2) Angular unconformity and disconformity.

   3) Genetic classification of joints.

SLR-Z – 115

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2015
MICROBIOLOGY
Microbial Genetics (Paper – VI)

Day and Date : Monday, 7-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw labelled diagrams ***wherever*** *necessary.*

1. Rewrite the following sentences by choosing correct answer. **10**

1) _____ is the chemical basis of heredity.

a) tRNA b) mRNA

c) rRNA d) DNA

2) The gene as a unit of recombination is called

a) recon b) muton

c) cistron d) intron

3) The E. coli chromosome contains about _____ no. of genes.

a) 10000 b) 6000

c) 4000 d) 500

4) A pyrimidine base links to C1 carbon of deoxyribose at _____ position.

a) N-3 b) N-7

c) N-1 d) N-9

5) A mutation which leads to formation of termination codon is called _____ mutation.

a) misense b) nonsense

c) neutral d) frame shift

6) Most of mRNA molecules starts with _____ codon.

a) UAA b) UGA

c) UAG d) AUG

P.T.O.

7) The integration of bacterial chromosome with _____ plasmid leads to Hfr formation.
   a) Col b) R
   c) F d) Cryptic

8) _____ phage is involved in the process of restricted transduction.
   a) P_1 b) P_{22}
   c) T_4 d) λ

9) The competence is developed in the process of
   a) abortive transduction b) transformation
   c) conjugation d) transfection

10) In DNA, the two consecutive sugar molecules are linked via _____ bond.
   a) hydrogen b) phosphodiester
   c) glycosidic d) peptide

2. Answer **any five** : **10**
   1) Define nucleotide.
   2) Describe A form of DNA.
   3) What are termination codons ?
   4) Describe action of hydroxylamine on DNA.
   5) Describe transfection process.
   6) Give applications of plasmids.

3. A) Write **any two** : **6**
   1) Describe chemical nature of DNA.
   2) Give an account of Dark repair mechanism.
   3) Describe action of 5 BU on DNA.

   B) Give an account of generalised transduction. **4**

4. Write **any two** : **10**
   1) Bacterial transformation.
   2) Frame shift mutations.
   3) Properties of plasmid.

5. Write **any two** : **10**
   1) Rolling circle model of DNA replication.
   2) Properties of genetic code.
   3) Process of conjugation.

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SLR-Z – 116

Seat No.	

B.Sc. II (Semester – IV) Examination, 2015
CHEMISTRY (New)
Physical Chemistry (Paper – VII)

Day and Date : Tuesday, 8-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *diagrams and give equations* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) ***Use*** *of logarithmic tables and scientific calculator is* ***allowed****.*
*(****At. Wts.*** *: H = 1, C = 12, O = 16, N = 14, Na = 23, Cl = 35.5)*

1. Choose the most correct alternative and rewrite the sentences. **10**

1) It t_+ is the transport number of cation then the transport number of anion is
a) $1 - t_+$ b) $1 + t_+$ c) $2 + t_+$ d) $2 - t_+$

2) Which of the following molecules is non-polar ?
a) HCl b) CCl_4 c) NaCl d) CH_3Cl

3) The structure of NaCl belongs to _____ cubic lattice.
a) Simple cubic b) Body centered
c) Face centered d) None of these

4) In an isothermal irreversible process, entropy change is
a) greater than zero b) less than zero
c) equal to zero d) none of these

5) Para-dichlorobenzene has _____ dipole moment.
a) 6.3 D b) 3.9 D c) 0 d) None of these

6) The ionic product of water is
a) 1×10^{-7} b) 1×10^{-10} c) 1×10^{-14} d) 1×10^{14}

P.T.O.

7) Entropy change is given by the equation

a) $\Delta S = q_{rev} T$ b) $\Delta S = \frac{q_{rev}}{T}$

c) $\Delta S = q_{rev} + T$ d) $\Delta S = q_{rev} - T$

8) S.I. unit of conductance is

a) Siemen b) Ohm c) Mhos d) ohm^{-1}

9) Solids which exhibit a regularity in the arrangement of structural units are called _____ solids.

a) amorphous b) crystalline

c) both a and b d) none of these

10) Following are the four solutions of sodium chloride. Which will have the highest value of specific conductance ?

a) 0.001 M b) 0.01 M c) 0.1 M d) 1.0 M

2. Answer **any five** of the following. **10**

i) Define the term specific resistance.

ii) Define lattice planes.

iii) Explain the terms conductors and insulators.

iv) Define dipole moment.

v) Define entropy. What are its units ?

vi) State Kohlrausch law.

3. A) Answer **any two** of the following. **6**

i) Explain variation of specific and equivalent conductances with concentration.

ii) Explain any two factors influencing transport number.

iii) Explain the use of dipole moment in the study of Aromatic compound.

B) Calculate the change in entropy when 4 moles of CO_2 expands isothermally from 3 litre to 6 litre. ($R = 8.314\ JK^{-1}mol^{-1}$) **4**

4. Answer **any two** of the following. **10**

   i) Give different applications of Kohlrausch law. Explain in detail how it may be applied to determine the ionic product of water.

   ii) State and explain the law of crystal symmetry.

   iii) Explain the term optical exaltation with suitable example.

5. Answer **any two** of the following. **10**

   i) Explain entropy change in physical transformation.

   ii) Describe moving boundary method to determine the transport number of ion.

   iii) Derive Bragg's equation for interplanar distances of crystals.

SLR-Z – 117

Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
COMPUTER SCIENCE
Paper – VII : Data Structures

Day and Date : Tuesday, 8-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *place indicate* ***full*** *marks.*

1. Choose correct alternatives. **10**

1) _____ is hierarchical data structure.
a) Stack b) Queue c) Tree d) Linked list

2) If balance factor of each node of tree is in the range – 1, 0, 1 then it is _____ tree.
a) Strictly Binary b) Complete Binary
c) AVL d) Skewed

3) The time complexity of selection sort method is _____
a) $O(n^2)$ b) $O(n (\log n)^2)$ c) $O(\log n)$ d) $O(n*n (\log n)^2)$

4) Data structure is programming language.
a) True b) False

5) If we read binary tree by post order method then root found at _____ position.
a) First b) Middle c) Second last d) Last

6) _____ data structure is used to calculate value of postfix expression.
a) Array b) Stack c) Queue d) Tree

7) Possible binary tree with 5 nodes is _____
a) 31 b) 25 c) 35 d) 52

8) _____ sort uses divide and conquer strategy.
a) Bubble b) Exchange c) Merge d) Insertion

P.T.O.

9) In _____ priority queues, smallest element has highest priority.
   a) Ascending b) Descending
   c) Both a) and b) d) None of these

10) Binary tree does not contain even number of nodes _____
   a) True b) False

2. Answer **any five** of the followings. **10**

1) Why binary search is fast as compared to linear search ?

2) What is circular linked list ? Write node structure for doubly circular list.

3) What is 'Strictly' and 'Complete' binary tree ?

4) List out different applications of Queue.

5) What is Stack ? List out real life examples of stack.

6) Draw binary expression tree for expression : (p*(x+y) – (m/n) + q).

3. A) Attempt **any two** of the followings. **6**

1) Write an algorithm for bubble sort method to sort 'n' numbers.

2) Implement recursive functions for preorder and post order traversal.

3) Write a program which find maximum and minimum number in array.

B) How stack is useful in recursion ? **4**

4. Answer **any two** of the followings. **10**

1) What is Singly Circular linked list ? Explain its *count ( )* and *search ( )* operations.

2) Implement *insert ( )* and *remove ( )* operations of circular queue.

3) Write a program that reverses entered string using stack.

5. Answer **any two** of the followings. **10**

1) Explain B-Tree and B^+ Tree in details.

2) Write a program to implement binary search method.

3) What is ADT ? Explain ADT for Array.

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SLR-Z – 118

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
CHEMISTRY (New)
Paper – VIII : Analytical and Industrial Inorganic Chemistry

Day and Date : Wednesday, 9-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Draw*** *neat labelled diagram and give equations* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the most correct alternative and rewrite the following sentences : **10**

1) The chemical reaction between acid and base to form salt and water is termed is _____
   a) Redox b) Complexometric
   c) Neutralisation d) Precipitation

2) Phenolphthalein is _____ indicator.
   a) Neutral b) Strong base c) Weak acid d) None of these

3) D.M.G. is a specific reagent for _____
   a) Cobalt b) Nickel c) Copper d) Zinc

4) The process of forming a precipitate is known as _____
   a) Precipitation b) Coagulation c) Peptization d) Flocculation

5) In the hardening process, steel is heated to redness and cooled _____
   a) Slowly b) Naturally
   c) At fixed temperature d) Suddenly

6) The optimum condition for the best yield of ammonia w.r.t. concentration of $N_2 : H_2$ is _____
   a) 3 : 1 b) 1 : 3 c) 2 : 3 d) 1 : 1

7) The optimum temperature for maximum yield of H_2SO_4 by contact process is _____
   a) 300 – 450°C b) 400 – 450°C c) 600 – 700°C d) 500 – 550°C

P.T.O.

8) Sedimentation is _____ process.
   a) Chemical b) Biological c) Coagulation d) Setling

9) _____ increases the efficiency of catalyst.
   a) Reactant b) Product c) Promoter d) Temperature

10) A substance which increase the rate of reaction is called _____
   a) Positive catalyst b) Negative catalyst
   c) Promoter d) Poisoner

2. Answer **any five** of the following : **10**

   i) Define the terms :
      a) Peptization b) Ageing

   ii) Draw the neat labelled diagram of manufacturing plant for ammonia by Haber's process.

   iii) Precipitation must be carried out from hot and dilute solution. Why ?

   iv) Give any two uses of catalyst in industrial process.

   v) Discuss physico chemical principle in the manufacture of H_2SO_4 by contact process w.r.t. temperature only.

   vi) Define alloy steel with suitable examples.

3. A) Answer **any two** of the following : **6**

   i) What are the types of EDTA titration ? Explain direct titration.

   ii) Distinguish between co-precipitation and post precipitation.

   iii) Mention the parameters of potability of water.

   B) Draw a neat labelled diagram for the manufacture of H_2SO_4 by contact process. **4**

4. Write short notes on **any two** of the following : **10**

   i) Adsorption theory

   ii) L.D. process

   iii) Activated sludge process.

5. Answer **any two** of the following : **10**

   i) With the help of neutralisation curve explain the choice of indicator for the titration of strong acid and weak base.

   ii) Give the merits of organic precipitants.

   iii) Discuss the role of metallochromic indicator.

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SLR-Z – 119

Seat No.	

B.Sc. (Computer Sci.) – II (Semester – IV) (New) Examination, 2015
SYSTEM ANALYSIS AND DESIGN (Paper – VIII)

Day and Date : Wednesday, 9-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose correct alternatives : **10**

1) _____ is performed to improve or maintain program efficiency.
   a) Adaptive maintenance b) Corrective maintenance
   c) Perfective maintenance d) None of these

2) Which of the following feasibility study always focuses on the existing computer hardware, software and personnel.
   a) Operational feasibility b) Technical feasibility
   c) Economic feasibility d) None of these

3) _____ method is time-consuming and can be very costly if the number of respondents is large and widely distributed.
   a) Interview b) Questionnaire
   c) Both a) and b) d) None of these

4) Which of the following is not component of a data dictionary ?
   a) Version b) Length c) Range d) Aliases

5) A relationship is represented by _____
   a) Diamond box b) Rectangle
   c) Flow lines d) Connectors

6) Various objectives of input design should focus on _____
   a) Avoiding delay b) Avoiding errors in data
   c) Controlling amount of input d) All of the above

7) _____ reinforces the direction in which the system is moving.
   a) Negative feedback b) Positive feedback
   c) Minus feedback d) None of these

P.T.O.

8) In _____ technique, analyst collect data from records, document.
   a) Record review b) Observation
   c) Interview d) All of these

9) Decision tree contain combinations of conditions and action.
   a) True b) False

10) The purpose of System Testing is to identify and correct errors in the candidate system.
   a) True b) False

2. Answer **any five** of the following : **10**
   1) What is entity ?
   2) What is meant by feedback ?
   3) What is normalization ?
   4) Give principles of Flowcharting.
   5) State Data Capture Objective.
   6) What is Decision Table ?

3. A) Answer **any two** of the following : **6**
   1) Explain types of system.
   2) Explain technical skills required for system analyst.
   3) Explain the following terms :
      i) Field check ii) Transaction check.

   B) Write short note on Program Flowchart. **4**

4. Answer **any two** of the following : **10**
   1) Discuss the different methods of conversion from old system to new system.
   2) Explain phases of System Development Life Cycle.
   3) Draw DFD for Library System.

5. Answer **any two** of the following : **10**
   1) State the advantage and disadvantage of Direct File Organization.
   2) Explain :
      i) Interviewing ii) Questionnaires.
   3) State the advantage and disadvantage of Decision Table.

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SLR-Z – 120

Seat No.	

B.Sc. II (Semester – IV) (New) Examination, 2015
PHYSICS
Optics (Paper – VII)

Day and Date : Thursday, 10-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Use*** *of logtable or calculator is* ***allowed.***
iv) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*
v) Answer to every question must begin on a ***new*** *page.*

1. Select and write the most appropriate answer from the given alternatives for **each** subquestion. **10**

   1) Nodal points of an optical system having
      a) unit positive lateral magnification
      b) unit positive longitudinal magnification
      c) unit positive angular magnification
      d) unit negative angular magnification

   2) The fringe width in f-p interferometer is _____ than in Michelson's interferometer.
      a) much more smaller b) more
      c) smaller d) very much higher

   3) For a coaxial optical system, the initial and final media are same. For a given object the lateral magnification is – 1.8. The axial magnification is
      a) Mx = – 1.8 b) Mx = 3.24
      c) Mx = – 3.24 d) Mx = – 3.6

   4) In a zone plate, the area of zones
      a) is the same for all b) increases as order increases
      c) decreases as order increases d) none of above

   5) Dextro rotatory substances which rotate the plane of polarization to the _____ of the observer looking towards the source.
      a) right b) left
      c) straight d) perpendicular

P.T.O.

6) As the number of lines in a plane transmission grating is increased, its resolving power

a) remain same b) decreases

c) increases d) none of above

7) By Rayleigh's criteria, the two spectral lines are said to be just resolved if the intensity at the saddle is _____ times the intensity of either of the maxima.

a) $\pi^2/8$ b) $8/\pi^2$ c) $4/\pi^2$ d) $\pi^2/4$

8) In Michelson interferometer movable mirror is displaced through 0.00293 cm. 100 fringes get shifted at a point in the field of view. The wavelength of the source of light is _____ A°.

a) 5850 A° b) 5860 A° c) 5870 A° d) 5880 A°

9) The basic principal of optical fibres is

a) refraction b) total internal reflection

c) reflection d) diffraction

10) For negative crystal

a) VE > Ve > Vo b) VE < Ve < Vo

c) VE < Vo < Ve d) VE > Vo > Ve

2. Answer **any five** of the following : **10**

i) State two characteristics of double refraction.

ii) What are the different types of optical fibers ?

iii) State the laws of rotation of plane of polarization.

iv) State the two points of comparison between zone plate and a convex lens.

v) Define numerical aperture.

vi) For an optical image forming system, the refractive indices of the initial and final media are water (n_1 = 1.33) and air respectively. If the focal length in the image space is +10 cm. Calculate the focal length in the object space.

3. A) Answer **any two** of the followings : **6**

   i) Show that a zone plate acts as a convex lens by considering the source is at a finite distance.

   ii) Define lateral and axial magnifications. Hence obtain the relation between them.

   iii) Calculate the thickness of a quarter wave plate for the light of wavelength 6000 A°. The refractive index for O-ray is 1.555 and for E-ray is 1.510.

   B) State the advantages of optical fibres. **4**

4. Answer **any two** of the following : **10**

   i) Explain Fresnel's type of diffraction at straight edge.

   ii) With the help of neat ray diagram explain construction and working of Nicol prism.

   iii) Define principal points and nodal points. Show that for a lens system, the distance between the principal points is equal to the distance between the nodal points.

5. Answer **any one** of the following : **10**

   i) What is meant by resolving power of an optical instrument ? Derive an expression for the resolving power of prism.

   ii) With a neat ray diagram explain the construction and working of fabry perot interferometer. State any three points of superiority of F.P. interferometer over Michelson's interferometer.

SLR-Z – 121

Seat No.	

B.Sc. II (Semester – IV) Examination, 2015
BIOCHEMISTRY (Paper – III) (New)
Nutrition and Metabolism

Day and Date : Thursday, 10-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Write ***biochemical*** *reactions* ***wherever*** *necessary.*

1. Write following sentences selecting most correct answer from given options : **10**

1) Hemoglobin contains _____ molecule in its structure.
a) Cobalt b) Copper c) Iodine d) Iron

2) _____ acid is an essential fatty acid.
a) Linoleic b) Oleic c) Palmitic d) Stearic

3) Iron is a part of _____ molecule.
a) NAD^+ b) CoQ_{10} c) FAD d) Cytochrome b

4) All spontaneous reactions proceed with _____ in free energy.
a) increase b) equilibrium c) decrease d) zero value

5) End product of glycolysis is
a) CO_2 and H_2O b) Glycogen c) Lactic acid d) Acetyl CoA

6) Enzyme glycogen phosphorylase is involved in
a) glycolysis b) glycogenolysis
c) gluconeogenesis d) glycogenesis

7) Urea synthesis takes place in
a) liver b) kidney
c) skeletal muscles d) adipose tissue

8) Organic molecule carnitine is used to transport _____ out of mitochondria.
   a) fatty acids b) glucose c) urea d) acetyl CoA

9) In case of human being, life cannot exist beyond blood pH
   a) 5.8 to 6.8 b) 6.8 to 7.8 c) 7.8 to 8.8 d) 8.8 to 9.8

10) To maintain electrical neutrality, chloride shift happens in
   a) erythrocytes b) muscle cells
   c) liver cells d) renal tubule cells

2. Answer **any five** in brief : **10**

i) What are essential amino acids ?

ii) Define respiratory quotient. What is its value for carbohydrates ?

iii) What is meant by electron transport chain ?

iv) What is the source of acetyl CoA for TCA ?

v) Write down a general transamination reaction.

vi) What is the effect of aldosterone hormone on renal tubule cells ?

3. A) Solve **any two** : **6**
   1) Define Basal Metabolic Rate. Write down its formula.
   2) Discuss the concept of free energy.
   3) Explain respiratory alkalosis.

   B) Write a note on energetics of glycolysis. **4**

4. Attempt **any two** : **10**
   1) Illustrate various ways of deamination in amino acid metabolism.
   2) Describe ATP as a high energy compound.
   3) Explain the process of glycogenesis.

5. Answer **any two** : **10**
   1) Discuss the role of carbohydrates and fats in diet.
   2) Write an account of measurement of BMR.
   3) How is the pH of the blood regulated by different buffer systems ?

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SLR-Z – 122

Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
PLANT PROTECTION (Paper – III)
Introduction to Weeds and Non-Insect Pests

Day and Date : Thursday, 10-12-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *and labeled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***All*** *questions carry* ***equal*** *marks.*

1. Rewrite the sentences by choosing the correct alternative : **(1×10 = 10)**

1) Weeds _____ the productivity of crops.
a) Decrease b) Increase c) Double d) All the above

2) Classification of weeds is based on _____ association.
a) Crop b) Drop
c) Nature of crop d) None of these

3) _____ weeds are of special types of weeds.
a) Saprophytic b) Parasitic
c) Symbiotic d) Both a and c

4) Study of the weeds is generally studied with reference to _____ morphology.
a) anatomy b) gross c) grass d) cytology

5) *Portulaca oleracea* is a
a) Cereal b) Millete c) Weed d) Pulse

6) _____ used for the weed management.
a) Virus b) Bacteria c) Insect d) All the above

7) _____ is used as a weedicides with reference to properties.
a) Wendimethalin b) Gendimethalin
c) Cendimethalin d) Pendimethalin

P.T.O.

8) Nematodes are the _____ pests.
   a) Snails b) Birds c) Mites d) Non-insect

9) *Argemone* is a _____ weed.
   a) Tricot b) Dicot c) Picot d) Monocot

10) Crop rotation is the _____ methods of weed management.
   a) Cultural b) Mechanical c) Biological d) Chemical

2. Answer **any five** of the following : **(2×5 = 10)**
   i) What is ecology ?
   ii) Define biological method.
   iii) What is poisonous weed ?
   iv) Give any three names of weeds.
   v) Give the uses of Glyphosate.
   vi) Write the ecology of *Amaranthus spinosus*.

3. A) Answer **any two** of the following : **(2×3 = 6)**
   i) Give the chemical methods of weed management.
   ii) Write dispersal of C*ynodon dactylon*.
   iii) Explain the cultural methods of weed management.

   B) Explain the morphology, reproduction and control of *Cyperus rotundus*. **4**

4. Answer **any two** of the following : **(2×5 = 10)**
   i) Explain the damage caused and management of Rats in storage.
   ii) Write poisonous weeds studied by you.
   iii) Describe the weed management by fungi and insects.

5. Answer **any two** of the following : **(2×5 = 10)**
   i) Explain the Nematodes as non-insect pests w.r. to damage and control methods.
   ii) Describe the properties, mode of action and uses of 2, 4-D.
   iii) Give the ploughing and hand weeding methods of weed management.

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SLR-Z – 123

Seat No.	

B.Sc. (Part – II) (Semester – IV) (New) Examination, 2015
PHYSICS (Paper – VIII)
Modern Physics

Day and Date : Friday, 11-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure to the ***right*** *indicates* ***full*** *marks.*
3) ***Use*** *of log table or calculator is* ***allowed****.*
4) ***Neat*** *labelled diagrams must be drawn* ***wherever*** *necessary.*

1. Select the correct answer from the given alternatives : **10**

1) The inertial frame of reference is _____ frame of reference.
   a) an accelerated b) an unaccelerated
   c) steady d) variable

2) According to relativity, as velocity increases then length of rod _____ in the direction of motion.
   a) contracts b) elongates
   c) remain constant d) varies

3) D'Broglie wavelength of matter waves is given by λ = _____
   a) $\lambda = \frac{h}{p}$ b) $\lambda = \frac{p}{h}$ c) $\lambda = \frac{h}{p^2}$ d) $\lambda = \frac{h}{mc^2}$

4) Wavelength of matter wave is independent of _____
   a) mass b) charge c) momentum d) velocity

5) Spin quantum number associated with single electron is _____
   a) zero b) one c) one half d) one third

6) Normal Zeeman effect produces when external magnetic field applied to spectral line is _____
   a) weak b) strong c) reversed d) zero

7) In Compton scattering the wavelength of scattered radiations _____
   a) increases b) decreases
   c) remain constant d) changes

P.T.O.

8) The value of change in compton wavelength $d\lambda$ = _____
   a) 0.0242 A.U. b) 0.0224 A.U. c) 0.242 A.U. d) 0.0484 A.U.

9) In chain reaction, if effective multiplication factor K > 1, then size and mass of core is _____
   a) critical b) supercritical c) subcritical d) constant

10) The material used for slowing down speed of neutron in reactor is called as _____
   a) control rod b) moderator c) fuel d) reflector

2. Attempt **any five** of the following : **10**

1) Write the Lorentz's transformation equations.

2) Define particle velocity and group velocity.

3) State Pauli's exclusion principle.

4) What is L-S coupling ?

5) What is Compton effect ?

6) What is nuclear reactor ?

3. A) Attempt **any two** of the following : **6**

1) State quantum number associated with vector atom model.

2) Explain chain reaction.

3) A particle is moving with velocity of 90 m/sec. Calculate the group velocity and phase velocity of matter waves associated with that particle.

B) Write a short note on space quantization. **4**

4. Attempt **any two** of the following : **10**

1) Deduce an expression for variation of length with velocity.

2) Derive an expression for D'Broglie's wavelength.

3) Explain construction and working of Stern and Gerlach experiment.

5. Attempt **any one** of the following : **10**

1) Obtain an expression for relativistic variation of mass with velocity.

2) Obtain an expression for change in wavelength of scattered X-ray radiations (photons) from any substance.

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SLR-Z – 124

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
BIOCHEMISTRY (Paper – IV) (New)
Molecular Biochemistry and Diseases

Day and Date : Friday, 11-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*

1. Write following sentences selecting most correct answer from given options : **10**

1) Eukaryotic mRNA contains poly _____ tail at its 3′ end.
   a) adenylate b) guanylate c) thymidylate d) cytidylate
2) DNA does not contain _____ base in its structure.
   a) adenine b) guanine c) cytosine d) uracil
3) DNA synthesis proceeds in _____ direction on the template strand.
   a) $3' \rightarrow 5'$ b) $5' \rightarrow 3'$ c) random d) either
4) Translation means biosynthesis of _____
   a) DNA b) RNA
   c) Protein d) Carbohydrates
5) First nucleotide in terminating codon is always _____
   a) adenine b) guanine c) cytosine d) uracil
6) DNA containing $5' - GAATTC - 3'$ base sequences in each strand is cut by _____
   a) Bam HI b) Eco RI c) Hin dII d) Pst I
7) Immunity transferred from mother to baby is called _____ immunity.
   a) Natural passive b) Artificial passive
   c) Natural active d) Artificial active
8) _____ is not a management option for diabetes mellitus.
   a) Exercise b) Bed rest
   c) Hypoglycemic drugs d) Insulin

P.T.O.

9) The enzyme _____ is a characteristic feature of HIV.
   a) DNA polymerase b) RNA polymerase
   c) Reverse transcriptase d) gp 41

10) Natural UV rays from Sun can cause cancer of _____
   a) Lungs b) Skin
   c) Bones d) Blood cells

2. Answer **any five** from below : **10**

1) State initiating codon, its anticodon and the amino acid coded by it.
2) Differentiate between insulin dependent and non insulin dependent diabetes.
3) Write down structural formula for adenosine monophosphate.
4) What is the function of t-RNA ?
5) Differentiate between perfect isoschizomers and imperfect isoschizomers.
6) What is immune memory ?

3. A) Solve **any two** : **6**

1) Give the differences between DNA and RNA.
2) Describe Meselson and Stahl experiment for DNA replication.
3) Write an account of oncogenic viruses.

B) Draw a labelled diagram of immunoglobulin G. (IgG) Show the sites cut by enzymes. **4**

4. Answer **any two** : **10**

1) Discuss the process of replication.
2) Write an account of RNAs.
3) Describe plasmid pBR 322 as a cloning vector.

5. Attempt **any two** : **10**

1) Write about acquired immunity.
2) Discuss about diabetes, its effects on body and management of diabetes.
3) Draw a labelled diagram of HIV and describe it. Give graphical representation of natural course of AIDS.

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SLR-Z – 125

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
PLANT PROTECTION (Paper – IV)
Insect Pests and their Management (New)

Day and Date : Friday, 11-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentences by choosing correct alternative : **(1×10=10)**

1) The crop losses caused by insects may be measured by
   a) Meters b) Qualitatively
   c) Quantitatively d) Both b) and c)

2) Classification of insect pests is generally based on
   a) Mouth parts b) Metamorphosis
   c) Nature of damage d) All the above

3) Thrips generally attack
   a) Mango b) Roses c) Jowar d) Tomato

4) The microbial insecticides are obtained from
   a) Viruses b) Bacteria
   c) Fungi d) All the above

5) Holotrichia consaguinea is the scientific name of
   a) White grub b) Pod borer
   c) Thrips d) Stem borer

6) The brinjal fruit borer has _____ number of overlapping generations in a year.
   a) 4 b) 5 c) 3 d) 2

7) The types of pesticide appliances include
   a) Dusters b) Sprayers
   c) Miscellaneous appliances d) All the above

P.T.O.

8) Bordeaux mixture has been found effective against _____ insects.
   a) Phytophagous b) Wood feeders
   c) Blood suckers d) Crawling

9) _____ are the botanical anti feedants .
   a) Pyrethrum b) Margosa
   c) Solanum alkaloids d) All the above

10) _____ are the common pests of stored grains.
   a) Rice weevil b) Pulse beetle
   c) Jassids d) All the above

2. Answer **any five** of the following : **(5×2=10)**
   a) Define insect pests.
   b) Give the scientific name of Jowar and Mango.
   c) Give the host range of stem borer.
   d) State the role of pheromones.
   e) State the names of appliances used for insecticide applications.
   f) Suggest the control measures of red spider.

3. A) Answer **any two** questions : **(2×3=6)**
   a) Give the nature of damage and control measures of white grubs.
   b) State the principles of insect pest control.
   c) Describe the classification of insecticides based on chemical nature.

   B) Give the scientific name, host range and control measures of fruit borer. **4**

4. Answer **any two** of the followings : **(2×5=10)**
   a) State the general characters of typical insect with respect to mouth parts and types of legs.
   b) Add a note on precautionary measures used during pesticide applications.
   c) Write the mode of action of Attractants and repellents.

5. Attempt **any two** of the followings : **(2×5=10)**
   a) Give the scientific name, host range, nature of damage and control of wool and aphids.
   b) Explain the causes of insects as pest.
   c) Describe any two plant origin insecticides with their applications.

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SLR-Z – 126

Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
STATISTICS (Paper – VII)
Continuous Probability Distributions – II

Day and Date : Saturday, 12-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory*** *and carry* ***equal*** *marks.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative : **10**

i) Let $X \sim \beta_1(3, 4)$ then harmonic mean is _____

a) 3 b) $\frac{2}{3}$ c) $\frac{1}{3}$ d) None of these

ii) If $X \sim N(\mu, \sigma^2)$ then $P(X \leq \mu)$ is _____

a) 1 b) 0 c) $\frac{1}{2}$ d) $\frac{3}{4}$

iii) If $X \sim N(\mu, \sigma^2)$ then Quartile deviation is _____

a) 0.67σ b) 0.75σ
c) 0.74σ d) None of these

iv) Let $X \sim G(\alpha, \lambda)$ then the Karl Pearson's coefficient of Skewness (S_K) is _____

a) $\frac{2}{\sqrt{\lambda}}$ b) $\frac{1}{\sqrt{\lambda}}$

c) $\frac{\lambda - 1}{\sqrt{\lambda}}$ d) None of these

P.T.O.

v) Chi-square distribution is _____

a) Negatively skewed b) Positively skewed

c) Mesokurtic d) None of these

vi) If X~t distribution with 7 d.f. then X^2 has _____ distribution.

a) N(0, 1) b) F(1, 7)

c) F (7, 1) d) None of these

vii) If $X \sim \beta_2(7, 8)$ then E(X) = _____

a) 1 b) 0.75

c) 0 d) None of these

viii) Let X and Y are independent Chi-square variates with 5 and 10 d.f.'s resp. then $E\left(\frac{10X}{5Y}\right)$ = _____

a) 10 b) 15 c) 1.25 d) 2

ix) If $X \sim G(\alpha, \lambda = 1)$, then the p.d.f of X is _____

a) Chi-square distribution b) Normal distribution

c) Exponential distribution d) None of these

x) If the variance of Chi-square distribution is 10, then mode of the distribution is _____

a) 8 b) 5 c) 3 d) 10

2. Attempt **any five** of the following : **10**

i) Show that uniform distribution is a particular case of beta distribution of first kind.

ii) State the additive property of Chi-square distribution.

iii) Define F distribution with n_1 and n_2 d.f. and write its p.d.f.

iv) If the m.g.f. of distribution of a continuous r.v.X. is given by

$M_X(t) = (1 - 5t)^{-13}$

Identify the distribution of X.

v) Suppose X_1, X_2, X_3 and X_4 are independent gamma variates with parameters (4, 2), (4, 4), (4, 3) and (4,1) resp. Identify the distribution of $z = X_1 + X_2 + X_3 + X_4$ and find E(z).

vi) Show that all odd ordered central moments of $N(\mu, \sigma^2)$ are zero.

3. A) Attempt **any two** of the following : **6**

i) If $X \sim \beta_2(m, n)$, obtain the distribution of $\frac{1}{X}$.

ii) Find mean and variance of the beta distribution of first kind.

iii) Obtain $(2r)^{th}$ central moments of normal distribution with mean μ and variance σ^2.

B) State and prove additive property of normal distribution. **4**

4. Attempt **any two** of the following : **10**

i) Define gamma distribution with two parameters (α, λ) and find its mean and variance.

ii) Obtain median of the normal distribution with mean μ and variance σ^2.

iii) Obtain the recurrence relation for even order central moments of 't' distribution with n d.f.

5. Attempt **any one** of the following : **10**

i) If X and Y are independent Chi-square variates with m and n d.f. resp. then obtain the probability distribution of U = X + Y and $V = \frac{X}{X+Y}$.

ii) Derive the p.d.f. of Chi-square distribution with n d.f.

SLR-Z – 128

Seat No.	

B.Sc. II (Semester – IV) Examination, 2015
GEOCHEMISTRY
Principles of Geochemistry (Paper – III) (New)

Day and Date : Saturday, 12-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagram* ***wherever*** *necessary.*

1. Select the most correct alternative from **each** of the following. **10**

1) _____ is a slow process.
a) irreversible b) reversible c) exothermic d) endothermic

2) According to Lewis concept, acid is _____
a) Proton acceptor b) Electron pair donar
c) Electron pair acceptor d) None of these

3) Organic acid contains _____ group.
a) – COOH b) –OH c) $\rangle C = o$ d) –CHO

4) Dispersion of solid in liquid is called as
a) sol b) gel c) emulsion d) none of these

5) The rate constant "K" for the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ is

a) $K = \frac{[NH_3]}{[N_2]\,[H_2]}$ b) $K = \frac{[NH_3]^2}{[N_2]\,[H_2]^3}$

c) $K = \frac{[2NH_3]}{[N_2]\,[3H_2]}$ d) $K = \frac{[N_2]\,[H_2]^3}{[NH_3]^2}$

6) Sodium Carbonate is _____ in nature.
a) Acidic b) basic c) neutral d) all of these

P.T.O.

7) An example of aromatic compound is
   a) Methane b) ethane c) ethene d) Toluene

8) Tyndall effect is an _____ property.
   a) mechanical b) electrical c) optical d) none of these

9) According to Lechatalier's principle, _____ in pressure favours exothermic reaction.
   a) decrease b) increase c) constant d) all of these

10) Acidic rock contains high percentage of
   a) SiO_2 b) MgO c) CaO d) FeO

2. Answer **any five** of the following. **10**

i) Write the equilibrium constant "K" for the reaction

a) $H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$

b) $HCO_3^- \rightleftharpoons H^+ + CO_3^{2-}$

ii) Discuss the effect of temperature on the reaction between CO_2 and H_2O.

iii) Define hydrolysis. Discuss the hydrolysis of Na_2CO_3.

iv) Give any two organic reactions occuring in geological environment.

v) Draw the structure of

a) $[SiO_4]^{-4}$

b) $[Si_2O_7]^{-6}$

vi) Give any two geological usages of acid and base.

3. A) Answer **any two** of the following. **6**

i) Show that chemical equilibrium is dynamic in nature.

ii) Give the types of hydrocarbons in petroleum.

iii) Discuss : Brownian Movement.

B) Distinguish between reversible and irreversible process. **4**

4. Answer **any two** of the following. **10**

   i) Write a short note on origin of coal.

   ii) Write a short note on clay mineral as colloids.

   iii) Discuss the conventions of chemical equilibrium.

5. Answer **any two** of the following. **10**

   i) State and explain Lechatalier's principle.

   ii) Write a short note on organic matter in black shale.

   iii) Discuss : Silica as a chemical sediments.

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SLR-Z – 129

Seat No.	

B.Sc. (Part – II) (Semester – IV) (New) Examination, 2015
ZOOLOGY (Paper – VII)
Animal Diversity – IV

Day and Date : Saturday, 12-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the appropriate answer and rewrite the sentences : **10**

1) Presence of pneumatic endoskeleton is found in _____
a) Amphibians b) Reptilians c) Birds d) Mammals

2) Stomach of rat shows presence of _____ glands.
a) Gastric b) Duodenial c) Intestinal d) Salivary

3) R.B.Cs of rat are _____
a) Nucleated b) Non nucleated
c) Polynucleated d) Binucleated

4) Perching feet are found in _____
a) Sparrow b) Eagle c) Heron d) Duck

5) _____ is pouched mammal.
a) Kangaroo b) Scaly ant eater
c) Deer d) Cow

6) The no. of clawed digits in hand of rat are _____
a) Four b) Five c) Six d) Eight

7) Function of the kidney in rat is _____
a) Ovulation b) Respiration c) Excretion d) Digestion

8) _____ glands are found in mammals.
a) Mammary b) Uropagial c) Poison d) Uricose

P.T.O.

9) Upper movable beak is found in _____
   a) Vulture b) Kite c) Peacock d) Parrot

10) In _____ the dental formula shows thecodont, heterodont and diphyodont teeth.
   a) Cat b) Elephant c) Human d) Whale

2. Write short notes on (**any five**) : **10**

   i) Salient features of reptiles.

   ii) W.B.Cs of rat.

   iii) Fruit eating beak.

   iv) Climbing feet of birds.

   v) Mesozoic reptiles.

   vi) Functions of internal ear of rat.

3. A) Answer **any two** of the following : **6**

   1) Marsupians.

   2) Dentition in rat.

   3) Describe the pancreas of rat.

   B) Functions of liver rat. **4**

4. Attempt **any two** of the following : **10**

   1) Describe the process of digestion in stomach of rat.

   2) Monotremes.

   3) Describe the poisonous apparatus in snake.

5. Answer **any one** of the following : **10**

   1) Describe the structure of the heart of rat and mechanism of blood circulation.

   2) Describe different types of migrations in birds.

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SLR-Z – 130

Seat No.	

B.Sc. II (Semester – IV) (New) Examination, 2015
STATISTICS (Paper – VIII)
Applied Statistics

Day and Date : Monday, 14-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory*** *and carry* ***equal*** *marks.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative : **10**

i) A selection procedure of a sample having no involvement of probability is known as

a) purposive sampling b) judgement sampling

c) subjective sampling d) all the above

ii) The faults due to assignable causes

a) can be removed b) cannot be removed

c) can sometimes be removed d) all the above

iii) Type II error is

a) Rejecting H_0 when H_0 is true

b) Rejecting H_0 when H_0 is false

c) Accepting H_0 when H_0 is false

d) Accepting H_0 when H_0 is true

iv) Control charts consist of

a) three control lines b) upper and lower control limits

c) the level of the process d) all the above

v) Total population will remain same if per women

a) NRR > 1 b) NRR < 1 c) NRR = 1 d) none of these

vi) For the 2×2 contingency table, the degrees of freedom for the Chi square statistic is

a) 2 b) 3 c) 4 d) 1

vii) Sampling frame is a term used for

a) a list of random numbers

b) a list of voters

c) a list of sampling units of a population

d) none of the above

viii) Paired t test is applicable when the observations in the two samples are

a) paired b) correlated c) equal in number d) all the above

ix) The hypothesis which is complementary to the null hypothesis is

a) Simple hypothesis b) Alternative hypothesis

c) Composite hypothesis d) None of these

x) To test for independence of attributes which of the following tests is used

a) Normal b) t c) χ^2 d) F

2. Answer **any five** of the following : **10**

i) Define parameter.

ii) Explain what is a critical region.

iii) Explain the term defective.

iv) Explain meaning of statistical quality control.

v) What is process control ?

vi) Define Crude Death Rate (CDR) and Crude Birth Rate (CBR).

3. A) Answer **any two** of the following. **6**

i) Show that in SRSWOR the probability of selecting a specified unit of the population at any given draw is equal to the probability of selecting it at the first draw.

ii) Distinguish between chance causes and assignable causes of variation.

iii) Explain the procedure to test for the mean of a normal population.

B) Answer the following : **4**

Show that in case of simple random sampling without replacement (SRSWOR) expected value of the sample mean is population mean.

4. Answer **any two** of the following. **10**

i) Explain the procedure for testing the hypothesis of equality of two population correlation coefficients by using Fisher's Z transformation.

ii) Prove that in a simple random sampling without replacement (SRSWOR) sample mean square is an unbiased estimate of population mean square.

iii) Explain the construction of R chart when standards are given.

5. Answer **any one** of the following. **10**

1) a) Explain the test procedure for testing the independence of attributes in the case of m×n contingency table.

b) Explain the construction of $\overline{X}$ chart in production process when standards are not given.

2) a) Describe the large sample test for testing the equality of means $\mu_1 = \mu_2$.

b) State the advantages of sample survey over census survey.

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SLR-Z – 132

Seat No.	

B.Sc. II (Semester – IV) Examination, 2015
GEOCHEMISTRY (Paper – IV)
Chemistry of the Earth (New)

Day and Date : Monday, 14-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*

1. Fill in the blanks with correct answer from given options. **10**

1) Mantle is mainly made up of _____ silicates.

(Mg-Fe, Ni-Fe, Mn-Fe, Na-Fe)

2) Soil, whose dimensions are between _____ mm is silty soil.

(2 and 0.2, 0.2 and 0.02, 0.02 and 0.002, <0.002)

3) Marine clays are mainly of _____ type.

(Illite, Kaolinite, China clay, Mont Morillonite)

4) The most resistant mineral to weathering is

(quartz, olivine, mica, pyroxene)

5) 'B' horizon is characterised by accumulation of leached elements from _____ horizon.

(R, D, C, A)

6) Limonite formation is an example of _____ chemical weathering process.

(solution, oxidation, carbonation, hydration)

7) The amount of CO_2 in soil is _____

(0.001, 1.03, 0.3, 1.02)

P.T.O.

8) The process involving gain of electrons is known as _____
(oxidation, reduction, potential, reductant)

9) If the pH of soil is 9 then the soil is said to be _____ in nature.
(acidic, alkaline, neutral, none of the above)

10) The reaction of H_2O with mineral is _____
(hydrolysis, hydration, carbonation, oxidation)

2. Answer **any five** of the following : **10**

1) Mineral susceptibility sequence for chemical weathering.
2) Explain role of particulate matter in air pollution.
3) What is mollisol soil ?
4) Name soil pollutants.
5) What is gravitational differentiation ?
6) Define pollution.

3. A) Answer **any two** of the following : **6**

1) Describe agents of chemical weathering.
2) What are iron sediments ?
3) Explain reduction potential.

B) What are factors controlling soil formation ? **4**

4. Answer **any two** of the following : **10**

1) Explain physicochemical system of the earth.
2) Porosity of soil.
3) Smectite structure.

5. Answer **any two** of the following : **10**

1) Composition of soil.
2) Kaolinite structure.
3) Air pollutants.

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SLR-Z – 133

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
ZOOLOGY (Paper – VIII) (New)
Histology and Physiology

Day and Date : Monday, 14-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the appropriate answer from those given below of **each** question and complete the sentence : **10**

1) Cytoplasm of axon of nerve cell is called as _____
   a) Sarcoplasm b) Cytoplasm c) Axoplasm d) Haemoplasm

2) Insulin hormone is secreted by _____ cells of Islets of Langerhans.
   a) Alpha b) Beta c) Deta d) Theta

3) In liver _____ cells are phagocytic in function.
   a) Hepatic b) Leydig c) Kupffer's d) Sertoli

4) _____ is the immatured follicle in ovary.
   a) Primary follicle b) Primordial follicle
   c) Secondary follicle d) Graffian follicle

5) _____ hormone is secreted by corpus luteum.
   a) Progesterone b) Testosterone
   c) Androsterone d) Dehydro androsterone

6) In T.T.B. technique _____ instrument is used by surgeon for taking ripened follicle from ovary.
   a) Laparoscope b) Telescope c) Microscope d) Periscope

7) T-lymphocytes are concerned with _____
   a) Cellular immunity b) Humoral immunity
   c) Serum immunity d) Cerebral immunity

P.T.O.

8) Male sterilization operation is called as
   a) Vasectomy b) Tubectomy
   c) Colectomy d) Oophorectomy

9) _____ phase of oestrous cycle is also called as _____ pre-preparatory phase.
   a) Pro-oestrous b) Dioestrous c) Oestrous d) Metoestrous

10) Degenerative form of corpus luteum is called as _____
   a) Corpus luteum b) Corpus albicans
   c) Graffian follicle d) Atretic follicle

2. Answer **any five** of the following : **10**
   i) Progesterone
   ii) Functions alpha cells of Islets of Langerhans
   iii) Atretic follicle
   iv) Menopause
   v) Role of MSH
   vi) Pulp cavity of tooth.

3. A) Answer **any two** of the following : **6**
   i) Describe the histology of spinal cord.
   ii) Describe the structure of antibody.
   iii) Describe the roles of growth hormone.

   B) Describe IUCD as a contraceptives. **4**

4. Answer **any two** of the following : **10**
   i) Describe the structure and functions of epithelial tissue.
   ii) Describe the invitro fertilization.
   iii) Describe the female sex hormones.

5. Answer **any one** of the following : **10**
   i) What is menstruation ? Explain various changes occurs in each phase of menstrual cycle.
   ii) Describe the histology of mammalian testis.

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SLR-Z – 134

Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
MATHEMATICS (Paper – VII)
Differential Equations

Day and Date : Tuesday, 15-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for **each** of the following : **10**

1) The solution of the equation $\tan(y - px) = p$ is

a) $y = cx + \tan^{-1}c$ b) $y = cx + \sqrt{1+c^2}$

c) $y = cx + \tan c$ d) $y = cx + (\tan^{-1}c)^2$

2) The solution of differential equation $y = x\frac{dy}{dx} + \left(\frac{dy}{dx}\right)^2$ is

a) $y = cx + c^2$ b) $y = cx - c^2$ c) $y = cx + x^2$ d) $y = cx^2$

3) If $\frac{d^2y}{dx^2} - 2\tan x\frac{dy}{dx} + 3y = 2\sec x$ then

a) $y = \cos x$ is a part of C.F.
b) $y = e^x$ is a part of C.F.
c) $y = \sin x$ is a part of C.F.
d) $y = x^m$ is a part of C.F.

4) The differential equation of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ is called as

a) Total differential equation
b) Non-linear differential equation
c) Simultaneous differential equation
d) None of these

5) The general solution of the equation $4xp^2 = (3x - a)^2$ is

a) $y^2 = (x - a)$ b) $(y + c)^2 = x(x - a)^2$

c) $y^2 = x(x - a)^2$ d) $(y + c)^2 = x^2$

6) The substitution by which you can change the independent variable of the differential equation $\frac{d^2y}{dx^2} - 2\tan x \frac{dy}{dx} + 5y = 0$ is

a) sinx b) cosx c) cosecx d) secx

7) A homogeneous linear differential equation can be transformed into a linear differential equation with constant coefficients by changing the independent variable from x to z by the substitution

a) $x = e^{-z}$ b) $x = e^{z}$ c) $x = e^{1/z}$ d) $x = e^{-z^2}$

8) The auxiliary equation for the equation $x^2 \frac{d^2y}{dx^2} - 3x\frac{dy}{dx} + 4y = 2x^2$ is

a) $D^2 - 4D - 4 = 0$ b) $D^2 + 4D + 4 = 0$

c) $D^2 - 4D + 4 = 0$ d) $D^2 + 4D - 4 = 0$

9) If $2 + 2Px + Qx^2 = 0$ then y = _____ is a solution of $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$

a) e^x b) e^{-x} c) x d) x^2

10) The solution of the equation $\frac{dx}{x} = \frac{dy}{y} = \frac{dz}{z}$ is

a) xy = c b) x + y = c, x = cy

c) $x = c_1y$, $y = c_2z$ d) None of these

2. Attempt **any five** of the following : **10**

a) Solve $p^2 - gp + 18 = 0$.

b) Solve xy (y – px) = x + py.

c) Convert the following differential equation to homogeneous linear form

$(x+2)^2 \frac{d^2y}{dx^2} - 4(x+2)\frac{dy}{dx} + 6y = x$.

d) If $a^2 + aP + Q = 0$, then show that $y = e^{ax}$ is a solution of $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = 0$.

e) Solve $\frac{dx}{1+y} = \frac{dy}{1+x} = \frac{dz}{z}$.

f) State the geometrical interpretation of $Pdx + Qdy + Rdz = 0$.

3. A) Attempt **any two** of the following : **6**

a) Explain the method of solving the equation which is solvable for y.

b) Solve $x\frac{d^2y}{dx^2} - (2x-1)\frac{dy}{dx} + (x-1)y = 0$.

c) Solve $(y + Px)^2 = Py^2$.

B) Explain the method of solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$. **4**

4. Attempt **any two** of the following : **10**

a) Solve $(2x+1)^2\frac{d^2y}{dx^2} - 6(2x+1)\frac{dy}{dx} + 16y = 8(2x+1)^2$

b) Solve $x^6\frac{d^2y}{dx^2} + 3x^5\frac{dy}{dx} + a^2y = \frac{1}{x^2}$ by change of independent variable.

c) Solve $(z + z^3)\cos x dx - (z + z^3)\, dy + (1 - z^2)\,(y - \sin x)\, dz = 0$.

5. Attempt **any one** of the following : **10**

a) Explain the method of solving the equation $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ where P, Q, R are functions of x, by removal of the first order derivative by changing the dependent variable.

b) Solve $x^2\frac{d^2y}{dx^2} - 2x\frac{dy}{dx} + (x^2+2)y = x^3e^x$.

SLR-Z – 135

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
BOTANY
Paper – VII : Plant Physiology and Cytogenetics (New)

Day and Date : Tuesday, 15-12-2015 Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions carry* ***equal*** *marks.*
2) Question ***1*** *is* ***compulsory****.*
3) Draw ***neat*** *and labeled diagrams* ***wherever*** *necessary.*
4) Figure to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences using correct answer : **10**

1) During night, stomata are open in _____
   a) C3 plants b) C4 plants c) C2 plants d) CAM plant

2) The transfer of organic substances from cytoplasm to cytoplasm of another cell through plasmodesmata is called _____
   a) Apoplast b) Symplast c) Leucoplast d) Amyloplast

3) C4 cycle is known as _____
   a) HSK pathway b) Calvin cycle
   c) CAM pathway d) Darwin pathway

4) The organ which supplies the organic substances for translocation is called _____
   a) Source b) Sink
   c) Both 'a' and 'b' d) None of these

5) _____ is an example of symbiotic nitrogen fixing bacteria.
   a) Rhizobium b) Clostridium c) Aerobacter d) Azatobacter

6) Linkage was discovered by _____
   a) Correns b) Mendel c) Morgan d) de.Vries

7) Crossing over is _____
   a) same as translocation b) directly prapornational to linkage
   c) inversely related to linkage d) none of the above

P.T.O.

8) Chromosome complement with 2n-1 is called
   a) monosomy b) nullisomy c) trisomy d) tetrasomy

9) Down's syndrome is characterize by _____
   a) 21 trisomy b) two X and Y chromosome
   c) 19 trisomy d) only chromosome

10) Turner syndrome is _____
   a) XO b) XXY c) XXX d) XYY

2. Write **any five** of the following : **10**
   1) Define non symbiotic nitrogen fixation.
   2) What is phloem unloading ?
   3) Define Dimorphic chloroplast.
   4) What are CAM ?
   5) What is apoplast ?
   6) What is meiosis ?

3. A) Write **any two** of the following : **6**
      1) Nitrogen cycle.
      2) Significance of linkage.
      3) Explain Break and Exchange' theory.
   B) Significance of chromosomal aberrations. **4**

4. Write **any two** of the following : **10**
   1) Describe in brief Mass-flow hypothesis.
   2) What is inversion ? Explain with example.
   3) Explain the mechanism of fixation of CO_2 fixation in CAM plants.

5. Write **any one** of the following : **10**
   1) Describe in brief the structure and chemical nature of eukaryotic chromosome.
   2) Describe the symbiotic nitrogen fixation in leguminous root nodule.

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SLR-Z – 136

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
MATHEMATICS (Paper – VIII)
Abstract Algebra (New)

Day and Date : Wednesday, 16-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N. B. : *1)* ***All*** *questions carry* ***equal*** *marks.*
2) ***All*** *questions are* ***compulsory****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative of the following : **10**

1) Which of the following is not a group ?
a) $(\{0\}, +)$ b) $(\{1\}, \cdot)$ c) $(\{0\}, \cdot)$ d) $(\{1\}, +)$

2) Alternating group is of order _____
a) $(n/2)!$ b) $\frac{n!}{2}$ c) $n!$ d) None of these

3) A relation ~ is transitive if for p, q, r $\in$ s such that _____
a) $p \sim q, r \sim q \Rightarrow q \sim r$ b) $p \sim q, q \sim r \Rightarrow q \sim q$
c) $p \sim q, q \sim r \Rightarrow p \sim r$ d) None of these

4) In division algorithm $p \equiv mq + r$ _____
a) $0 \leq r < p$ b) $0 \leq r < m$
c) $0 \leq r \leq p$ d) None of these

5) Let $f : G \to G'$ be mapping. Then f is homomorphism if f is _____
a) into b) onto
c) preserves operation d) None of these

6) Every quotient group of an abelian group is _____
a) Abelian b) Cyclic c) Normal d) None of these

7) The number of positive divisors of the integer –101 are _____
a) six b) five c) two d) zero

8) Every group of order 11 is _____
a) Cyclic and abelian b) Cyclic but not abelian
c) Abelian but not cyclic d) None of these

P.T.O.

9) If H and K are subgroups of a group G, then HK is a subgroup of G iff _____
   a) HK = KH b) HK = G c) HK = H d) KH = H

10) The product of g.c.d. and l.c.m. of 10 and 15 is _____
   a) 75 b) 50 c) 150 d) 100

2. Attempt **any five** of the following : **10**

1) If $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$

and $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$

Find $\alpha \cdot \beta$.

2) Define subgroup of a group G.

3) Compute $([3] \odot [2]) \oplus ([3] \odot [4])$ in Z_5.

4) Define equivalence relation.

5) Define quotient group.

6) Find the order of all elements of a group {0, 1, 2, 3, 4, 5} under +6.

3. A) Attempt **any two** of the following : **6**
   1) Let G be a group with operation $*$ and H be subgroup of G. If f is identity of H and e is identity of G then show that f = e.
   2) Prove that every quotient group of an abelian group is abelian.
   3) Solve the equation x(132) = (13) in S_3.

   B) Does the following set forms a group (I, $*$) and $*$ is defined by $a * b = a + b + 1$. **4**

4. Attempt **any two** of the following : **10**

1) Find g.c.d. of 616 and 427 and express (616, 427) = 616 m + 427n.

2) Show that if every element of a group is its own inverse then G is abelian.

3) Prove that every homomorphic image of cyclic group is cyclic.

5. Attempt **any one** of the following : **10**

1) State and prove Lagrange's theorem.

2) a) If G and G′ are groups and $f : G \to G'$ is homomorphism then prove that ker f is normal subgroup of G.

   b) Prove that a group G is abelian iff $(ab)^{-1} = a^{-1}b^{-1}$ for $a, b \in G$.

SLR-Z – 137

Seat No.	

B.Sc. (Part – II) (Sem. – IV) Examination, 2015
BOTANY (Paper – VIII) (New)
Plant Diversity and Utilization

Day and Date : Wednesday, 16-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Draw*** *neat labelled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct answer from given alternative. **10**

1) The Sargassum included in the division _____
   a) Phaeophyta b) Chlorophyta c) Pyrrophyta d) Chrysophyta

2) The mature teleutospore is _____ in structure.
   a) Unicelled uninucleate b) Unicelled binucleate
   c) Bicelled binucleate d) Bicelled uninucleate

3) The Equisetum is also called as _____
   a) Cattails b) Dogtails c) Horsetails d) All of these

4) Pollination in Pinus take place by _____
   a) Hydrophily b) Entomophily c) Ornithophily d) Anemophily

5) Coir is obtained from the _____ of coconut fruit.
   a) epicarp b) mesocarp c) endocarp d) endosperm

6) The botanical name of chick pea (Bengal gram) is _____
   a) Cicer arietinum b) Medicago sativa
   c) Sesbania sesban d) Cajanus cajan

7) Ground nut oil obtained from the seed of _____
   a) Glycine max b) Gossypium herbaceum
   c) Cocas nucifera d) Arachis hypogaea

8) Which one of the following is a constituent of Triphala Churna _____
   a) Emblica officinale b) Withania Somnifera
   c) Tinospora cordifolia d) Adhatoda Zeylanica

9) _____ is the important insecticidal chemical constituent obtained from Azadirachta indica.
   a) Anabasine b) Pyrethrin
   c) Anadirachtine d) Cinerin

10) A vernacular name of rangoon creeper refers to _____
   a) Bougainvillea spectabilis b) Quisqualis indica
   c) Cleosia critata d) Crossandra undulaefolia

2. Answer **any five** of the following : **10**
   i) State the botanical name and source of drug Avala.
   ii) What are natural dyes, write any one rhizome dyes with botanical name ?
   iii) Write the systematic position of Anthoceros.
   iv) What are ornamental plant ? Write any two ornamental character of Quisqualis indica.
   v) What are plant fibers ?
   vi) Draw the structure of Anthocerose male sex organs.

3. A) Answer **any two** of the following : **6**
   i) Give the economic importance of Pinus.
   ii) Write external morphology of Sargassum.
   iii) Give the economic importance of Henna.

   B) Discuss in brief sporophyte of Anthoceros. **4**

4. Answer **any two** of the following : **10**
   i) Male cone of Pinus
   ii) Draw and write external morphology of Equisetum.
   iii) Write economic importance of rubber.

5. Answer **any one** of the following : **10**
   i) Describe structure of male and female conceptacles of Sargassum.
   ii) What are plant drugs and add chemical constituents and uses of Aloe Vera and Zingiber Officinalis ?

_____

SLR-Z – 140

Seat No.	

B.Sc. II (Semester – IV) (New) Examination, 2015
ELECTRONICS (Paper – VII)
Fundamentals of Operational Amplifier

Day and Date : Thursday, 17-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of log-table and calculator is* ***allowed****.*

1. Select the correct alternative from the following. **10**

i) A constant current source is used to
   a) increase Ad b) decrease Ad
   c) increase CMRR d) decrease CMRR

ii) Op amp is a high gain _____ coupled amplifier.
   a) RC b) LC c) transformer d) direct

iii) If square wave is applied as input to integrator then output is
   a) square wave b) sine wave
   c) triangular wave d) spikes

iv) In Schmitt trigger circuit _____ feedback is used.
   a) positive b) negative c) both a and b d) none

v) In Wien-bridge oscillator, op amp is used as
   a) inverting amplifier b) noninverting amplifier
   c) voltage follower d) none

vi) In ideal differential amplifier, common mode gain is
   a) zero b) unity c) high d) infinity

vii) In op amp inverting amplifier with $R_i = 1k\Omega$ and $R_f = 2.5\ k\Omega$, if $V_i = 1V$ then output voltage is
   a) 2.5 V b) – 2.5 V c) 1 V d) – 1V

P.T.O.

viii) Slew rate of op amp must be

a) zero b) low c) moderate d) high

ix) Comparator is a circuit which has _____ output state (s).

a) only one b) two c) four d) none

x) In phase-shift oscillator each RC network introduces _____ phase shift.

a) 0° b) 30° c) 60° d) 90°

2. Answer **any five** of the following : **10**

i) Define Ad and Ac.

ii) Draw the equivalent circuit of op amp.

iii) Give the characteristics of an ideal op amp.

iv) What is virtual ground ?

v) Draw the circuit diagram of monostable multivibrator using op amp.

vi) In differential amplifier V_1 = 100 mV, V_2 = 200 mV, Ad = 100 and Ac = 0.1. Calculate the output voltage.

3. A) Answer **any two** of the following : **6**

i) Explain the action of basic comparator.

ii) Explain current mirror bias.

iii) Define : input bias current, input offset current and slew rate.

B) Explain op amp inverting amplifier. **4**

4. Answer **any two** of the following : **10**

i) What is differential amplifier ? Explain emitter coupled differential amplifier.

ii) Explain adder circuit using op amp.

iii) Explain current to voltage converter using op amp.

5. Answer **any one** of the following : **10**

i) What is Schmitt trigger ? Explain its transfer characteristics. Give the application of Schmitt trigger as sine to square wave converter.

ii) Explain astable multivibrator using op amp. Derive the expression for frequency of oscillations.

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Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
GEOLOGY (Paper – VII) (New)
Ingneous Petrology

Day and Date : Thursday, 17-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Draw neat diagrams **wherever** necessary.*
*3) Figures to the **right** indicates **full** marks.*

1. Fill in the blanks with suitable answer from the given options. **10**

1) The proof for Bowen's crystallization process can be seen in the _____ texture.
(a) reaction rim b) graphic c) granitic d) flow banding)

2) Intergranular texture is found in _____ rock.
(a) Granitic b) Gabbro c) Basalt d) Dolerite)

3) Hemicrystalline texture is developed in
(a) Granite b) Basalt c) Syenite d) Dunite)

4) As per Bowen's Reaction Series, _____ is formed after muscovite.
(a) Quartz b) Olivine c) Hornblende d) Plagioclase)

5) In Basaltic magma's gravitational differentiation _____ mineral is usually sinks down first.
(a) Quartz b) Olivine/plagioclase
c) Orthoclase d) Nepheline)

6) In binary crystallization process, the common point of simultaneous crystallization is called
(a) Eutectic b) Clastic c) Boiling d) Freezing)

P.T.O.

7) Dunite is _____ rock.
(a) sedimentary b) volcanic c) hypabyssal d) plutonic)

8) Marble is formed by _____ metamorphism.
(a) Thermal b) Dynamothermal
c) Cataclastic d) Clastic)

9) Solidification under low pressure conditions takes place to form _____ rock.
(a) Granite b) Plutonic c) Gabbro d) Basalt)

10) Fast cooling of lava forms
a) Gabbro b) Syenite
c) Glass d) Graphic Granite)

2. Answer **any five** of the following : **10**

1) Holocrystallinetexture.

2) Formation of Basalt.

3) Spherulitic texture.

4) Minerals of Dolerite.

5) Process of formation of Hemicrystalline texture.

6) Sub-ophitic texture.

3. A) Answer **any two** of the following : **6**

1) Describe Rhyolite.

2) Poikilitic texture.

3) Crystallinity.

B) Porphyritic Texture. **4**

4. Answer **any two** of the following : **10**

   1) Describe Binary crystallization.

   2) Describe the Tabular Classification of the igneous rocks.

   3) Describe Dolerite and Gabbro.

5. Answer **any two** of the following : **10**

   1) Describe the formation processes of Flow texture with example.

   2) Describe the process of Ternary Eutectic Formation. Draw neat diagram.

   3) Describe reaction relationship of minerals in Bowen's Reaction series. Add note on released mineral.

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Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
MICROBIOLOGY (Paper – VII)
Immunology and Medical Microbiology

Day and Date : Thursday, 17-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *diagram* ***wherever*** *necessary.*

1. Rewrite the following sentences by choosing correct answers : **10**

i) _____ test is used for diagnosis of enteric fever.
   a) Coagulase b) Widal
   c) Complement fixation d) Germ tube

ii) Decreased plate count is found in _____
   a) Enteric fever b) Candidiasis
   c) Urinary tract infection d) Dengue fever

iii) _____ is the primary lymphoid organ.
   a) Thymus b) Spleen
   c) Lymph node d) Peyer's patches

iv) Mucus membrane lines all except _____
   a) Respiratory tract b) Digestive tract
   c) Genitourinary tract d) Central nervous system

v) Helper T lymphocytes have _____ molecules on their surface.
   a) CD_4 b) CD_8 c) CD_{11} d) IL-1

vi) TAB is an example of _____ vaccine.
   a) Killed b) Live attenuated c) DNA d) Recombinant

vii) The inborn immunity is _____ immunity.
   a) Innate b) Active c) Passive d) Adaptive

P.T.O.

viii) The pentameric immunoglobulin is _____

a) IgG b) IgD c) IgA d) IgM

ix) Injection of readymade antibodies is example of _____ immunity.

a) Natural passive immunity b) Natural active

c) Artificial passive d) Artificial active

x) Dengue fever is acquired by _____

a) Mosquito bite b) Ingestion of contaminated food

c) Inhalation of air d) Dog bite

2. Answer **any five** of the following : **10**

i) Name different chemical barriers of innate immunity.

ii) Write two functions of spleen.

iii) Mention any two biological functions of IgG.

iv) Write any two applications of precipitation test.

v) Mention any two names of transport media.

vi) Write any two prophylactic measures used to prevent dengue fever.

3. A) Write answers to **any two** of the following : **6**

i) Give the role of normal flora of human body in development of innate immunity.

ii) Describe different infections caused by Candida albicans.

iii) Explain how microscopic methods help in diagnosis of diseases.

B) Describe how enteric fever is diagnosed. **4**

4. Answer **any two** of the following : **10**

i) Describe various guidelines regarding collection and handling of specimen.

ii) Which are different types of lymphocytes ? Give role of each in immunity.

iii) What is active immunization ? Describe in detail about it.

5. Write short notes on **any two** : **10**

i) Bacterial toxins

ii) Lymph node

iii) Complement fixation test.

_____

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Seat No.	

B.Sc. – II (Semester – IV) (New) Examination, 2015
ELECTRONICS (Paper – VIII)
Digital Techniques and Microprocessor

Day and Date : Friday, 18-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw neat labelled diagram **wherever** necessary.*
*3) Figures to the **right** indicate full marks.*
*4) **Use** of log table and calculator is allowed.*

1. Select the correct alternative for the following : **10**

i) A memory cell in SRAM is a _____
   a) Flip-flop b) Capacitor
   c) Fuse d) Magnetic domain

ii) The data storing capacity of memory chip 2764 is _____
   a) 4 KB b) 8 KB
   c) 12 KB d) 16 KB

iii) For a 4-bit D to A converter using binary weighted method, if a resistor of 1K Ω is connected at MSB position, then for LSB position the resistance value would be _____
   a) 1K Ω b) 2K Ω
   c) 4K Ω d) 8K Ω

iv) Integrator, comparator and binary counter are the important blocks present in _____ method.
   a) Binary weighted b) R – 2R ladder
   c) Successive approximation d) Dual slope

v) _____ device has fixed number of AND and OR gate arrays.
   a) PLA b) PAL
   c) CPLD d) FPGA

P.T.O.

vi) A device which consists of number of PAL like blocks, I/O blocks and a set of interconnection wires is _____

a) PLA b) PAL

c) CPLD d) FPGA

vii) If a quartz crystal of 6 MHz is connected to μp 8085, its internal operating will be _____

a) 6 MHz b) 12 MHz

c) 3 MHz d) 1.5 MHz

viii) The system bus consists of _____

a) Address and data bus b) Data and control bus

c) Address and control bus d) Address, data and control bus

ix) Which one of these is a logical instruction ?

a) mov H, A b) INR B

c) CMA d) JMP 2050H

x) _____ symbol represents a decision making block.

a) Rectangle b) Diamond

c) Oval d) Double sided rectangle

2. Answer **any five** (**two** marks **each**) : **10**

i) Define any two memory related parameters.

ii) List any four features of ADC 0804.

iii) Explain in brief, the concept of PAL.

iv) What is T-state ? Explain in brief.

v) Briefly explain I/O mapped I/O technique.

vi) Write any two logical instructions and explain in brief.

3. A) Answer **any two** from the following (**three** marks **each**) : **6**

   i) What is flash memory ? Explain.

   ii) Discuss the basic concept of DAC.

   iii) Explain the concept of FPGA.

   B) Write a note on line transceiver 74245. **4**

4. Answer **any two** of the following (**five** marks **each**) : **10**

   i) Discuss basic microprocessor-based system with bus architecture.

   ii) Explain binary weighted method for D to A conversion.

   iii) Discuss the architecture of memory chip 2764.

5. Answer **any one** : **10**

   i) Give the classification of instructions with proper example. Draw the flowchart and write a program to generate a time delay.

   ii) Draw the logical pin diagram of µp 8085 with pin description.

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Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
GEOLOGY (Paper – VIII) (New)
Sedimentary and Metamorphic Petrology

Day and Date : Friday, 18-12-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*

1. Fill in the blanks with correct answer from the given options : **10**

1) Plagioclase (An > 20 to 50), Hornblende, Diopside minerals indicate _____ metamorphic facies.
   a) Amphibolite b) Granulite
   c) Green Schist d) Granite

2) Composition of dolomite is _____
   a) $Mg\,CO_3$ b) $Ca\,CO_3$
   c) $Fe\,CO_3$ d) $Ca\,CO_3\,Mg\,CO_3$

3) Red shales are due to _____
   a) Magnetite d) Carbon
   c) Goethite d) Hematite

4) Metasomatic effects are much less commonly in rocks with the interaction of _____ rocks.
   a) Basic b) Diorite
   c) Magnetite d) Granite

5) Size of gravels is between _____ mm in diameter.
   a) 2 – 10 b) 0.1 – 2
   c) 2 – 5 d) 5 – 10

6) Agglomerates are _____ breccias.
   a) Sedimentary b) Aeolian
   c) Volcanic d) Fault

P.T.O.

7) Sand size of clastic sediments is between _____ mm.
   a) 0. 1 – 2 b) 0.1 – 3
   c) 0.002 – 0.2 d) 0.002 – 0.02
8) Polymetamorphism can be recognized by _____
   a) strain-slip cleavage b) cleavage
   c) schistosity d) rock cleavage
9) Schists are _____ rocks.
   a) Weakly foliated b) Strongly foliated
   c) Non-foliated d) Fine grained
10) Slate, phyllite and serpentinite are rocks of metamorphic facies.
   a) Granulite b) Eclogite
   c) Greenshist d) Amphibolite

2. Explain **any five** of the following : **10**
   1) Arkose
   2) Marl
   3) Mineral and rocks of amphibolite facies
   4) Marble
   5) Roundness of sediments
   6) Migmatites.

3. A) Describe **any two** of the following : **6**
   1) Characteristics of strongly foliated rocks.
   2) Formation of Oolitic limestone
   3) Laterite.

   B) Greenschist metamorphic facies.

4. Explain **any two** of the following : **4**
   1) Arenaceous deposit and their important rocks.
   2) Terrestrial environment of deposition.
   3) Classification sediments based on mineral composition.

5. Describe **any two** of the following : **10**
   1) Polymetamorphism
   2) Metamorphism and pneumatolysis
   3) What is metamorphic facies ? Add note on eclogite facies.

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SLR-Z – 147

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
MICROBIOLOGY (New) (Paper – VIII)
Applied Microbiology – II

Day and Date : Friday, 18-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to right indicate ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Rewrite the following sentences by choosing correct answer : **10**

1) _____ is an example of fermented dairy product.
a) paneer b) cheese c) cream d) skimmed milk

2) The most commonly produced vitamin as a result of fermentation is _____
a) Vit. C b) Vit. B_{12} c) Vit. D d) Vit. E

3) The process of _____ is used to select suitable production strain for fermentation.
a) assay b) strain improvement
c) scale up d) screening

4) A large scale fermentor has a capacity of _____ lit.
a) 1 – 10 b) 100 – 10,000
c) 10,000 – 1,00,000 d) 2,00,000 – 5,00,000

5) The supply of sterile air is done by _____ device.
a) impeller b) coils c) baffles d) sparger

6) _____ is an animal food produced as a result of microbial fermentation.
a) SCP b) Penicillin c) Vit. B_{12} d) Alcohol

7) The production strain is maintained in _____ phase of growth in continuous fermentation.
a) lag b) log c) stationary d) death

8) The paper disc method is an example of _____ assay procedure.
a) turbidimetric b) diffusion
c) enzymatic d) metabolic response

P.T.O.

9) _____ is the correct formula for calculating mean.

a) $\sum x$ b) X/n c) $\frac{\sum x}{n}$ d) X_n

10) Probiotics involves administration of _____

a) antibiotics b) inhibitors
c) live organisms d) vaccines

2. Answer **any five** of the following : **10**

i) What is dual fermentation ?
ii) What is submerged culture method ?
iii) What is screening ?
iv) Describe median.
v) Write on uses of probiotics.
vi) Write on fermentation conditions for penicillin.
vii) Give methods of preservation.

3. A) Write on **any two** of the following : **6**

i) Draw labelled diagram of fermentor.
ii) Give an account of strain improvement.
iii) Give applications of biostatistics.

B) Describe secondary screening procedure. **4**

4. Answer **any two** of the following : **10**

i) Give an account of penicillin fermentation.
ii) Describe types of fermentation process.
iii) Give an account of assay.

5. Answer **any two** of the following : **10**

i) Give an account of alcohol production.
ii) Write on basic concepts of fermentation.
iii) Calculate mean, mode, median of following data :
size of bacterial cell in μm
2, 3, 5, 4, 2, 3, 3, 4, 4, 2
3, 3, 4, 2, 2, 3, 4, 5, 2, 2

_____

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Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
CHEMISTRY (Paper – VII) (Old)
Physical Chemistry

Day and Date : Tuesday, 8-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw neat diagram and give equation, wherever necessary.
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of logarithmic* ***tables*** *and scientific calculator is allowed.*
[At.wts : H = 1, c = 12, 0 = 16, N = 14, Na = 23, Cl = 35.5]

1. Choose the most correct alternative and rewrite the sentence : **10**

1) For thermodynamically reversible process, the entropy change is _____
   a) Zero b) One c) Two d) Three

2) The process carried out at constant pressure is called _____ process.
   a) Isothermal b) Isobaric
   c) Isochoric d) Isotonic

3) If the plane of crystal cuts the two co-ordinate axes and is parallel to third axis, then it is known as _____ plane.
   a) Cubic b) Cubic diagonal
   c) Simple d) Diagonal

4) In Nacl crystal, there are _____ molecules per unit cell.
   a) 1 b) 2 c) 3 d) 4

5) CS_2 and CO_2 have zero dipole moments, hence their expected structure is _____
   a) Linear b) Non-linear
   c) Angular d) None of these

P.T.O.

6) The relation $\frac{\sin i}{\sin r}$ is known as _____

a) Raoult's law b) Charle's law

c) Snell's law d) Coulomb's law

7) The hydrogen ion concentration of a solution is 10^{-5}, what will be the P^H ?

a) 10^5 b) 5

c) 10 d) 10^{-5}

8) The equation $\lambda_v = \lambda_\infty - b\sqrt{c}$ is known as _____

a) Arrhenius equation b) Onsagar equation

c) Bragg's equation d) None of these

9) On dilution, equivalent conductivity _____

a) Increases b) Decreases

c) Remains constant d) All of these

10) Following are the four solutions of sodium chloride. Which will have the highest value of specific conductance ?

a) 0.001 M b) 0.01 M

c) 0.1 M d) 1.0 M

2. Answer **any five** of the following : **10**

1) Define the terms 'specific conductance' and 'equivalent conductance'.

2) Define the terms P^H and P^{OH} what are the Henderson's equations for acidic and basic buffers ?

3) 2 moles of an ideal gas expand isothermally and reversibly from a volume of 1 dm^3 to 10 dm^3 at 300K. Calculate Δs.

(Given : R = 8.314JK^{-1} $m01^{-1}$)

4) State and explain snell's law.

5) Define plane of symmetry and axis of symmetry.

6) The ionic conductance at infinite dilution of Ag^+ ions 61.92 ohm^{-1} cm^2 at 298K. Calculate the ionic mobility of Ag^+ ions at 298K.

3. A) Answer **any two** of the following : **6**

   i) Explain with suitable example the terms polar and nonpolar molecules.

   ii) What are weiss indices and Miller indices ?

   iii) Discuss entropy changes in isothermal reversible process.

   B) Absolute velocities of Na^+ and NO_3^- ions at 298K are 5.2×10^{-4} m/s and 7.4×10^{-4} m/s respectively. Calculate transport numbers of Na^+ and NO_3^- ions. **4**

4. Attempt **any two** of the following : **10**

   i) What is meant by strong and weak electrolytes ? Explain variation of equivalent conductance with dilution.

   ii) Explain the terms :

   a) Specific and molecular retractivities

   b) Optical exaltation.

   iii) The first order reflection of a beam of X-rays from a given crystal plane occurs at 5° 15'. At what angle will be the third order reflection ?

5. Attempt **any two** of the following : **10**

   i) Discuss the factors affecting transport numbers.

   ii) Derive an expression for entropy change in mixing of gases.

   iii) State and explain Kohlrausch law. How it is useful to determine the ionic product of water ?

SLR-Z – 149

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
COMPUTER SCIENCE (Paper – VII) (Old)
Data Structures

Day and Date : Tuesday, 8-12-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** place indicate **full** marks.*

1. Choose correct alternatives : **10**

1) If binary tree having 'n' nodes then out of which _____ links are NULL links.
   a) n – 1 b) n – 2 c) n + 1 d) n + 2
2) Static implementation by means of _____
   a) Function b) Array c) Pointer d) None of these
3) Stack is useful in _____
   a) Radix sort b) Breadth first search
   c) Recursion d) None of these
4) Complexity of insertion sort is _____
   a) 0 (n^2) b) 0 (n log n)
   c) 0 (n^2 log n) d) None of these
5) _____ is linear data structure having two ends.
   a) Stack b) Queue c) Tree d) None of these
6) Header node in linked list always contains address of _____ node.
   a) Last b) Second last c) Middle d) First
7) ADT stands for _____
   a) Abstract Data Tool b) Abstract Data Technique
   c) Abstract Data Type d) None of these
8) Finds out odd one from the following
   a) Bubble b) Simple exchange
   c) Quick d) Insertion

P.T.O.

9) A characteristic of the elements that binary search follows but linear search ignores is _____

a) Order of element b) Number of elements

c) Maximum element d) Mean of all elements

10) _____ binary tree replaces 'NULL' links by giving links to another node in tree.

a) Complete b) Extended c) Threaded d) AVL

2. Answer **any five** of the following : **10**

1) Define 'Data structure' with its types.
2) Define 'Binary search tree'.
3) What is 'Queue' ? List out its applications.
4) Why stack is called as LIFO data structure ?
5) Define all types of 'Array'.
6) Define 'Singly circular linked list'.

3. A) Answer **any two** of the following : **6**

1) Evaluate postfix expression :

AB + CD – * if A = 1.10, B = 2.0, C = 3.0, D = 4.0.

2) Explain the operation to insert new node at the end of singly linear linked list.
3) Write an algorithm for inorder traversal of binary tree.

B) Explain priority queue with its types. **4**

4. Answer **any two** of the following : **10**

1) Explain the bubble sort method with its operation.
2) Explain ADT for array.
3) Explain the operation to remove the last node of doubly linear linked list.

5. Answer **any two** of the following : **10**

1) Explain insert and remove operation of circular queue.
2) Write an algorithm for binary search method.
3) Write an algorithm for conversion of infix expression to postfix expression.

SLR-Z – 150

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
CHEMISTRY (Paper – VIII) (Old)
Analytical and Industrial Inorganic Chemistry

Day and Date : Wednesday, 9-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1) **All** questions are **Compulsory**.*
*2) Draw neat diagram and give equations **wherever** necessary.*
*3) Figures to **right** indicate **full** marks.*

1. Select the correct alternative for the following and rewrite the sentences : **10**

i) L.D. process of manufacture of steel is first operated in

a) 1950 b) 1960 c) 1953 d) 1963

ii) _____ is used as a catalyst in Haber's process of manufacture of Ammonia.

a) Fe_2O_3 b) Ni c) V_2O_5 d) Pt

iii) Dimethyl glyoxime is used to precipitate

a) Al b) Ni c) Cu d) Fe

iv) _____ is called king of chemicals.

a) Na_2CO_3 b) NH_3 c) H_2SO_4 d) HNO_3

v) Water which contains no dissolved substance is called _____ water.

a) Distilled b) Pure c) Potable d) Deionised

vi) Eriochrome black-T is also called as

a) Molochrome-black b) Acid-base indicator
c) Solochrome black d) None of these

vii) Ageing is nothing but the process of

a) Nucleation b) Ignition c) Coagulation d) Digestion

viii) Colour-change interval of phenolphthalein is

a) 8.3 – 10 b) 8.3 – 12 c) 3.1 – 4.4 d) 4.2 – 6.3

P.T.O.

ix) _____ value serves as an index of pollution.
   a) Chemical Oxygen Demand (COD)
   b) Biological Oxygen Demand (BOD)
   c) Dissolved Oxygen (DO)
   d) Ultimate Oxygen Demand (UOD)

x) _____ process removes all ions from water.
   a) Zeolite b) Ion exchange
   c) Soda-ash d) Lime soda

2. Answer **any five** of the following : **10**
   i) Define nucleation.
   ii) Draw the structure of EDTA.
   iii) Define the terms indicator.
   iv) Name two methods of purification of water.
   v) Explain the classification of catalysis.
   vi) Define the term promoter.

3. A) Answer **any two** of the following : **6**
      i) Explain the conditions for precipitation.
      ii) Industrial applications of catalysis
      iii) Name the different types of steel.
   b) Draw and explain manufacture of Ammonia by Haber's process. **4**

4. Answer **any two** of the following : **10**
   i) Define steel and explain manufacture of steel by L.D. process.
   ii) What is catalyst and explain the characteristics of catalysis ?
   iii) Explain in brief ion exchange method of purification of industrial water.

5. Answer **any two** of the following : **10**
   i) Explain the neutralisation curve for titration between strong acid Vs weak base.
   ii) Explain the role of organic precipitant DMG 4 aluminon in gravimetric analysis.
   iii) What is municiple sewage and Explain activated sludge process.

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SLR-Z – 151

Seat No.	

B.Sc. – II (Semester – IV) (Old) Examination, 2015
COMPUTER SCIENCE
Paper – VIII : System Analysis and Design

Day and Date : Wednesday, 9-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternatives : **10**

1) _____ is defined as the activity that makes possible the transformation of input to output.
a) Input b) Output c) Process d) Feedback

2) An output must convey information about _____
a) Past Activities b) Current status
c) Future Projections d) All of the above

3) In the parallel-systems method, the new system is set to work alongside the old one.
a) True b) False

4) Second normal form is based on the concept of _____
a) Full functional dependency b) Semi functional dependency
c) Transitive dependency d) All of these

5) Age is a derived attribute.
a) True b) False

6) _____ implies structure and order.
a) Integration b) Interaction c) Organization d) Interdependence

7) _____ is role of system analyst.
a) An agent of change b) An architect
c) An intelligent salesperson d) All of above

P.T.O.

8) A system flowchart depicts the flow of data through all parts of a system with minimum of details.
   a) True b) False

9) Which fact finding technique is adopted when the field of investigation is very vast and respondents are spread over a wide geographical area ?
   a) Interview b) Questionnaire
   c) Record review d) Observations

10) DFD means detect flow diagram.
   a) True b) False

2. Answer **any five** of the following : **10**
   1) Differentiate between open and closed system.
   2) What is flowchart ?
   3) What is Normalization ?
   4) Define Attribute.
   5) State Data Capture Objectives.
   6) State principles of flowcharting.

3. A) Answer **any two** of the following : **6**
      1) Explain economic and technical feasibility.
      2) Explain need of normalization.
      3) State the design principles of output.
   B) Write short note on system requirements analysis. **4**

4. Answer **any two** of the following : **10**
   1) Explain elements of system.
   2) Explain different methods of conversion from old system to new system.
   3) Explain advantages and disadvantages of decision table.

5. Answer **any two** of the following : **10**
   1) Explain the role of system analyst.
   2) Write short note on record review and observation.
   3) Draw CLD for payroll system.

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SLR-Z – 152

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
PHYSICS
Electronics (Paper – VII) (Old)

Day and Date : Thursday, 10-12-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams must be draw* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct alternative from the following : **10**

i) _____ gate is called as inverter.

a) AND b) Ex-OR c) NOT d) OR

ii) The De-morgan's second theorem is given by the relation $\overline{A.B}$ =

a) $A + B$ b) $\overline{A+B}$ c) $\overline{A}+B$ d) $\overline{A}+\overline{B}$

iii) In phase shift oscillator three R-C networks produces total phase shift of

a) 90° b) 180° c) 270° d) 360°

iv) Fraction of the output signal given to the input is called

a) amplifier b) oscillator c) rectifier d) feedback

v) Transistor works at _____ biasing.

a) FR b) RF c) RR d) FF

vi) UJT is a _____ terminal semiconductor device.

a) 1 b) 2 c) 3 d) 4

vii) Single stage amplifier contains _____ number of transistors.

a) one b) two c) three d) four

viii) The most widely used method of transistor biasing is

a) base resistor method b) voltage divider bias
c) biasing with feed back d) none of a, b, c

P.T.O.

ix) The time period of wave form measured on CRO is 2 ms then unknown frequency of wave is

a) 5 Hz b) 50 Hz c) 500 Hz d) 5000 Hz

x) The most accurate device for measuring voltage is

a) voltmeter b) multimeter c) VTVM d) CRO

2. Answer **any five** of the following. **10**

i) Define transistor and draw symbols of npn and pnp transistors.

ii) Draw frequency response curve of an amplifier and write relation to measure band width.

iii) What is Barkhausen's criterion ?

iv) Give the construction and symbol of UJT.

v) Why NAND gate is called universal gate ?

vi) Give any two uses of CRO in detail.

3. A) Answer **any two** of the following. **6**

i) Explain the construction and working of R-S flip-flop.

ii) What is transistor biasing ? Explain need of biasing ?

iii) Describe the use of FET as VVR.

B) The phase shift oscillator uses three identical sections in the feedback network. The value of components are R = 200 KΩ and C = 400 PF. Calculate the frequency of oscillations. **4**

4. Answer **any two** of the following. **10**

i) Explain the working of Hartly oscillator with neat circuit diagram.

ii) Describe use of UJT as voltage sweep generator.

iii) What is feedback ? Explain positive and negative feedback in amplifier.

5. Answer **any one** of the following. **10**

i) Draw the block diagram of CRO and explain the function of each block.

ii) What is amplifier ? Explain single stage RC coupled transistor amplifier in detail.

SLR-Z – 153

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
BIOCHEMISTRY (Paper – III) (Old)
Nutrition and Metabolism

Day and Date : Thursday, 10-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Write biochemical reactions ***wherever*** *possible.*

1. Write the following sentences selecting most correct answer from given options. **10**

1) Respiratory Quotient (R.Q.) for carbohydrate is
   a) 0.7 b) 0.8 c) 0.9 d) 1.0

2) In metabolism when dietary nitrogen intake is less than nitrogen excreted, body is said to be at
   a) positive nitrogen balance b) negative nitrogen balance
   c) nitrogen equilibrium d) nitrogen gain

3) ATP functions in a cyclic manner as a carrier of chemical energy from catabolic to anabolic processes was first stated by
   a) Embden-Meyerhof b) Sir Hans Krebs
   c) Lipmann d) Jacob and Monod

4) Spontaneous reactions proceed with _____ in free energy.
   a) increase b) decrease c) equilibrium d) none of a, b or c

5) Glycogen phosphorylase enzyme is involved in _____ reactions.
   a) Glycolysis b) Glycogenolysis
   c) TCA cycle d) Glycogenesis

6) _____ is an important buffer system of the body.
   a) Protein b) Acetate c) Phosphate d) Bicarbonate

7) Ammonia required for urea synthesis is provided by _____ of amino acids.
   a) transamination b) decarboxylation
   c) deamination d) peptide formation

8) _____ hormone increases reabsorption of water by renal tubules.
   a) Antidiuretic hormone b) Aldosterone
   c) Growth hormone d) Insulin

9) Normal adult woman has B.M.R. _____ cal/hm^2 of body surface area.
   a) 26 b) 36 c) 46 d) 56

10) Phenylketonuria is a disease related to the metabolism of
   a) glucose b) fatty acid c) phenyl alanine d) amino acids

2. Answer **any five** from below : **10**
   1) What is difference between essential and non-essential amino acids in diet ?
   2) What is the role of chloride ions($C\bar{l}$) in the body ?
   3) Give names of all molecules involved in electron transport chain.
   4) What are the causes of dehydration of body ?
   5) Write and explain one reaction of decarboxylation of amino acid.
   6) Define balanced diet and state the components of balanced diet.

3. A) Answer **any two** from below : **6**
   1) What is the function of lipids in the body ?
   2) Explain the role of Coenzyme Q_{10} in respiratory chain.
   3) Write an account of mineral salts and trace elements in diet.

   B) Discuss energetics of Krebs cycle reactions. **4**

4. Attempt **any two** : **10**
   1) Illustrate all reactions of anaerobic oxidation of glucose.
   2) Write down respiratory chain and discuss about the chemiosmotic coupling hypothesis.
   3) Explain all reactions of urea cycle.

5. Answer **any two** : **10**
   1) Explain the renal mechanism of pH regulation.
   2) Write an account of role of protein in diet.
   3) Discuss biosynthesis of palmitic acid.

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SLR-Z – 155

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
PHYSICS (Paper – VIII) (Old)
Modern Physics

Day and Date : Friday, 11-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
iv) ***Use*** *of log tables and calculators is* ***allowed****.*

1. Select correct alternative from the following : **10**

i) Special theory of relativity was developed by _____
   a) Newton b) Einstein
   c) Galileo d) Kepler

ii) According to theory of relativity mass of moving body _____
   a) remain constant b) decreases
   c) becomes half d) increases

iii) Matter exhibits _____ nature.
   a) only wave b) only particle
   c) both particle and wave d) none of above

iv) The relation between phase velocity (u) and particle velocity (v) is _____
   a) $uv = c^2$ b) $uv = c$ c) $uc = v^2$ d) $uv = 0$

v) X-rays are discovered by _____
   a) Bohr b) Roentgen
   c) Rutherford d) Newton

vi) The equation of any one of the lines on Mosley diagram is given by _____
   a) $\gamma = a(z-b)^2$ b) $\gamma = a(z-b)$
   c) $\gamma = a(z-b)^3$ d) $\gamma = a(z+b)^2$

vii) The magnitude of compton wavelength is _____ A°.
   a) 1 b) 0.0482
   c) 0.0342 d) 0.0242

P.T.O.

viii) Anomalous zeeman effect occurs when external magnetic field is _____
   a) strong b) weak
   c) medium d) very strong

ix) The two main concepts of vector atom model are _____
   a) orbital and spin angular momentum
   b) electron spin and orbital momentum
   c) space quantisation and electron spin
   d) none of above

x) The α -particle is identical to _____
   a) Hydrogen b) Helium
   c) Carbon d) Proton

2. Answer **any five** of the following : **10**
   i) Which are two postulates of special theory of relativity ?
   ii) Define phase velocity and group velocity.
   iii) Draw neat diagram of a modern coolidge type of X-ray tube.
   iv) What is Pauli's exclusion principle ?
   v) Explain J-J coupling.
   vi) Define half life and average life of radioactive substance.

3. A) Answer **any two** of the following : **6**
   i) Deduce the expression for variation of length with velocity.
   ii) Explain continuous X-ray spectrum.
   iii) Obtain the exponential law of the radioactive disintegration.

   B) Explain De Broglie hypothesis of matter waves. **4**

4. Answer **any two** of the following : **10**
   i) Give explanation of negative result of Michelson-Morley experiment.
   ii) Derive Bragg's law of X-ray diffraction.
   iii) Write a note on carbondating.

5. Answer **any one** of the following : **10**
   i) What is Compton effect ? Derive an expression for change in wavelength due to compton effect.
   ii) What is normal zeeman effect ? Explain the normal zeeman effect experiment.

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SLR-Z – 156

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
BIOCHEMISTRY (Paper – IV) (Old)
Molecular Biochemistry and Diseases

Day and Date : Friday, 11-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Write biochemical reactions ***wherever*** *necessary.*

1. Write following sentences selecting most correct answer from given options : **10**

1) Deoxyribose sugar present in DNA is deoxy at _____ carbon.
a) second b) third c) fourth d) fifth

2) The concept of lac operon was proposed by _____
a) Watson and Crick b) Jacob and Manod
c) Meselson and Stahl d) Krebs and Hensleit

3) RNA polymerase enzyme without sigma (σ) factor is called
a) holoenzyme b) coenzyme
c) core polymerase d) apoenzyme

4) Lac repressor protein is inhibited by _____ molecules.
a) glucose b) c-AMP
c) RNA polymerase d) lactose

5) The process of RNA biosynthesis is called as
a) replication b) transcription c) translation d) ligation

6) Immunity induced by vaccination is _____ type of immunity.
a) natural active b) natural passive
c) artificial active d) artificial passive

7) _____ is not a cloning vector.
a) Plasmid b) λ-phage c) M13 virus d) E.coli cells

P.T.O.

8) People working in asbestos mine are at risk of developing cancer of
   a) skin b) liver c) lungs d) bones
9) Total number of polypeptide chains present in IgG molecules are
   a) 4 b) 6 c) 8 d) 3
10) HIV affects primarily _____ system of body and destroys it.
   a) circulatory b) nervous c) muscular d) immune

2. Answer **any five** from below : **10**
   1) Give differences between natural active immunity and artificial active immunity.
   2) What are reasons of HIV infection ?
   3) Differentiate between nucleoside and nucleotide.
   4) Why λ-phage vector is preferred over plasmid vector ?
   5) What are the causes of insulin dependent diabetes ?
   6) What is the function of mRNA ?

3. A) Attempt **any two** : **6**
      1) What are differences between DNA and RNA ?
      2) How was it experimentally proved that DNA replication was semiconservative ?
      3) What is the effect of insulin on blood sugar level ?
   B) Draw a labelled diagram of structure of HIV. **4**

4. Answer **any two** from below : **10**
   1) Illustrate primary and secondary immune response.
   2) Write an account of plasmid pBR322 as a cloning vector.
   3) Explain the structure and functions of tRNA.

5. Answer **any two** : **10**
   1) Write a note on translation process.
   2) Illustrate the concept of lac operon.
   3) Discuss various modes of action of insulin in body.

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SLR-Z – 158

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
STATISTICS (Paper – VII) (Old)
Continuous Probability Distributions – II

Day and Date : Saturday, 12-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N. B. : *1) **All** questions are **compulsory** and carry **equal** marks.*
*2) Figures to the **right** indicates **full** marks.*

1. Choose the correct alternative : **10**

1) For sufficiently large n ; G(1, n) distribution tends to
   a) exponential dist^n b) normal dist^n
   c) X^2-distribution d) F-distribution

2) The p.d.f. of uniform distribution is similar to the pdf of _____ distribution.
   a) $\beta_2(1, 1)$ b) $\beta_1(1, 1)$
   c) G(1, 1) d) N(0, 1)

3) For $G(\alpha, \beta)$ distribution
   a) variance > mean, if $\alpha < 1$ b) Variance = mean, if $\alpha = 1$
   c) Variance < mean, if $\alpha > 1$ d) All the above

4) If $X \sim N(\mu, \sigma^2)$ r.v. then the values of co-efficients β_1 and β_2 are
   a) (μ, σ^2) b) (0, 3) c) (0, 1) d) None of these

5) Normal distribution was invented by
   a) Laplace b) De-moivre c) Gauss d) All the above

6) If $X \sim N(\mu, \sigma^2)$, then $z = \frac{x - \mu}{\sigma} \sim N(0, 1)$ and z^2 follows a
   a) Chi-square variate 1 d.f
   b) Chi-square variate with ndf
   c) Chi-square variate with 2n d.f.
   d) None of these

P.T.O.

7) Mode of Chi-square distribution with n.d.f. is

a) n b) n – 2

c) 2n d) None of these

8) The range of F-distribution is

a) $-\infty$ to ∞ b) 0 to 1

c) 0 to ∞ d) None of these

9) If X~N (0, 1) and $Y \sim X^2/n$, then the distribution of variate $X/\sqrt{Y}$ follows

a) Cauchy's distribution

b) Student's t-dist^n

c) Fisher's t-distribution

d) None of these

10) If $X \sim G(\alpha, \lambda = 1)$, then the pdf of X is

a) Chi-square distribution

b) Normal distribution

c) Exponential distribution

d) None of these

2. Attempt **any five** of the following : **10**

i) Define probability density function of Gamma distribution with parameters (α, λ).

If $\alpha = 1$, then identify its distribution.

ii) Show that uniform distribution is a particular case of Beta distribution of first kind.

iii) Define Chi-square distribution with 1 d.f. and write the p.d.f. of χ^2-dist^n with n d.f.

iv) State any four properties of $N(\mu, \sigma^2)$.

v) State under what conditions the binomial distribution tends to normal distribution.

vi) What is the relation between gamma distribution and Chi-square distribution ?

3. A) Attempt **any two** of the following : **6**
   i) State and prove additive property of gamma variates.
   ii) Obtain mean of beta distribution of second kind.
   iii) If $X \sim \beta_1$ (m, n) variate. Obtain the distribution of (1 – X).

   B) Obtain the expression for even order central moments of $N(\mu, \sigma^2)$. **4**

4. Attempt **any two** of the following : **10**
   i) If X and Y are independent gamma variates with parameters m and n respectively. Obtain the distribution of u = x + y and $v = x/y$.
   ii) Compute mode of the t-distribution with n.d.f.
   iii) Find the p.d.f. of F-distribution with (n_1, n_2) d.f.

5. Attempt **any two** of the following : **10**
   i) Find the harmonic mean of beat distribution of first kind.
   ii) Obtain m.g.f. of Chi-square distribution with n d.f.
   iii) State and prove additive property of normal distribution.

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SLR-Z – 161

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
ZOOLOGY (Paper – VII) (Old)
Animal Diversity – IV

Day and Date : Saturday, 12-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Rewrite the following sentences using correct alternative : **10**

1) The body of _____ is covered by feathers.
a) amphibians b) birds c) reptiles d) mammals

2) When all the teeth of mammals are similar in shape and size, then they are called
a) thecodont b) heterodont c) homodont d) diphyodont

3) Pulmonary vein carry _____ blood to the heart.
a) oxygenated b) deoxygenated
c) mixed d) clotted

4) Mesozoic era is called as the golden era of
a) reptiles b) birds c) mammals d) amphibians

5) Digestion in stomach is called as _____ digestion.
a) gastric b) complete c) incomplete d) partial

6) Bile is secreted by
a) pancreas b) salivary glands
c) heart d) liver

7) _____ are called as oxygen carrier.
a) RBCs b) WBCs c) Leucocytes d) Thrombocytes

P.T.O.

8) The poison of cobra is
   a) haemotoxic b) neurotoxic
   c) respirotoxic d) hepatotoxic

9) In duck _____ beak is present.
   a) mud and water probing b) wood chiseling
   c) seed eating d) fruit eating

10) The skin of _____ is dry, rough and non-glandular.
   a) amphibians b) birds
   c) reptiles d) mammals

2. Write short note on following (**any five**) : **10**
   1) Salient features of mammals.
   2) Swimming type of feet in birds.
   3) Marks of identification in poisonous snakes.
   4) Monotremes.
   5) Give reptilian characters of Archaeopteryx.
   6) Functions of Pancreas of rat.

3. A) Answer **any two** of the following : **6**
      1) Functions of liver of rat.
      2) Salient features of marsupials.
      3) Functions of brain of rat.

   B) Poisonous apparatus in snakes. **4**

4. Answer **any two** of the following : **10**
   1) Describe latitudinal migration in birds.
   2) Describe digestion in stomach of rat.
   3) Describe dentition in mammals.

5. Answer **any one** of the following : **10**
   1) What is excretion ? Describe excretory system of rat.
   2) Describe in detail beak modification in birds.

_____

SLR-Z – 162

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
STATISTICS (Paper – VIII)
Applied Statistics (Old)

Day and Date : Monday, 14-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory*** *and carry* ***equal*** *marks.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative : **10**

i) A sample consists of
   a) all units of the population
   b) 50 percent units of the population
   c) 5 percent units of the population
   d) any fraction of the population

ii) Probability of including a specified unit in a sample of size 'n' selected out of 'N' units is

   a) $\frac{1}{n}$ b) $\frac{1}{N}$ c) $\frac{n}{N}$ d) $\frac{N}{n}$

iii) Chance or random variation in the manufactured product is
   a) controllable b) not controllable
   c) both a) and b) d) none of the above

iv) Level of significance is the probability of
   a) Type I error b) Type II error
   c) Both a) and b) d) None of these

v) If μ and σ are process mean and standard deviation (s.d.) respectively then 3σ control limits given by
   a) $\mu \pm \sigma$ b) $\mu \pm 2\sigma$
   c) $\mu \pm 3\sigma$ d) none of these

P.T.O.

vi) Number of defects per unit follows _____ distribution.

a) Binomial b) Poisson c) Normal d) Geometric

vii) Sampling frame is a term used for

a) a list of random numbers

b) a list of voters

c) a list of sampling units of a population

d) none of the above

viii) For the 2 × 2 contingency table, the degrees of freedom for the Chisquare statistic is

a) 2 b) 3 c) 4 d) 1

ix) Type I error is

a) Rejecting a true hypothesis

b) Accepting a false hypothesis

c) Rejecting a false hypothesis

d) Accepting a true hypothesis

x) Net reproductive rate NRR = 1 indicates

a) Increase in population

b) Decrease in population

c) Population remains constant

d) None of these

2. Answer **any five** of the following : **10**

i) Define GFR and TFR.

ii) Explain what is a null hypothesis. Give an example.

iii) Explain what is a critical region.

iv) Explain the term defective.

v) Explain meaning of statistical quality control.

vi) What is process control ?

3. A) Answer **any two** of the following : **6**

   i) Distinguish between chance causes and assignable causes of variation.

   ii) Explain the term infant mortality rate.

   iii) Obtain the sampling distribution of the mean of a random sample drawn from normal population.

   B) Answer the following : **4**

   Show that in case of Simple Random Sampling Without Replacement (SRSWOR) expected value of the sample mean is population mean.

4. Answer **any two** of the following : **10**

   i) Explain the procedure for testing the equality of two population variances based on F distribution.

   ii) State the advantages of sample survey over census survey.

   iii) Prove that in a simple random sampling without replacement sample mean square is an unbiased estimate of population mean square.

5. Answer **any two** of the following : **10**

   i) Explain various methods of population projection.

   ii) Explain the construction of control chart for number of defects when standards are not given.

   iii) Explain the construction of $\overline{X}$ chart in production process when standards are not given.

SLR-Z – 165

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
ZOOLOGY (Paper – VIII) (Old)
Histology and Physiology

Day and Date : Monday, 14-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B.** : 1) **All** questions are **compulsory.
*2) Draw **neat** and labelled diagrams **wherever** necessary.*
*2) Figures to the **right** indicate **full** marks.*

1. Rewrite the sentence by selecting appropriate answer : **10**

1) The outer most hardest covering of tooth is _____
   a) enamel b) cementum c) dentine d) vitrodentine

2) The cytoplasm of myofibril of striated muscle is called as _____
   a) sarcomere b) endoplasm c) sarcoplasm d) exoplasm

3) Schwann's cells are present in _____
   a) cartilage b) nerve cell c) bone d) muscle cell

4) Hair-Papilla is present in _____layer of skin.
   a) epidermis b) mesodermis
   c) dermis d) both epidermis and dermis

5) Cellular immunity is due to_____
   a) Plasma cell b) B-lymphocytes c) Antibodies d) T-lymphocyte

6) Progesterone hormone is secreted by _____
   a) carpus albican b) graffian follicle c) carpus luteum d) atrefic follicle

7) The endocrine part of testis is known as _____
   a) granulosa cells b) Islet's of Langerhan cells
   c) interstitial cells d) columnar cells

P.T.O.

8) The duration of oestrous cycle of Rat is _____ days.

a) 5 b) 15 c) 10 d) 28

9) The process of termination of pregnancy is called as _____

a) menstruation b) Perturbation c) lactation d) misturation

10) Copper-T is _____

a) gastric device b) oral device

c) intestinal device d) intra-uterine device

2. Answer **any five** of the following : **10**

i) Columnar epithelium.

ii) Structure of non-striated fibre.

iii) Condom

iv) Malpighian body

v) Amniocentesis.

vi) Islet's of Langerhans.

3. A) Answer **any two** of the following : **6**

i) Describe V.S. of Mammalian tooth.

ii) T.S. of Uterus.

iii) Describe the hormonal control of pregnancy.

B) Describe oral pills as contraceptives. **4**

4. Describe **any two** of the following : **10**

i) Describe the oestrus cycle in Rat.

ii) Describe the invitro-fertilization.

iii) Describe the hormonal control of testicular activities.

5. Describe **any one** of the following : **10**

i) What is menstruation ? Describe the various changes that occurs during the cycle.

ii) Give detailed account of hormones secreted by the adenohypophysis of Pituitary gland.

SLR-Z – 166

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
MATHEMATICS (Paper – VII) (Old)
Integral Calculus

Day and Date : Tuesday, 15-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative for each of the following : **10**

1) The perimeter of the curve $r = 2\cos\theta$ is _____

a) $\frac{\pi}{2}$ b) π c) $\frac{3\pi}{2}$ d) 2π

2) The length of the arc of the curve y = logsecx between x = 0 and x = $\pi/6$ is equal to _____

a) log3 b) 2log3

c) $\frac{1}{2}$log3 d) None of these

3) The area of the circle $x^2 + y^2 = r^2$ is _____

a) πr^2 b) $\frac{\pi}{2} r^2$ c) πr d) $\frac{\pi}{2} r$

4) Another form of B (m, n) is _____

a) $\int_0^\infty \frac{x^{m-1}}{(1+x)^n} dx$ b) $\int_0^\infty \frac{x^{n-1}}{(1+x)^n} dx$

c) $\int_0^\infty \frac{x^{m+n-1}}{1+x} dx$ d) $\int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}} dx$

P.T.O.

5) The volume generated by revolving about the x-axis and area bounded by the curve y = f(x) and the two ordinates x = a and x = b is given by _____

a) $\int_a^b y^2 dx$

b) $\frac{1}{2}\int_a^b y^2 dx$

c) $\frac{\pi}{2}\int_a^b y^2 dx$

d) $\pi\int_a^b y^2 dx$

6) If n > 0, then the gamma function is defined by _____

a) $\int_0^1 e^{-x}\, x^{n-1}\, dx$

b) $\int_0^1 e^{-nx}\, x^{n-1}\, dx$

c) $\int_0^\infty e^{-x}\, x^{n+1}\, dx$

d) $\int_0^\infty e^{-x}\, x^{n-1}\, dx$

7) The value of $\left|\left(\frac{-3}{2}\right)\right|$ is _____

a) $-2\sqrt{\pi}$

b) $\frac{4\sqrt{\pi}}{3}$

c) $\frac{-8\sqrt{\pi}}{15}$

d) None of these

8) The value of $\int_0^{\pi/2}\int_0^{a\cos\theta} r\sin\theta\, d\theta\, dr$ is _____

a) $\frac{1}{6}a^2$

b) $\frac{1}{3}a^2$

c) $\frac{1}{2}a^2$

d) $\frac{5}{6}a^2$

9) The value of $\int_1^2 \int_0^{3y} y \, dx \, dy$ is _____

a) 3 b) 5 c) 7 d) 9

10) The value of $\int_1^a \int_1^b \frac{dx \, dy}{xy}$ is _____

a) log(ab) b) log(a/b)

c) (loga) (logb) d) $\frac{\log a}{\log b}$

2. Attempt **any five** of the following : **10**

1) Find the length of arc of the parabola $y^2 = 4ax$ cut off by its latus rectum.

2) Find the area of a loop of the curve $r^2 = a^2\cos^2\theta$.

3) Prove that $\int_0^\infty x^3 e^{-x} \, dx = 6$.

4) Show that B (m, n) = B (m + 1, n) + B (m, n + 1).

5) Evaluate $\int_0^\infty \frac{dx}{1+x^4}$

6) Evaluate $\int_1^{\log 8} \int_0^{\log y} e^{x+y} \, dx \, dy$.

3. A) Attempt **any two** of the following : **6**

1) Prove that $\left|\frac{1}{2} = \sqrt{\pi}\right.$.

2) Evaluate $\iint xy\,(x+y)\,dxdy$ over the area between $y = x^2$ and $y = x$.

3) Rectify the curve $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$.

B) Prove that $B(m, n) = \frac{\left|m\right|\left|n\right.}{\left|m+n\right.}$. **4**

4. Attempt **any two** of the following : **10**

   1) Prove that $\int_0^{\pi/2} \sin^m \theta \cos^n \theta \, d\theta = \frac{\left\lfloor \frac{m+1}{2} \right\rfloor \left\lfloor \frac{n+1}{2} \right\rfloor}{2 \left\lfloor \frac{m+n+2}{2} \right\rfloor}$.

   2) Transform to polar co-ordinates and integrate $\iint \sqrt{\frac{1-x^2-y^2}{1+x^2+y^2}} \, dx \, dy$ the integral being extended over all positive values of x and y subject to $x^2 + y^2 \leq 1$.

   3) Find the ratio of the two parts into which the parabola $2a = r(1 + \cos\theta)$ divide the area of the cardiode $r = 2a(1 + \cos\theta)$.

5. Attempt **any two** of the following : **10**

   1) To prove that $\lfloor m \left\lfloor \left(m + \frac{1}{2}\right) \right. = \frac{\sqrt{\pi}}{2^{2m-1}} \lfloor 2m$.

   2) Change of order of integration in

   $$\int_0^a \int_{\sqrt{a^2 - x^2}}^{x+2a} \phi(x, y) \, dx \, dy \cdot$$

   3) Find the volume of solid generated by the revolution of the fractrix $x = a\cos t + \frac{1}{2} a \log \tan^2\left(\frac{t}{2}\right)$, $y = a \sin t$ about its asymptote.

SLR-Z – 167

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
BOTANY (Paper – VII) (Old)
Plant Physiology

Day and Date : Tuesday, 15-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
3) ***All*** *questions carry* ***equal*** *marks.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

I. Write the correct answer. **10**

1) The energy stored in carbohydrate molecules is released during

a) Cellular oxidation b) Photosynthesis

c) Transpiration d) β-oxidation

2) Nitrogen fixation is the process of conversion of atmospheric nitrogen into

a) inorganic nitrogenous compounds

b) RNA

c) DNA

d) carbohydrates

3) _____ is the fruit ripening harmone.

a) Auxins b) Gibberellins c) Ethylene d) Kinetin

4) Mass flow hypothesis was proposed by

a) Curtis b) Munch

c) Spanner-Jones d) Garner-Allard

5) _____ is essential for synthesis of chlorophylls.

a) Mn b) Fe c) Ca d) P

6) _____ is an example of CAM plant.
   a) Hibiscus b) Sugarcane c) Aloe d) Jowar

7) 2, 4 – D, a weedicide belongs to
   a) Cytokinins
   b) Gibberellins
   c) Auxins
   d) Growth retarding harmones

8) Glucose is converted into glucose-6-phosphate in presence of enzyme
   a) Isomerase b) Pyruvate kinase
   c) Hexokinase d) Aldolase

9) Percentage of nitrogen in the atmosphere is approximately
   a) 60 b) 70 c) 21 d) 78

10) The primary acceptor of CO_2 in Calvin cycle is
   a) RuBP b) PEP c) 3-PGA d) Pyruvate

II. Answer **any five** of the following. **10**

i) Why the mitochondria are called as power houses of the cell.

ii) What is the role of leghaemoglobin in symbiotic nitrogen fixation ?

iii) Explain the terms-source and sink.

iv) Define photosynthesis.

v) Give the practical applications of Abscissic Acid (ABA).

vi) What is photoperiodism ?

III. A) Answer **any two** of the following. **6**

i) Enlist the enzymes involved in Glycolysis.

ii) What are the different phases of growth ? Draw the growth curve.

iii) Differentiate between Calvin cycle and C_4 cycle.

B) Describe the role of any two minerals in plants. **4**

IV. Answer **any two** of the following. **10**

i) Write a note on vernalization.

ii) Give an account of discovery and chemical nature of Gibberellins.

iii) Explain in brief mass flow hypothesis.

V. Answer **any two** of the following. **10**

i) Write an account of TCA cycle.

ii) Describe Nitrogen fixation in legumes.

iii) Explain non-cyclic electron transfer with the help of diagram only. Give its significance.

SLR-Z – 168

Seat No.	

B.Sc. II (Semester – IV) (Old) Examination, 2015
MATHEMATICS (Paper – VIII)
Integral Transforms

Day and Date : Wednesday, 16-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the right indicate full marks.

1. Choose the correct alternative for each of the following : **10**

1) The value of the integral $\int_0^\infty e^{-3t} \sin t dt$ is

a) 5 b) $\frac{1}{5}$ c) 10 d) $\frac{1}{10}$

2) The Laplace transform of te^{-t} is

a) $\frac{1}{(p+1)^2}$ b) $-\frac{1}{(p+1)^2}$ c) $\frac{p}{(p+1)^2}$ d) $-\frac{p}{(p+1)^2}$

3) The Laplace transform of f (t) = 4, 0 < t < 5 and f (t) = 0, t > 5 is

a) $\frac{4(1-e^t)}{p}$ b) $\frac{4(1-e^{-5t})}{p}$ c) $\frac{1-e^t}{P}$ d) None of these

4) If L{F(t) } = f (p) then final-value theorem states that

a) $\lim_{t\to\infty} F(t) = \lim_{p\to 0} pf(p)$ b) $\lim_{t\to 0} F(t) = \lim_{p\to 0} pf(p)$

c) $\lim_{t\to 0} F(t) = \lim_{p\to\infty} pf(p)$ d) None of these

5) $\int_0^\infty \frac{\sin t}{t} dt =$

a) $\frac{\pi}{4}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{2}$ d) π

P.T.O.

6) $L^{-1}\left(\frac{s+s^2}{s^3}\right)=$

a) $t + t^2$ b) $t + 1$ c) $t^2 + 1$ d) t

7) L^{-1} (f (p+a)) =

a) $e^{-at} L^{-1}$ (f (p)) b) $e^{-at}(-t)$ c) $e^{at}L^{-1}$ (f (p)) d) $-t\, L^{-1}(f(p))$

8) $\frac{1}{(p+1)^2}$ is the Laplace transform of

a) t^2 b) t^3 c) e^{-2t} d) te^{-t}

9) If m > 0, n > 0 the Beta function is defined as B (m, n) =

a) $\int_0^1 x^m(1-x)^n dx$ b) $\int_0^1 x^{m+1}(1-x)^n dx$

c) $\int_0^1 x^{m+1}(1-x)^{n-1} dx$ d) $\int_0^1 x^{m-1}(1-x)^{n-1} dx$

10) With usual meanings, $1*1*1$ =

a) t b) $\frac{t^2}{2}$ c) $\frac{t^3}{3!}$ d) $\frac{t^{n+1}}{n!}$

2. Attempt **any five** from the following. **10**

1) Define Integral Transform of the function F(t).

2) Find $L\left\{e^{-4t}\cosh t\right\}$.

3) Find the Laplace transform of the function F(t) = 1.

4) Evaluate $L^{-1}\left\{\frac{e^{-5p}}{(p-2)^4}\right\}$.

5) Define the term convolution.

6) If $L^{-1}\{f(p)\} = F(t)$, then show that $L^{-1}\left\{\int_p^\infty f(x)dx\right\} = \frac{F(t)}{t}$.

3. A) Attempt **any two** of the following. **6**

   1) Show that t^2 is of exponential order 3.

   2) If $L^{-1}\left\{\frac{p}{(p+1)^2}\right\} = \frac{1}{2}$ tsint, find $L^{-1}\left\{\frac{3^2}{(16p^2+1)^2}\right\}$.

   3) Solve $\frac{d^2y}{dt^2} + y = 0$ under the conditions that y =1, $\frac{dy}{dt} = 0$ when t = 0.

   B) If L{F(t)} = f (p), then prove that L {F(at)} = $\frac{1}{a}\mathcal{F}\left(\frac{p}{a}\right)$. **4**

4. Attempt **any two** of the following. **10**

   1) If F (t) is a function of class A and if L {F(t)} = f (p) then prove that

   $L\{t^n F(t)\} = (-1)^n \frac{d^n}{dp^n} f(p)$.

   2) Prove that $L^{-1}\left\{\frac{f(p)}{p^2}\right\} = \int_0^t \int_0^y F(x)dxdy$.

   3) Solve $(D^2 + 9)$ y = cos 2t, if y (0) = 1, y (π/2) = –1.

5. Attempt **any two** of the following. **10**

   1) Show that $L\left\{\frac{\cos\sqrt{t}}{\sqrt{t}}\right\} = \sqrt{\frac{\pi}{p}} e^{-p/4}$.

   2) Find the Laplace transform of H(t) defined as $H(t) = \begin{cases} t+1, & 0 \le t \le 2 \\ 3, & t > 2 \end{cases}$.

   Also determine L {H′ (t)}.

   3) For a > 0 prove that L^{-1} {f(p)} = F(t) implies L^{-1}{f (ap+b)} = $\frac{1}{a} e^{-bt/a} F(t/a)$.

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Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
BOTANY (Paper – VIII) (Old)
Utilization of Plants

Day and Date : Wednesday, 16-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *and labelled diagram* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct answer from the given alternatives : **10**

1) The primary centre of origin of ground-nut (Arachis hypogea) is _____ region.

a) South America b) North Eastern
c) Central Asian d) Mediterranean

2) The botanical name of Red gram (Pigeon Pea) is _____

a) Arachis hypogea b) Cajanus Cajan
c) Cicer arietinum d) Medicago sativa

3) The common name of Cicer arietinum is _____

a) Lucerne b) Sesbania
c) Red gram d) Bengal gram

4) Soybean oil is _____ oil.

a) Semi-drying b) Drying
c) Non-drying d) Essential

5) Coir is obtained from the _____ of coconut fruit.

a) Epicarp b) Mesocarp
c) Endocarp d) None of these

P.T.O.

6) _____ oil is used in the preparation of perfume, insecticide and mosquito repellent.

a) Citronella b) Rose

c) Jasmine d) Lowsonia

7) The botanical name of liquorice is _____

a) Glycyrrhiza glabra

b) Zingiber officinale

c) Rauvolfia serpentine

d) Withania somnifera

8) Botanical name of ginger is _____

a) Tinospora cordifolia

b) Rauvolfia serpentina

c) Aloe vera

d) Zingiber officinale

9) The major source of natural rubber is _____

a) Euphorbia sps. b) Parthenium argetatum

c) Havea braselensis d) Ficus elestica

10) Aster and Celosia are the _____

a) Perennials b) Seasonal

c) Climbers d) Succulents

2. Answer **any five** of the following : **10**

1) What is mean by pulse legumes ?

2) What are textile fibres ?

3) Give use of plants in cosmetics and perfumes.

4) State the botanical name and source of drug of Sarpagandha.

5) What are the plant insecticides ? Give any two environmental advantages of plant insecticides.

6) Give an ornamental value of seasonals.

3. A) Answer **any two** of the following : **6**
   1) Describe in brief the megacentres of diversity of cultivated plants.
   2) State importance of legumes.
   3) Explain Henna as a source of perfumes and cosmetics.

   B) Write on Rauvolfia as a medicinal plant. **4**

4. Answer **any two** of the following : **10**
   1) Give the botanical name, source and economic importance of Sesbania.
   2) Give the botanical name, source and economic importance of Groundnut.
   3) Give the botanical name, source and economic importance of Rose.

5. Answer **any two** of the following : **10**
   1) Give a brief account of drugs obtained from root, state botanical name, chief chemical constituents and medicinal uses.
   2) Give general account of plant insecticides with suitable examples and its advantages.
   3) Give an account of plant rubber source along with the economic importance of rubber.

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SLR-Z – 173

Seat No.	

B.Sc. (Part – II) (Semester – IV) (Old) Examination, 2015
GEOLOGY
Igneous Petrology (Paper – VII)

Day and Date : Thursday, 17-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. State whether following statements are **true** or **false** : **10**

1) Petrography comprises a textural mineralogical and chemical points.

2) Texture is defined as the intimate mutual relation between the grains and the glassy matter.

3) Volcanic neck is an intrusion in an unfolded rock.

4) Dunite is not a volcanic but it is the monominerolic rock of the igneous type.

5) In the Bowen's reaction series _____ is the second crystallised mineral.
   a) amphibole b) mica
   c) pyroxene d) feldspar

6) Sub-ophitic texture is observed in
   a) granite b) basalt
   c) dolerite d) dunite

7) When two components crystallised at a common point, the point is called as
   a) crystallization b) freezing
   c) eutectic d) boiling

8) Which of the following igneous volcanic rock contain highest percentage of silica ?
   a) Basalt b) Rhyolite
   c) Trachyte d) Andesite

P.T.O.

9) Which of the following is the monomineralic rock ?
   a) syenite b) gabbro
   c) anorthite d) peridotite

10) Binary-eutectic gives _____ type of texture.
   a) Granitic b) Ophitic
   c) Graphic d) Glassy

2. Explain **any five** of the following : **10**
   i) Pyrogenetic silicates.
   ii) Nigglis classification.
   iii) Labile and metastable zone.
   iv) Concordant igneous rock body.
   v) Graphic texture.
   vi) Spherulitic structure.

3. A) Answer **any two** of the following : **6**
      i) Sub-ophitic and ophitic texture.
      ii) Saturated rocks.
      iii) Differentiation of magma.
   B) Bowen's reaction series. **4**

4. Answer **any two** of the following : **10**
   i) Describe textures of igneous rock.
   ii) Describe structures of igneous rock.
   iii) Zonal structure.

5. Answer **any two** of the following : **10**
   i) Groups of meteorites.
   ii) Give a brief account of CIPW classification of Igneous rocks.
   iii) Describe the process of assimilation of magma.

_____

SLR-Z – 174

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
MICROBIOLOGY (Paper – VII) (Old)
Immunology and Medical Microbiology

Day and Date : Thursday, 17-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *diagram* ***wherever*** *necessary.*

1. Choose the correct alternative and write the sentence again : **10**

1) Passive immunization include _____
   a) introduction of antibodies b) injecting interferon
   c) injecting vaccine d) injecting killed pathogen

2) Lactoferrin is _____
   a) iron binding protein b) antiviral protein
   c) vaccine d) antifungal drug

3) _____ is end cell that produce antibodies.
   a) cytotoxic T cell b) Plasma cell
   c) Neutrophil d) Mast cell

4) Blood group antigen is example of _____
   a) heterophile antigen
   b) isoantigen
   c) organ specific antigen
   d) specie's specific antigen

5) The clonal selection hypothesis was put forth by _____
   a) Paul Ehrilch b) Robert Koch
   c) Burnet d) Alexander Fleming

6) Dengue fever is spread _____
   a) by bite of mosquito
   b) by consumption of contaminated food
   c) by inhalation of air
   d) by bite of dog

7) Germ tube test helps _____
   a) to differentiate pathogenic staph aureus from non pathogenic staph aureus
   b) to identify candida albicans
   c) to differentiate salmonella species
   d) to diagnose staphylococcal wound infection

8) All the following are examples of serological tests except _____ test.
   a) V.D.R.L. b) Widal c) Germ tube d) ELISA

9) _____ enzymes attack hyaluronic acid.
   a) Streptokinase b) Coagulase
   c) Collagenase d) Hyaluronidase

10) _____ immunoglobulin crosses the placenta.
   a) IgD b) IgM c) IgG d) IgA

2. Define the following terms and give example of it **(any five)** : **10**
   i) Autoantigen.
   ii) Serological test.
   iii) Transport media.
   iv) Lymphoid organ.
   v) Exotoxin.
   vi) Innate immunity.

3. A) Answer the following questions **(any 2)** : **6**
   i) What is vaccination ? Mention different types of vaccines with example.
   ii) Describe the symptoms and causative agents of enteric fever.
   iii) What is phagocytosis ? Describe in short.

   B) Describe the basic structure of monomeric immunoglobulin. **4**

4. Write short notes on **(any 2)** : **10**
   1) B lymphocytes.
   2) Virulence factors of staphylococcus aureus.
   3) Lattice hypothesis.

5. Write short notes on **(any 2)** : **10**
   i) ELISA test.
   ii) Secondary immune response.
   iii) Basic principle of microbial adhesion.

SLR-Z – 176

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
ELECTRONICS (Old) (Paper – VIII)
Fundamentals of Microcontrollers

Day and Date : Friday, 18-12-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** labelled diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) **Use** of calculator is **allowed**.*

1. Select correct alternative from the following : **10**

i) While interfacing IO devices to the microprocessor in IO mapped IO mode _____ control signal is used.

a) IO Read b) Memory Read c) Memory Write d) None of these

ii) Microcontroller 8051 is _____ bit.

a) 16 b) 8 c) 10 d) 32

iii) _____ of microcontroller 8051 need external pull-up resistor.

a) Port 2 b) Port 3 c) Port 0 d) Port 1

iv) Which of the following do not have SFR address ?

a) A b) B c) DPTR d) PSW

v) How many bytes of RAM is reserved for register banks ?

a) 8 b) 16 c) 32 d) 64

vi) Which of the following instruction is not correct ?

a) MOV Rs, 60H b) MOV A, @R_0 c) MOV A, @ R_3 d) MOV A, @ R_1

vii) Which one of the following is a decision making instruction ?

a) LCALL b) DJHZ c) SJMP d) INC

P.T.O.

viii) _____ port of microcontroller 8051 can use as higher order address bus for external access.

a) Port 0 b) Port 1 c) Port 2 d) Port 3

ix) Microprocessor 8085 has _____ flags.

a) 8 b) 5 c) 16 d) 9

x) Operating frequency for microcontroller 8051 is

a) 4 MHz b) 10 MHz c) 3 MHz d) 12 MHz

2. Answer **any five** : **10**

i) Give classification of instruction set of 8051 microcontroller.

ii) Give any four advantages of microcontroller over microprocessor.

iii) List instructions used for branch control operation.

iv) Draw reset circuit for microcontroller 8051.

v) What do you mean by register banks of 8051 microcontroller ?

vi) Mention any four SFR with their function.

3. A) Attempt **any two** : **6**

i) Write a note on timers of 8051 microcontroller.

ii) Explain bus architecture of 8085 μ p.

iii) Write a note on relative addressing.

B) Write a program to demonstrate ON/OFF of the LED. **4**

4. Attempt **any two** : **10**

i) Draw block diagram of microcontroller 8051.

ii) With suitable example explain any two arithmetic instructions.

iii) Write a note on flow chart.

5. Attempt **any two** : **10**

i) Explain with suitable example, Boolean instructions of microcontroller 8051.

ii) Write a program in assembly language program to read status of port – 2 and display the same on LEDs connected to port ⊥

iii) Write a note on port 3 of microcontroller 8051.

_____

SLR-Z – 178

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2015
GEOLOGY (Paper – VIII) (Old)
Sedimentary and Metamorphic Petrology

Day and Date : Friday, 18-12-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct answer from the given options. **10**

1) The composition of dolomite is

a) Carbonate of calcium and magnesium

b) Only calcium

c) Clay and silt

d) Only magnesium

2) The residual deposits are the _____ products of rock weathering.

a) Soluble b) Insoluble

c) Soluble and insoluble d) None of these

3) Rocks consisting chiefly of sandgrade sediments are called _____ deposits.

a) Rudaceous b) Arenaceous

c) Argillaceous d) Calcareous

4) Shales are mainly formed by the welding of _____ particles.

a) Gravel b) Pebble c) Sand d) Clay

5) The rounded sediments indicate

a) Well transportation b) Ill transportation

c) No transportation d) None of these

6) Slate, phyllite, serpentinite represent rocks of _____ facies.
   a) Amphibolite b) Eclogite
   c) Granulite d) Greenschist

7) The process of mineral or rock alteration by the agency of solutions is called
   a) Metasomatism b) Crystallization
   c) Recrystallization d) None of these

8) The chief effect of cataclastic metamorphism on argillaceous rock is the production of
   a) Limestone b) Quartzite c) Marble d) Slate

9) Pyrope garnet and omphacite minerals are characteristic of _____ metamorphic facies.
   a) Greenschist b) Amphibolite c) Eclogite d) Granulite

10) _____ are well developed crystals in metamorphic rocks that are larger than average grain size.
   a) Granoblasts b) Poikiloblasts
   c) Porphyroblasts d) Xenoblasts

2. Answer **any five** of the following. **10**

1) Bauxite
2) Arkose
3) Dolomite
4) Slate
5) Quartzite
6) Granulose structure.

3. A) Answer **any two** of the following. **6**

1) Conglomerate and breccia
2) Argillaceous rocks
3) Eclogite facies.

B) Write note on : **4**

Concept of metamorphic facies.

4. Answer **any two** of the following. **10**

   1) Explain process of sedimentation.

   2) Classification of sediments based on grade size.

   3) Fabrics of strongly foliated metamorphic rocks.

5. Answer **any two** of the following. **10**

   1) Terrestrial environment of deposition.

   2) What is Anatexis ? Explain the factors controlling Anatexis.

   3) Describe Gneisses and Migmatites.

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Seat No.	

B.Sc. – II (Semester – IV) Examination, 2015
MICROBIOLOGY (Old)
Applied Microbiology – II (Paper – VIII)

Day and Date : Friday, 18-12-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by selecting correct answer from given : **10**

1) The minimum capacity of laboratory fermentor is _____ litres.
   a) 5 b) 3 c) 1 d) 10

2) The molasses is a by product of _____ industry.
   a) Sugar b) Textile
   c) Paper and pulp d) Distillery

3) The crowded plate technique is carried out for screening of _____ producers.
   a) Enzyme b) Acid c) Vitamin d) Antibiotic

4) The provision of cooling coils is done to control _____ during fermentation.
   a) aeration b) temperature
   c) foam formation d) pH changes

5) The sporulating cultures of production strains are commonly preserved by _____ technique.
   a) Oil overlay b) Serial subculture
   c) Soil cultures d) Broth cultures

6) In _____ type of fermentation, the fermentation is continued till its completion.
   a) Continuous b) Semicontinuous
   c) Dual d) Batch

7) P. Chrysogenum (Q. 176) strain is used for production of _____
   a) Streptomycin b) Penicillin c) Ampicillin d) Griseofulvin

8) _____ is added as a source of nitrogen for alcohol production.
   a) Ammonium sulphate b) Ammonium citrate
   c) Ammonium chloride d) Ammonium molybdate

9) The industrial production of SCP is done by using _____ as a major raw material.
   a) CSL b) WSL c) Molasses d) Whey

10) The most frequently used chemical mutagen for strain improvement is _____
   a) 5 BU b) Mustard gas
   c) Acridine d) Hydroxylamine

2. Answer **any five** of the following : **10**
   i) What is the scope of industrial microbiology ?
   ii) Write on laboratory scale fermentor.
   iii) What is primary screening ?
   iv) What is surface culture method ?
   v) Write on recycling of wastes.
   vi) Give applications of biofertiliser.

3. A) Answer **any two** of the following : **6**
   i) Write on continuous fermentation.
   ii) Draw a labelled diagram of batch fermentor.
   iii) Give an account of raw materials used in production medium.

   B) Give an account of screening procedures. **4**

4. Answer **any two** of the following : **10**
   i) Describe continuous fermentation.
   ii) Write on strain improvement technique.
   iii) Give an account of production of Azotobacter as biofertiliser.

5. Answer **any two** of the following : **10**
   i) Describe dual and multiple fermentation.
   ii) Describe methods of presentation of industrially important organisms.
   iii) Give an account of biopesticide.

_____

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Seat No.	

B.Sc. III Semester – V Examination, 2015
ENGLISH (Compulsory) (New)
English Skills for Success

Day and Date : Thursday, 29-10-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. A) Rewrite the following sentences by choosing the correct alternatives. **6**

1) The average parson teaches _____ at the village school.
   a) honesty and equality b) loyalty and religion
   c) deference to the rich d) religion and law

2) Shaw believes that a society must be judged by
   a) its average parson b) its few rebels
   c) its journalists and editors d) its millions of obedient subjects

3) The united states was founded on the principle that
   a) all men are equal
   b) white men are superior
   c) it is under God
   d) a govt. is of the people, by the people and for the people

4) The _____ have already consecrated the ground at Gettysburg.
   a) clergy b) founding fathers
   c) common people d) soldiers

5) The value accorded to _____ prevented women from living a free life like male writers.
   a) decency b) humility
   c) anonymity d) chastity

6) Why are there so few writers among women and the working classes ?
   a) their talents are mocked and suppressed
   b) they have no interest in writing
   c) they are illiterate
   d) their talents are more inclined towards scientific discoveries.

B) Choose the appropriate modal in the following : **2**

1) You _____ be frank with your parents.

a) may b) should c) might d) could

2) Hamid _____ climb the tall coconut palm in his field when he was just ten.

a) can b) could c) may d) might

C) Rewrite the following sentences in indirect speech. **2**

1) I said to the men, "You can keep your boxes in the room".

2) "Take the certificates that you left here two days ago", said the principal to the student.

2. Answer the following questions in **two-three** sentences **each**. (**any five**) **10**

1) What does the average parson do ?

2) Why do so many women writers choose to remain anonymous ?

3) What according to Lincoln, would give the nation a new birth of freedom ?

4) How does society erode the talents of women writers ?

5) What according to Shaw, will cure people of sickness ?

6) Why did Lincoln say the task of consecration and dedication was impossible ?

3. A) Answer the following questions in about **fifty** words (**any two**). **6**

1) What did Abou Ben Adhem ask the angel ?

2) Why does the poet ask the captain to rise up ?

3) What request did Abou Ben Adhem make ?

B) Write short reports on **any two** of the following : **4**

1) Making an omlette

2) A scientific experiment

3) Sitar maestro honoured.

4. Answer **any one** of the following questions. **10**

1) Write a group discussion on the topic 'Global Warming'.

2) Write a group discussion on the topic 'Information Technology'.

5. Answer the following question. **10**

Prepare a presentation to promote a new <u>washing machine</u> in the market giving five charts or slides.

_____

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Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
PHYSICS
Special Paper – IX : Mathematical Physics and Statistical Physics

Day and Date :Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Use*** *of logtable or calculator is* ***allowed****.*
iv) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*

1. Select the correct alternative from the following : **10**

i) The average number of electrons in each of the quantum states of a given energy is called the _____

a) electron density b) energy density
c) photon density d) occupation index

ii) Rayleigh Jean's formula agrees well with the experimental results at _____ wavelengths.

a) longer b) shorter c) all d) zero

iii) Stefan's constant σ, planks constant h and boltzmann constant k are related by expression σ = _____

a) $\frac{2\pi^5 h^4}{15 k^2 c^3}$ b) $\frac{2\pi^5 k^4}{15 h^3 c^2}$ c) $\frac{2h^5 c^4}{15\pi^3 k^2}$ d) $\frac{2h^5 k^4}{15\pi^3 c^2}$

iv) Maxwell-Boltzmann law of the most probable distribution of molecules is based on the following conditions for a system _____

a) Total number of molecules is constant
b) Total energy of the assembly is constant
c) a) and b) both
d) Temperature of the system is constant

P.T.O.

v) The collection of large number of essentially dependent systems having the same temperature T, volume V, and the same number of identical particle N is called the _____ ensemble.

a) Microcanonical b) Macrocanonical

c) Canonical d) Grand canonical

vi) For the most probable distribution _____

a) $\ln W = 0$ b) $\delta \ln W = 0$ c) $\log W = 0$ d) $W = 0$

vii) In Cartesian co-ordinate system $h_1 = h_2 = h_3 =$ _____

a) 1 b) 0 c) r d) θ

viii) In orthogonal curvilinear co-ordinate system the co-ordinates h_1, h_2, h_3 are called _____

a) Scale co-ordinates b) Scale functions

c) Scale coefficients d) Scale factors

ix) The average energy of an electron at 0°K is _____

a) $0.6\ u_F$ b) $0.06\ u_F$ c) $6\ u_F$ d) $0.006\ u_F$

x) According to Stroke's theorem $\int_c \vec{A} \cdot \vec{dr} =$ _____

a) $\iint_s \left(\vec{\nabla} \cdot \vec{A}\right) \cdot d\vec{s}$ b) $\iint_s \left(\vec{\nabla} \times \vec{A}\right) \cdot d\vec{s}$

c) $\iint_s \left(\vec{\nabla} \cdot \vec{A}\right) \cdot d\vec{n}$ d) $\iint_s \left(\vec{\nabla} \times \vec{A}\right) \cdot d\vec{n}$

2. Answer **any five** of the following : **10**

i) What is volume integral of vector field ?

ii) What is phase space ?

iii) State Wein's displacement law.

iv) What are the conditions of the particles obeying Fermi-Dirac statistics ?

v) What is Fermi energy ?

vi) Draw the distribution curve for molecular speeds.

3. A) Answer **any two** of the following : **6**

   i) What are thermodynamic functions ? Express enthalpy in terms of the Boltzmann partition function.

   ii) Obtain Green's symmetrical theorem from Gauss divergence theorem.

   iii) What do you mean by a microstate and a macrostate ?

   B) For a given volume V, prove that $\iint \vec{r} \cdot d\vec{s} = 3V$ where r is position vector. **4**

4. Answer **any two** of the following : **10**

   i) Deduce the functional relationship between entropy and probability.

   ii) Explain electronic specific heat.

   iii) Derive expression for most probable speed of gas molecules.

5. Answer **any one** of the following : **10**

   i) Obtain an expression for divergence of a vector field in orthogonal curvilinear co-ordinate system and extend the formula for divergence in cylindrical co-ordinates.

   ii) Derive Bose-Einstein distribution law.

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Seat No.	

B.Sc. III (Semester – V) (New) Examination, 2015
CHEMISTRY (Special Paper – IX)
Physical Chemistry

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Neat diagrams must be drawn ***whenever*** *necessary.*
4) ***Use*** *of logarithmic table/scientific calculator is* ***allowed****.*

1. Choose the most correct alternative from **each** of the following and rewrite the sentence : **10**

1) The reverse of photochemical reaction is called as

a) chemiluminescence b) fluorescence

c) phosphorescence d) photosensitization

2) For a reaction that obeys Einstein law

a) $\phi > 1$ b) $\phi < 1$

c) $\phi = 0$ d) $\phi = 1$

3) Both fluorescent and phosphorescent transitions have _____ frequencies than the exciting light.

a) shorter b) longer

c) both a) and b) d) none of these

4) Simple meaning of eutectic point is easy

a) boiling point b) freezing point

c) melting point d) all of these

P.T.O.

5) Generally the dotted lines in the phase diagram represents

a) meta stable equilibria b) true equilibria

c) stable equilibria d) none of these

6) A positive value for the emf of the cell indicates the cell reaction is

a) spontaneous b) non-spontaneous

c) reversible d) all of these

7) When the temperature coefficient of the cell becomes zero ΔG of the cell reaction is

a) equal to ΔH b) zero

c) equal to ΔS d) none of these

8) Electrode concentration cell can be prepared by using

a) amalgam electrode b) metal-metal ion electrode

c) gas electrode d) both a) and c)

9) The equation $\Delta G = -nE_CF$ represents

a) maximum work b) electrical work

c) free energy d) all of these

10) The cell potential becomes equal to E° when

a) reaction quotient is 1 b) reaction quotient is 10

c) reaction quotient is 100 d) reaction quotient is 1000

2. Answer **any five** of the following : **10**

1) Define :

a) Enantiotropy

b) Transition point.

2) Represent metal-insoluble salt electrode and write the half cell reaction for the same.

3) Define :

a) Congruent melting point

b) Triple point.

4) What are concentration cells ? Mention their types.

5) Define the terms :

a) Electrochemistry

b) Anode.

6) Define :

a) First law of photochemistry

b) Second law of photochemistry.

3. A) Answer **any two** of the following : **6**

1) Write a note on Pattinson's process of desilverisation of lead.

2) What is photochemical equilibrium ? Give one example.

3) Write the electrode reaction for reduction and expression for single electrode potential for the following electrodes.

a) $C\bar{l}_{(aq.)} \left| Cl_{2(g,p)} \right| Pt$

b) $Fe^{++}_{(aq.)}, Fe^{+++}_{(aq.)} \mid Pt$

B) Calculate the emf of the electrode-concentration cell. **4**

$Zn_{C_1}(Hg) \mid Zn^{++}_{aq.} \mid Zn_{C_2}(Hg)$ | at 298 K, if the concentrations of the zinc amalgam are C_1 = 2 gm of zinc per 100 gm of mercury and C_2 = 1 gm of zinc per 100 gm of mercury.

4. Answer **any two** of the following : **10**

1) State Gibb's phase rule. Explain the terms involved in it.

2) Derive an expression for emf of chemical cells without transference.

3) What are photosensitized reactions ? Explain with suitable examples.

5. Answer **any two** of the following : **10**

   1) Write a note on Reversible and Irreversible cells.

   2) A certain system absorbs 3×10^{18} quanta of radiation per second. On irradiation for 10 minutes 3×10^{-3} mole of the reactant was found to have reacted. Calculate the quantum yield.

   3) Calculate the equilibrium constant for the reaction

      $Cu_{(s)} + 2Ag^{+}_{(aq.)} \longrightarrow Cu^{++}_{(aq.)} + 2Ag_{(s)}$ at 298 K.

      (Given : $E°_{Cu} = 0.337$ volt, $E°_{Ag} = 0.771$ volt)

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Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
BOTANY (Special Paper – IX) (New)
Biology of Cryptogams

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct answer from the given alternatives. **10**

i) Formation of secondary protonema is the mean of _____ propagation of *Chara*.
a) asexual b) sexual c) vegetative d) none of these

ii) The sporophyte of *Ectocarpus* produces _____ sporangia.
a) unilocular b) plurilocular c) tetra locular d) both a and b

iii The fruiting body of *Uncinula* is known as
a) apothecium b) cleistothecium
c) perithecium d) basidiocarp

iv) *Polyporus sp*. causes _____ disease in timber yielding plants.
a) blight b) powdery mildew
c) downy mildew d) wood rot

v) Gemmae bodies are formed in
a) *Anthoceros* b) *Marchantia* c) *Riccia* d) All the above

vi) _____ fungi are called as Mushrooms.
a) Gilled b) Saprophytic c) Edible d) All the above

vii) According to theory of progressive sterilization of fertile cells, the sporophyte of _____ is considered as the most evolved one.
a) *Funaria* b) *Anthoceros* c) *Marchantia* d) *Riccia*

P.T.O.

viii) Amphiphloic siphonostele is formed in _____ stem.

a) *Psilotum* b) *Marsilea* c) *Selaginella* d) All the above

ix) Oogamous type sexual reproduction is observed in

a) *Spirogyra* b) *Oedogonium* c) *Chara* d) *All the above*

x) Diplontic life cycle in algae is dominated by _____ generation.

a) haploid b) tetraploid c) diploid d) triploid

2. Answer **any five** of the followings : **(2×5=10)**

i) Name any four filamentous forms of algae.

ii) Define epiphytic forms of algae.

iii) Classify *Ectocarpus* giving reasons.

iv) Define life cycle.

v) What are phytoplanktons ?

vi) Give the economic importance of mushrooms.

3. A) Answer **any two** of the followings. **(2×3=6)**

i) Describe the thallus structure of *Chara*.

ii) Describe the diplohaplontic life cycle in algae.

iii) Give an account of vegetative reproduction in fungi.

B) Describe the structure of basidiocarp of *Polyporus*. **4**

4. Answer **any two** of the following : **(2×5=10)**

i) Describe the sporophyte of *Marchantia*.

ii) Describe the structure of sporophyte of *Ectocarpus*.

iii) Describe the structure of sporocarp of *Marsilea*.

5. Answer **any two** of the following : **(2×5=10)**

i) Describe the structure of sori and sporangia in pteridophyte.

ii) Describe the sex organs of *Chara*.

iii) Add a note on the sexual reproduction in *Uncinula*.

_____

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Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
ZOOLOGY
(Special Paper – IX) (New)
Non-chordates

Day and Date : Thursday, 5-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Select appropriate answer from **each** of the following and rewrite the sentences. **10**

1) _____ type of canal system found in Leucosolenia.
a) Sycon b) Leucon c) Rhagon d) Ascon

2) Molozoic type of nutrition found in _____
a) Euglena b) amoeba c) paramecium d) entamoeba

3) The sea water lying in between Island and coral reef is called as _____
a) atoll b) coral c) lagoon d) ice cap

4) In Leech posterior sucker is formed by the fusion of _____ segments.
a) 10 b) 16 c) 7 d) 33

5) _____ is a good example of living fossil.
a) Limulus b) Lingula c) Peripatus d) Sagitta

6) Sea star has great power of _____
a) morphogenesis b) haemolysis c) histolysis d) regeneration

7) In Leech its saliva contains _____ anticoagulant substance.
a) heparin b) hirudin c) histamine d) Na. citrate

8) _____ is respiratory organs in sea-star.
   a) Tube feet b) Madriporite c) Gills d) Pollian vesicles

9) In Lingula, _____ shell is slightly larger in size.
   a) ventral b) dorsal c) lateral d) anterior

10) Polymorphism occurs in _____
   a) Coelenterata b) Echinodermata
   c) Hemichordata d) Mollusca

2. Answer **any five** of the following **:** **10**

i) Oligopod larva.

ii) Describe binary fission in Paramecium.

iii) Cyclosis in Paramecium.

iv) Segmentation in Leech.

v) Draw course of water current in Sycon.

vi) Mysis larva.

3. A) Answer **any two** of the following **:** **6**

i) Describe structure and functions of tube foot in sea star.

ii) Describe salient features of Lingula.

iii) Describe complete (holometabolous) metamorphosis in insects.

B) Describe parasitic adaptations in Leech. **4**

4. Answer **any two** of the following **:** **10**

i) Describe significance of Limulus.

ii) Describe structure of testicular nephridium of Leech.

iii) Describe polymorphism in Physalia.

5. Answer **any one** of the following **:** **10**

i) Describe salient features and affinities of Ctenophora.

ii) Describe digestive system of Leech.

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SLR-Z – 185

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MATHEMATICS (New) (Special Paper – IX)
Algebra – II

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative of the following : **10**

1) The number of zero divisors in Z_{16} is _____
   a) 8 b) 4 c) 15 d) 7

2) Which ring of the following is not an integral domain ?
   a) $(I, +, \cdot)$ b) $(Q, +, \cdot)$ c) $(R, +, \cdot)$ d) $(N, +, \cdot)$

3) The characteristic of the ring $Z_3 \times 3Z$ is _____
   a) 0 b) 2 c) 9 d) 6

4) S is subring of R if $S \subseteq R$ and _____
   a) $a, b \in S \Rightarrow a + b \in S$ and $ab \in S$
   b) $a, b \in S \Rightarrow a - b \in S$ and $ab \in S$
   c) Both a) and b) are correct
   d) None of these

5) Let V be a vector space and let $S_1 \subseteq S_2 \subseteq V$ and p) s_1 is linearly dependent q) S_2 is linearly dependent then
   a) $p \Rightarrow q$ b) $q \Rightarrow p$
   c) $p \Leftrightarrow q$ d) None of these

6) The vector space $M_{n \times n(F)}$ has dimension _____
   a) 0 b) n^2 c) n d) Infinite

P.T.O.

7) Consider the mapping $T : R^3 \to R$ such that $T(x, y, z) = x^2 + y^2 + z^2$ then T is

a) Linear transformation

b) Nonlinear transformation

c) One-one and onto linear transformation

d) None of these

8) $T : P_1(R) \to R^2$ is linear transformation defined by $T(a + bx) = (a, a + b)$ then $[T]_{\beta}^{\alpha}$

a) $\begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ d) None of these

9) Let V be an inner product space over F then for all $X \in V$ and $C \in F$, $||CX||$= _____

a) $|C| \cdot \|X\|$ b) $\|C\|\|X\|$ c) $C\|X\|$ d) $|C|X$

10) If $u = \left(\frac{1}{2}, -\frac{1}{4}, \frac{1}{3}, \frac{1}{6} \right) \in R^4$ then $||u||$= _____

a) $\frac{65}{12}$ b) $\frac{12}{65}$ c) $\frac{\sqrt{65}}{12}$ d) $\frac{\sqrt{66}}{12}$

2. Solve **any five** : **10**

1) Define left ideal, right ideal and ideal.

2) Define Quotient ring.

3) If $T : V_3 \to V_2$ defined by rule transformation of $T(x_1, x_2, x_3) = (x_1 - x_2, x_1 + x_3)$ show that T is linear.

4) Let V be an inner product space then $x, y, z \in V$ then show that

$\langle x; y + z \rangle = \langle x, y \rangle + \langle x, z \rangle$

5) In vector space $0 \cdot x = 0$ for each $x \in V$.

6) Let $V = R^3$ show that W is sub space of V where W = {a, b, c : (a + b + c) = 0}.

3. A) Attempt **any two** : **6**

   1) Show that intersection of two left ideals of R is left ideal of R.

   2) Let $\{v_1 v_2 v_3 \ldots . vk\}$ be an orthogonal set in v and let $a_1 a_2 \ldots a_k$ be scalars

      prove that $\left\| \sum_{i=1}^{K} a_i v_i \right\|^2 = \sum_{i=1}^{K} |a_i|^2 \| v_i \|^2$.

   3) Let $T : R^2 \to R$ be linear map defined by T(7, 1) = 3, T(0, 1) = – 2 find T(a, b).

   B) Show that every field is an integral domain. **4**

4. Attempt **any two** : **10**

   1) Let V be an inner product space over F then prove that for all

      $x, y \in V \quad |\langle x, y \rangle| \leq \|x\| \cdot \|y\|$.

   2) Determine whether the following sets are linearly dependent or linearly independent {(1, – 1, 2) (1, – 2, 1) (1, 1, 4)}.

   3) Let $T : R^3 \to R^3$ be linear transformation given by

      T(x, y, z) = (2x – y + z, x + y, 3x + y + z) find T^{-1}

5. Attempt **any one** : **10**

   1) Let V and W be Vector space and Let $T : V \to W$ be linear. If V is finite dimensional then show that nullity (T) + rank(T) = dimV.

   2) Show that the set of members of $a + b\sqrt{2}$ with a, b as rational number is a field.

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Seat No.	

B.Sc. III (Semester – V) Examination 2015
STATISTICS (Special Paper – IX)
Statistical Inference – I (New)

Day and Date : Thursday, 5-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory*** *and carry* ***equal*** *marks.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative. **10**

i) An estimator which converges to a parameter Θ in probability as the sample size tends to infinity is said to be

a) Sufficient estimator b) Efficient estimator
c) Consistent estimator d) Unbiased estimator

ii) If X is a single observation from a $N(0, \sigma^2)$ then the sufficient statistic for σ^2 is

a) $|X|$ b) X c) X^2 d) None of these

iii) For a random sample $X_1, X_2 \cdots X_n$ from $N(\mu, \sigma^2)$, the MLE for σ^2 is when μ is known

a) $\frac{1}{n}\sum(X_i - \bar{X})^2$ b) $\frac{1}{n-1}\sum(X_i - \bar{X})^2$

c) $\frac{1}{n}\sum(X_i - \mu)^2$ d) $\frac{1}{n-1}\sum(X_i - \mu)^2$

iv) If the expected value of an estimator T_n is equal to the value of the parameter Θ, T_n is said to be

a) biased estimator of Θ b) sufficient estimator of Θ
c) unbiased estimator of Θ d) none of these

v) An estimator T is said to be more efficient than any other estimator T' for a parameter Θ, if

a) Var (T) < Var (T') b) Var (T) > Var (T')
c) Both (a) and (b) d) none of these

P.T.O.

vi) An estimator T_n is said to be sufficient for Θ if it contains all the information which is contained in the

a) population b) parameter c) sample d) none of these

vii) A sample constant representing a population parameter is known as

a) estimate b) estimator c) statistic d) none of these

viii) The estimator $\sum x/n$ of population mean is

a) An unbiased estimator b) Biased estimator

c) A consistent estimator d) Both (a) and (c)

ix) The maximum likelihood estimators are necessarily

a) unbiased b) sufficient c) most efficient d) none of these

x) Regularity conditions of Cramer-Rao inequality are related to

a) integrability of functions b) differentiability of functions

c) both (a) and (b) d) neither (a) nor (b)

2. Answer **any five** of the following : **10**

i) If T is an unbiased estimator of Θ show that T^2 is not unbiased estimator of Θ^2.

ii) Define minimum variance unbiased estimator (MVUE).

iii) Obtain likelihood function of a random sample $X_1, X_2 \cdots X_n$ from Poisson distribution with parameter Θ.

iv) Show that sample standard deviation is always a biased estimator of the population standard deviation.

v) Let $X_1, X_2 \cdots X_n$ from $N(\mu, \sigma^2)$,find the relative efficiency of $T = \frac{3X_1 + X_2 + 2X_3}{\sigma}$ with respect to $\bar{X}$.

vi) State Neyman-factorization theorem.

3. A) Attempt **any two** of the following. **6**

i) Prove that uniformly minimum variance unbiased estimator is unique.

ii) Show that if T is a consistent estimator of Θ, then T^2 is a consistent estimator of Θ^2.

iii) Obtain the maximum likelihood estimate of Θ for the distribution having probability function

$$f(x, \Theta) = \frac{1}{2} e^{-|x-\Theta|} \quad \begin{matrix} -\infty < x < \infty \\ -\infty < \Theta < \infty \end{matrix}$$

B) If L is the likelihood function of a random sample $X_1, X_2 \cdots X_n$ from $f(x, \Theta)$,

show that $E\left(\frac{\partial \log L}{\partial \Theta}\right)^2 = -E\left(\frac{\partial^2 \log L}{\partial \Theta^2}\right)$ **4**

4. Answer **any two**. **10**

i) Let X_1, X_2 be random sample from Poisson distribution with parameter λ, then prove that $X_1 + X_2$ is sufficient statistic for λ.

ii) Show that there exist infinite number of unbiased estimators of the parameter Θ

iii) If $X_1, X_2 \cdots X_n$ is a random sample from $N(\mu, \sigma^2)$ distribution and if $T = \frac{1}{n}\sum_{1=1}^{n} |X_i - \mu|$.

Show that $T\sqrt{\frac{\pi}{2}}$ is an unbiased estimator of σ^2.

5. Attempt **any two**. **10**

i) If T is minimum variance unbiased estimator for $\gamma(\Theta)$ then prove that T is sufficient for Θ.

ii) By the method of moments, estimate α and β for the following distribution

$$f(x;\alpha,\beta) = \frac{\beta^\alpha}{\Gamma\alpha} x\, e^{-\beta x}\, x^{\alpha-1} \quad \begin{matrix} 0 < x < \infty \\ \alpha, \beta > 0 \end{matrix}$$

iii) A random sample $(X_1, X_2 \cdots X_5)$ is drawn from a normal population with unknown mean μ and known variance σ^2. The following are estimators of μ.

i) $T_1 = (X_1 + X_2 + X_3 + X_4 + X_5)/5$

ii) $T_2 = \frac{X_1 + X_2}{2} + X_3$

iii) $T_3 = (2X_1 + X_2 + \lambda X_3)/3$

Find λ where T_3 is unbiased estimator of μ.

Are T_1 and T_2 unbiased ?

State the estimator which is best among T_1, T_2 and T_3.

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B.Sc. III, (Semester – V) Examination, 2015
GEOLOGY (Special Paper – IX) (New)
Earth's Physics and Dynamics

Day and Date :Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions** : 1) **All** questions are **compulsory.
*2) Figures to the right indicate **full** marks.*
*3) Draw **neat** labelled daigrams **wherever** necessary.*

1. Fill in the blanks with correct answer from given options. **10**

1) Age of seafloor is _____ towords continental borders from mid-oceanic ridges.
   a) increasing b) decreasing
   c) same d) remains constant

2) Satpura Mountain is an example of _____ mountain.
   a) fold b) fault block c) volcanic d) residual

3) Mid-Atlantic oceanic ridge is an example of _____ plate boundary.
   a) transform fault b) convergent c) divergent d) passive

4) The Tethys sea was located between
   a) Eurasia and North America b) Antarctica and South India
   c) Africa and Antarctica d) Eurasia and Africa

5) The magnetic normals and reversals are well documented in the rocks flanking the
   a) mid -Ocean ridges b) transform faults
   c) oceanic trenches d) dip-slip faults

6) _____ postulated his hypothesis of isostasy considering the uniform density of the outer crust.
   a) Pratt b) Airy c) Heiskanen d) Hess

7) _____ refers to the origin of the continents.
   a) Isostasy b) Orogenesis
   c) Epeirogenesis d) Erosiogenesis

8) _____ means all land masses.
   a) Gondwana b) Tethys c) Pangaea d) Eurasia

9) _____ land comprises, Africa, South America, India, Australia and Antarctica
   a) Gondwana b) Laurasia c) Panthalassa d) None of these

10) Which one of the following plates is larger plate ?
   a) China plate b) Arabian plate c) Cocoas plate d) Indian plate

2. Answer **any five** of the following : **10**
   i) Define the mountain.
   ii) What are two types of plate boundaries ?
   iii) What are types of orogenic forces ?
   iv) Define subduction zone.
   v) Define triple junction.
   vi) What is asthenosphere ?

3. A) Answer **any two** of the following : **6**
   i) What are the characters of plate ?
   ii) What is level of compensation ?
   iii) Describe palaeo-climatic evidences of continental drift.

   B) Write answer of **any one**. **4**
   i) Explain mechanism of plate motion.
   ii) Describe supporting evidences for continental drift.

4. Answer **any two** of the following : **10**
   i) Describe hot plumes.
   ii) Explain crustal movements.
   iii) Explain concept of plate tectonics.

5. Answer **any two** of the following : **10**
   i) Describe convergent plate boundaries.
   ii) Distinguish between plate margin and plate boundary.
   iii) Explain causes of sea floor spreading.

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B.Sc. III (Semester – V) Examination, 2015
MICROBIOLOGY(Special Paper – IX) (New)
Virology, Extremophiles and Bioinformatics

Day and Date :Thursday, 5-11-2015. Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions** : 1) **All** questions are **compulsory.
2) Figures to right indicate full marks.

1. A) Rewrite the sentences after choosing correct answer from the given alternatives. **10**

1) *Vibrio cholera* is _____ organism.

a) Acidophilic b) Alkophilic c) Neutral d) Psychrophilic

2) LHT system of viral classification grouped RNA viruses into _____ class.

a) Retroviruses b) Retroviridae c) Ribovira d) Deoxyvira

3) In the term NCBI the letter "B stands for

a) Biochemical b) Biological c) Bioinformatics d) Biotechnology

4) One step Growth Experiment was deviced by

a) Watson b) Crick

c) Lederberg d) Ellis and Delbruck

5) Polystyrene latex is used for enumeration of viruses in sample by

a) Pock method b) Direct microscopic count

c) Acid end point method d) Hemagglutation assay

6) The naturally occurring alkaline environment on earth is

a) Hot spring b) Deep ocean c) Soda lake d) Deep wells

7) _____ lambda phage gene is responsible for the lysogenic state.

a) Q c) A c) R d) C1

P.T.O.

8) _____ is used to find out queried sequences from different databases of proteins, DNA, RNA etc.

a) Rediff b) BLAST c) Google d) Yahoo

9) λ Phage is an example of _____ phage.

a) Virulent b) Temperate c) Nonvirulent d) Icosahedral

10) Hemagglutination assay is suitable for enumeration of _____viruses.

a) Enveloped b) Naked c) Complex d) All

2. Answer **any five** of the following. **10**

i) What is prophage ?

ii) Define bioinformatics

iii) Define Oncogenesis

iv) Explain Eclipse period

v) Explain Halophilic organisms

vi) What is NCBI ?

vii) What is latent period ?

3. A) Answer **any two** of the following. **6**

a) Describe briefly thermophlilic micro-organisms

b) Discuss briefly intracellular development of Influenza virus .

c) Briefly explain Acid End point method

B) Discuss briefly purification of viruses by Ultrafiltration. **4**

4. Answer **any two** of the following. **10**

i) Explain in detail lytic cycle of T4 phage.

ii) Discuss the LHT system of viral classification .

iii) Give the detailed account of Bacteriophage cultivation.

5. Write in short on **any two** of the following. **10**

i) Explain in detail cultivation of animal viruses

ii) Give the detailed account Adeno virus multiplication

iii) Describe briefly types of oncogenic viruses.

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Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
ELECTRONICS (Special Paper – IX) (New)
Linear Integrated Circuits and Applications

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
4) ***Use*** *of log-table and calculator is* ***allowed****.*

1. Select the correct alternative for the following : **10**

i) In epitaxial process _____ is used as silicon source.
   a) $SiCl_4$ b) SiO_2
   c) Elemental Si d) None

ii) In second order filter, gain decreases at the rate of _____ dB/decade.
   a) 6 b) 10
   c) 20 d) 40

iii) When PLL is locked the VCO frequency is _____ input frequency.
   a) Less than b) Equal to
   c) Greater than d) Greater than or equal to

iv) IC 79XX is _____ voltage regulator series.
   a) Positive b) Negative
   c) Adjustable d) None

v) IC _____ is a phase locked loop.
   a) 565 b) LF 198
   c) 556 d) LF 356

vi) _____ filter is also known as notch filter.
   a) Low-pass b) High-pass
   c) Narrow band-pass d) Narrow band-reject

P.T.O.

vii) In IC regulator _____ is used to increase the current capacity of the regulator.

a) Reference voltage source

b) Pass transistor

c) Error amplifier

d) None

viii) For proper operation of voltage regulator input voltage must be _____ output voltage.

a) Less than b) Equal to

c) Greater than d) None

ix) The peak detector is generally used to detect the _____ peak values of non-sinusoidal waveforms.

a) Negative b) Positive

c) Average d) Constant

x) _____ can be used to have direct dB display on digital voltmeter and spectrum analyser.

a) Log-amplifier b) Antilog-amplifier

c) S/H circuit d) Precision rectifier

2. Answer **any five** from the following (**2** marks **each**) : **10**

i) Give the advantages of integrated circuits.

ii) What are the three stages through which PLL operates ?

iii) Give the classification of filters with their frequency response.

iv) What is the purpose of having input and output capacitors in three terminal IC regulators ?

v) In second order low-pass filter, $R_1 = R_2 = 1\ k\Omega$ and $C_1 = C_2 = 0.1\ \mu f$. Calculate the cut-off frequency.

vi) Define lock range and capture range in PLL.

3. A) Answer **any two** (**3** marks **each**) : **6**

   i) Draw the block diagram of PLL. What is the function of phase detector ?

   ii) Explain peak clamper circuit using Op-Amp and draw I/P-O/P waveforms.

   iii) Explain variable voltage regulator using IC LM 317.

   B) Draw the circuit of active peak detector and explain its operation with I/P-O/P waveforms. **4**

4. Answer **any two** (**5** marks **each**) : **10**

   i) Draw and explain the operation of sample-and-Hold circuit.

   ii) Explain second order high-pass filter.

   iii) Draw and explain F to V converter using LM 331.

5. Answer **any one** : **10**

   i) What is integrated circuit ? Explain how electronic circuit consisting of different components can be constructed in a monolithic IC.

   ii) Explain the use of PLL as

   a) Frequency multiplier and

   b) FSK demodulator.

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Seat No.	

B.Sc. (Part – III) (Semester – V) (New) Examination, 2015
Special Paper – IX : VISUAL PROGRAMMING
Computer Science

Day and Date : Thursday, 5-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative : **10**

1) Value constants assigned to variables are
   a) Identifiers b) Keywords
   c) Punctuators d) Literals

2) An _____ can contain one or more method, properties, indexes and events.
   a) Abstract b) Interface
   c) Virtual d) Override

3) Which of the following feature is missing from C# ?
   a) Versioning b) Web services
   c) Pointers d) Automatic garbage collection

4) The code designed to work on the data is known as _____ in C#.
   a) Object b) Function
   c) Method d) Class

5) The ? operator is known as _____ operator.
   a) Conditional operator b) Branching operator
   c) Relational operator d) Arithmetic operator

6) By default class members are
   a) Public b) Private c) Protected d) None

7) If we do not catch the exception thrown at runtime then which of the following will catch it _____
   a) Compiler b) CLR c) Linker d) Loader

P.T.O.

8) An _____ is a name assigned to variable, method or other user defined item.
   a) Class b) Identifier
   c) Variable name d) Method name

9) An _____ is a collection of variables of the same type, are referred to by a common name.
   a) class b) structure
   c) array d) both (b) and (c)

10) The static method called through its _____
   a) Object name b) Instance name
   c) Class name d) All of these

2. Answer the following (**any 5**) : **10**
   1) Explain Enumeration.
   2) Discuss about polymorphism with example.
   3) Explain Thread priorities in detail.
   4) Explain CLR.
   5) Explain Thread synchronization.
   6) Define indexer and properties.

3. a) Solve **any two** : **6**
   1) What is Exception ? Write C# Program to implement user defined Exception.
   2) What is method overloading ? Explain with example.
   3) What are boxing and unboxing ?

   b) What is Operator Overloading ? Write program to overload operator +. **4**

4. Solve **any two** : **10**
   1) Write a C# program to implement DivideByZero Exception.
   2) What is the use of StreamReader and StreamWriter ? Explain with example.
   3) What is abstract method ? Explain with example.

5. Solve **any two** : **10**
   1) Explain in detail about various operator available in C#.
   2) What is the use of Monitor class in thread ? Explain with suitable example.
   3) What is interface ? Explain with suitable example.

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Seat No.	

B.Sc. III (Semester – V) (New) Examination, 2015
PHYSICS
Solid State Physics (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) Draw a neat labelled diagram ***wherever*** *necessary.*
4) Use of log table and calculator is ***allowed****.*

1. Select the correct answer from given alternatives : **10**

I) The relation of length of axes of unit cell in monoclinic crystal system is

a) $a = b = c$ b) $a \neq b \neq c$

c) $a = b \neq c$ d) $a \neq b = c$

II) The relation between atomic radius 'r' and lattice constant 'a' in the case of simple cubic structure is

a) $a = 2r$ b) $a = r/2$

c) $a = 4/\sqrt{3}\, r$ d) $a = 2\sqrt{2}\, r$

III) The Miller indices of the plane parallel to the X axis and Y-axis are

a) (100) b) (001)

c) (010) d) (111)

IV) In an insulator forbidden energy gap is of the order of

a) 1 MeV b) 0.1 MeV

c) 0.5 eV d) 5 eV

V) The free electron theory could not explain the _____ properties.

a) electrical and thermal conductivity of metals

b) thermal conductivity of non metals

c) ferromagnetism

d) Ohm's law

P.T.O.

VI) The temperature below which superconductivity is exhibited is called as
a) Critical temperature b) Critical field
c) Neel temperature d) Curie temperature

VII) Super conductor is also called as a
a) bad conductor b) hole conductor
c) perfect conductor d) phonon

VIII) Metals below transition temperature in superconducting state behaves like _____ substance.
a) paramagnetic b) antiferromagnetic
c) diamagnetic d) ferromagnetic

IX) In a material domain or dipole is
a) a particle like electron
b) an empty space
c) a particle like photon
d) a small region having resultant magnetic moment

X) The susceptibility of diamagnetism is
a) positive b) negative
c) neutral d) sometimes positive

2. Solve **any five** of the following : **10**
1) Define packing factor.
2) What is superconductivity ?
3) What are the drawbacks of classical free electron theory ?
4) What are ferromagnetic domains ?
5) Draw NaCl crystal structure.
6) Why semiconductors are insulators at absolute zero temperature ?

3. A) Solve **any two** of the following : **6**
1) State and explain Meissner effect in superconductivity.
2) Write the Fermi-Dirac distribution function. Plot it as a function of energy.
3) Obtain an expression for interplanar spacing in simple cubic crystal system.

B) For certain BCC crystal, the (110) planes have separation of 1.181A°. These (110) planes are irradiated with X-rays of wavelength 1.54A°. How many orders of Bragg reflections can be observed ? **4**

4. Solve **any two** of the following : **10**

   1) Write a note on ferromagnetic materials. Give their examples.

   2) Explain HCP structure in details.

   3) Explain Sommerfield's free electron theory.

5. Solve **any one** of the following : **10**

   1) Describe free electron gas model of the metal and derive the expression for electrical conductivity (σ) and thermal conductivity (k).

   2. Describe Debye – Scherrer (powder) method for determination of crystal structure.

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Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
CHEMISTRY
Special Paper – X : Inorganic Chemistry

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) Draw ***neat*** *labeled diagram and give equations* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the most correct alternative for the following and rewrite the sentences. **10**

1) Jahn-Tellar distortion, in non-linear molecule result in _____
   a) lower in energy b) lower the symmetry
   c) remove the degeneracy d) all of these

2) Increase in CFSE in octahedral complex _____ the stability of complex.
   a) increases b) decreases
   c) remain same d) some time changes

3) The magnetic property of $[Co(NH_3)_6]^{3+}$ is diamagnetic according to CFT and _____ according to MOT.
   a) diamagnetic b) paramagnetic
   c) high spin d) nonmagnetic

4) The radiant energy from sun is due to _____
   a) chemical reaction b) nuclear fusion
   c) nuclear fission d) artificial transmutation

5) Atomic bomb works on the principle of _____
   a) chain reaction b) natural radioactivity
   c) uncontrolled chain reaction d) nuclear fusion

P.T.O.

6) Metalloporphyrines are complexes between _____

a) metal and nonmetal
b) metals and porphyrines
c) ligand and porphyrines
d) haemoglobin and myoglobin

7) The formation of chain of _____ atoms is called catenation.

a) organic
b) carbon and oxygen
c) same
d) hetero

8) Thermal stability of inorganic polymers is due to _____ bonding.

a) strong
b) coordinate
c) ionic
d) hydrogen

9) The change in the size of metallic and semiconducting materials to nanoscale result into change in _____ properties.

a) electrical and structural
b) electrical and optical
c) structural and optical
d) electrical, structural and optical

10) The Haemoglobin and myoglobin are the _____

a) proteins
b) carbohydrates
c) lipids
d) molecular compounds

2. Answer **any five** of the following : **10**

i) In octahedral field crystal field splitting energy Δ_o is always higher than tetrahedral field splitting energy Δ_t, that is $\Delta_o > \Delta_t$. Give reason.

ii) Give the similarities in CFT and MOT.

iii) Distinguish between Nuclear reactions and chemical reaction.

iv) Explain the function of haemoglobin.

v) Why Inorganic polymers are called special polymers ?

vi) Give the applications of nanoparticals in Industry and as medicine.

3. A) Answer **any two** of the following : **6**

   i) Give the brief account of crystal field stabilizing energy.

   ii) Write note on : Oxygen binding curve.

   iii) Give the classification of polymers.

   B) What is mean by Radioactivity ? Explain artificial Radioactivity. **4**

4. Answer **any two** of the following : **10**

   i) With the help of molecular orbital diagram explain magnetic properties of $[Ni(NH_3)_6]^{2+}$.

   ii) What are the different applications of tracer technique ? How this technique is useful for determination of structure of PCl_5 ?

   iii) Which elements are essential for biological processes ? Explain the role of calcium in biological processes.

5. Answer **any two** of the following : **10**

   i) Discuss the crystal field splitting of d orbitals in tetrahedral complex with suitable example.

   ii) What is nuclear energy ? How nuclear energy is generated from U-235 ?

   iii) What are phosphonitrilic polymers ? Discuss their preparation properties and uses.

SLR-Z – 193

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
BOTANY (Special Paper – X) (New)
Gymnosperms and Palaeobotany

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) ***All*** *questions carry* ***equal*** *marks.*
iii) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
iv) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences choosing the correct alternative. **(1×10=10)**

1) The species of Zamia are _____
   a) Monoecious b) Dioecious
   c) Monosporic d) Herbaceous

2) The leaves of Zamia are _____
   a) Unipinnately compound
   b) Bipinnately compound
   c) Tripinnately compound
   d) Needle like

3) Because of only _____ Gnetum is a gymnosperm.
   a) Pollination by wind
   b) Orthotropous ovule
   c) Polyembryony
   d) Naked seeds

4) T. S. of young stem of Gnetum shows a ring of conjoint, collateral and _____ vascular bundles.
   a) Exarch b) Endarch
   c) Mesarch d) None of these

P.T.O.

5) Jurassic period is included under _____ era.
   a) Precambrian
   b) Paleozoic
   c) Mesozoic
   d) Cenozoic

6) Cenozoic is divided into tertiary and _____ period.
   a) Cambrian b) Permian
   c) Quaternary d) Devonian

7) Enigmocarpon belongs to _____ period.
   a) Triassic b) Cretaceous
   c) Tertiary d) Quaternary

8) The flower of Cycadeoidea dacotensis is _____
   a) Unisexual
   b) Bisexual
   c) Polygamous
   d) Both a) and b)

9) Enigmocarpon fossil fruit shows _____ placentation.
   a) Axile b) Marginal
   c) Basal d) Parietal

10) According to Mahabale and Deshpande (1957) Enigmocarpon belongs to family _____
   a) Lythraceae b) Myrtaceae
   c) Sonnertiaceae d) Enigmocarpaceae

2. Answer **any five** of the following : **10**

1) Enlist Indian species of Gnetum.
2) Sketch and label Palaeostachys.
3) Any two sub-genera of Calamites plant.
4) Give systematic position of Zamia.
5) Geographical distribution of Gnetum.
6) Any two groups or periods of precambrian.

3. A) Answer **any two** of the following : **6**

   1) Describe petrification.

   2) Sketch, label and describe the T. S. of Zamia rachis.

   3) Economic importance of Gnetum.

   B) Describe the structure of male cone of Zamia. **4**

4. Answer **any two** of the following : **10**

   1) What is fossilization ? Describe the process of fossilization.

   2) Sketch label and describe the anatomy of cycadeoidea stem.

   3) Describe the role of palynology in oil exploration.

5. Answer **any two** of the following : **10**

   1) Write the classification of Calamites and describe Calamostachys.

   2) Describe the origin of coal and geological period of coal formation.

   3) Sketch, label and describe the T. S. of Lyginopteris oldhamia.

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Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
ZOOLOGY (Special Paper – X) (New)
Biostatistics, Bioinformatics, Medical Zoology and Evolutionary Genetics

Day and Date : Friday, 6-11-2015 Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) ***Draw*** *neat labeled diagrams* ***wherever*** *necessary.*

3) Figures to ***right*** *indicate* ***full*** *marks.*

1. Complete the sentence selecting appropriate answer : **10**

1) _____ is not related with the measurement of central tendency.

a) Mean b) Mode

c) Standard deviation d) Median

2) Ctrl + A is a command used for _____ the file in Bioinformatics.

a) to select all b) to delete all

c) to copy all d) to create all

3) _____ is defined as systematic arrangement of data in rows and sentences.

a) Co-relation b) Frequency distribution

c) Histogram d) Tabulation

4) CPU is _____ device of bioinformatics.

a) Storage b) Print

c) Input d) Output

P.T.O.

5) In the perfect positive co-ordination the value of r is

a) – 1 b) 0

c) 0.5 d) + 1

6) The larval stage of mosquito is _____

a) Aquatic b) Parasitic

c) Aerial d) Terrestrial

7) The use of statistics in life science is called _____

a) Biostatistics b) Numerical biology

c) Biomeasurement d) Bioinformatics

8) Pen drive is _____ device in computer.

a) Output b) Input

c) Print d) Corrupt

9) Profuse salivation in dog bite man is due to _____

a) Poliovirus b) H_1V_1 virus

c) Rabies d) Antivirus

10) The pathogenic agent _____ is responsible for the disease Tuberculosis (TB).

a) Poliovirus b) Bacterium

c) Plasmodium d) Fungi

2. Write short notes on following (**any five**) : **10**

i) Hydrophobia

ii) BLAST

iii) Migration –a natural selection

iv) Mode

v) Standard error

vi) Importance of Bioinformatics.

3. A) Answer **any two** of the following : **6**

   i) Explain the disease Elephantiasis.

   ii) Describe the phenomenon genetic drift.

   iii) Describe the tabulation in statistical table.

   B) Plot the histogram from the given data : **4**

Class	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75
Frequency	8	12	18	14	8	6	4

4. Answer **any two** of the following : **10**

   i) Describe the three levels of Bioinformatics.

   ii) Describe the scatter diagram.

   iii) Give an account of the disease elephantiasis.

5. Answer **any one** of the following : **10**

   i) Describe the frequency distribution and graphical distribution in biostatistics.

   ii) Give an account of pathogenicity of malarial parasite and add a note on its control.

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Seat No.	

B.Sc. – III Semester – V (New) Examination, 2015
MATHEMATICS (Special Paper – X)
Complex Analysis

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select correct alternative for each of the following : **10**

i) Regular function of which either real part or imaginary part is known can be obtained by using _____

a) C. R. equations b) Laplace equation
c) Difference equation d) None of these

ii) A simple closed Jordan curve divides the Argand plane into _____ domains which have the curve as common boundary.

a) two closed b) two open
c) one open and one closed d) none of these

iii) Arc L is non-rectifiable then L has _____ only.

a) finite length
b) infinite length
c) no length or infinite length
d) no length

iv) A curve Γ is called closed curve if there exists some parametric representation z(t) = x(t) + iy(t) where $\alpha \le t \le \beta$ and $\alpha < \beta$ such that _____

a) $\frac{z(\alpha)}{z(\beta)} = -1$ b) $\frac{z(\alpha)}{z(\beta)} = 0$

c) $\frac{z(\alpha)}{z(\beta)} = 1$ d) none of these

v) The residue at z = a is the coefficient of _____ in the Laurent's expansion of f(z).

a) $\frac{1}{(z-a)^2}$ b) $\frac{1}{z-a}$

c) $\frac{1}{(z-a)^{-1}}$ d) $\frac{1}{(z-a)^{-2}}$

vi) Continuity is _____ condition for the existence of a finite derivative.

a) necessary but not a sufficient

b) necessary and sufficient

c) not necessary but sufficient

d) not necessary and not sufficient

vii) Norm is the _____ number of the numbers of the $t_1 - t_0$, $t_2 - t_1$, ---, $t_n - t_{n-1}$ for the interval $[t_0, t_n]$.

a) smallest

b) largest

c) any

d) none of these

viii) The residue of f(z) at the pole z = a of the order m + 1 is _____

a) $\frac{f^{m+1}(a)}{(m+1)!}$

b) $\frac{f^{m+1}(a)}{m+1}$

c) $\frac{f^{m}(a)}{m}$

d) $\frac{f^{m}(a)}{m!}$

ix) In a Cauchy's fundamental theorem $\int_C f(z)\,dz = 0$ then the term C is defined as a _____ contour contained in D.

a) particular closed

b) any

c) particular

d) any closed

x) Polar form of Cauchy-Riemann equations is _____

a) $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}, \frac{1}{r}\frac{\partial u}{\partial \theta} = -\frac{\partial v}{\partial r}$

b) $\frac{1}{r}\frac{\partial u}{\partial r} = \frac{\partial v}{\partial \theta}, -\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial \theta}$

c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}, \frac{\partial v}{\partial r} = -r\frac{\partial u}{\partial \theta}$

d) none of these

2. Attempt **any five** of the following : **10**

1) Find the poles and their orders for the function given by

$$f(z) = \frac{z+1}{z\left(z^2+1\right)^3 (z+1)(z-2)^2}$$

2) Obtain the expansion $f(z) = \frac{1}{(z+1)(z+3)}$ series valid for $1 < |z| < 3$.

3) If f(z) and g(z) are analytic functions in a domain D then prove that

$$\frac{d}{dz}[f(z).g(z)] = f(z)\frac{d}{dz}[g(z)] + g(z)\frac{d}{dz}[f(z)]$$

4) Define Maclaurin's series for analytic function f(z) within circle.

5) Show that the function u (x, y) = sinx cosh y is harmonic.

6) Find the residue of $\frac{1}{\left(z^2+1\right)^3}$ at z = i.

3. A) Attempt **any two** of the following : **6**

   i) Evaluate $\int \bar{z}^2 \, dz$ around the circle

      a) $|z| = 1$

      b) $|z - 1| = 1$

   ii) For what values of z do the function w defined by z = sinu coshv + i cosu sinhv where w = u + iv ceases to be analytic ?

   iii) Expand the function $f(z) = \frac{1}{z(z^2 - 3z + 2)}$ for the region $0 < |z| < 1$.

   B) Prove that $\int_0^{\pi} \frac{a}{a^2 + \sin^2 \theta} \, d\theta = \frac{\pi}{\sqrt{1 + a^2}}$, $a > 0$. **4**

4. Attempt **any two** of the following : **10**

   1) If f(z) = u + iv is an analytic function of z = x + iy and $u - v = \frac{e^y - \cos x + \sin x}{\cosh y - \cos x}$

      then find f(z) when $f\left(\frac{\pi}{2}\right) = \frac{3 - i}{2}$.

   2) State and prove Cauchy's fundamental theorem.

   3) Find the residue of

      $f(z) = \frac{z^3}{(z - 1)^4 (z - 2)(z - 3)}$ at z = 1.

5. Attempt **any one** of the following : **10**

   1) State and prove Cauchy's residue theorem.

   2) State and prove the sufficient condition for f(z) to be analytic.

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Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
STATISTICS
Sampling Techniques (Special Paper – X) (New)

Day and Date : Friday, 6-11-2015 Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Soundless calculators are ***allowed****.*

1. Choose most appropriate alternative from those given in **each** case : **10**

i) Sampling frame is a term used for
   a) A list of random numbers
   b) A list of voters
   c) A list of sampling units of a population
   d) None of the above

ii) Under proportional allocation the size of the sample from each stratum depends on
   a) Total sample size
   b) Size of the stratum
   c) Population size
   d) All of the above

iii) Systematic sampling means
   a) Selection of n contiguous units
   b) Selection of n units situated at equal distances
   c) Selection of n largest units
   d) Selection of n middle units in a sequence

iv) Circular systematic sampling is used when
   a) N is a multiple of n
   b) N is a whole number
   c) N is not divisible by n
   d) None of the above

v) In which of the following situations cluster sampling is appropriate ?
   a) When the units are situated far apart
   b) When sampling frame is not available
   c) When all the elementary units are not easily identifiable
   d) All of the above

vi) There are more chances of nonsampling errors than sampling errors in case of
   a) Studies of large samples
   b) Complete enumeration
   c) Inefficient investigators
   d) All of the above

vii) If we have a sample of size n from a population of N units, the finite population correction is

   a) $\frac{N-1}{N}$ b) $\frac{n-1}{N}$ c) $\frac{N-n}{N}$ d) $\frac{N-n}{n}$

viii) A sample consists of
   a) All units of the population
   b) 50 percent units of the population
   c) 5 percent units of the population
   d) Any fraction of the population

ix) Which of the following statements does not hold good in case of stratified sampling ?
   a) Stratified sampling is convenient
   b) Stratified sampling is always good
   c) Enables to gather information about different stratum separately
   d) Reduces error for fixed cost

x) If an investigator selects districts from a state, panchayat samities from districts and farmers from panchayat samities, then such a sampling procedure is known as
   a) Two stage sampling
   b) Multistage sampling
   c) Cluster sampling
   d) Stratified sampling

2. Attempt **any five** of the following : **10**

i) Define sampling unit. Give an example.

ii) Write a note on two stage sampling.

iii) Give the objectives of a sample survey.

iv) What is ratio estimate ? Prove that it is biased estimate of population mean.

v) Describe proportional allocation.

vi) Give the idea of circular systematic sampling.

3. A) Attempt **any two** of the following : **6**

   i) Give the concept of sampling error and nonsampling error.

   ii) Describe stratified random sampling.

   iii) Give the situations where cluster sampling is preferred.

   B) Show that sample proportion (p) is unbiased estimator of population proportion (p), in case of simple random sampling for proportion. Obtain variance of (p). **4**

4. Attempt **any two** of the following : **10**

   i) Describe the method of determining the sample size (n) in case of simple random so as to meet desired margin of error and confidence coefficient.

   ii) What is regression estimation ? Obtain an expression to show that regression estimate is more efficient than the estimate based on SRS (Simple random sample).

   iii) Show that greater is the gain in precision of stratified sampling with proportional allocation over unstratified simple random sample.

   $V(\bar{y}_n)_R \geq V(\bar{y}_{st})_p$

5. Attempt **any one** of the following : **10**

   i) If the population consists of a linear trend then prove that

   $V(\bar{y}_{st}) \leq V'(\bar{y}_{sys}) \leq V(\bar{y}_n)_R$ in their usual notations.

   ii) In stratified sample of size n_i is taken from i^{th} stratum containing N_i units where i = 1, 2,.....k. Show that with cost function of the form $C = C_o + \sum_{i=1}^{K} C_i n_i$ the variance of the estimated mean $(\bar{y}_{st})$ is minimum for fixed total cost C When n_i is proportional to $\frac{N_i S_i}{\sqrt{C_i}}$ where S_i, C_i, C_o have usual meaning.

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Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
GEOLOGY (New)
Geomorphology (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Draw** neat labelled diagrams **wherever** necessary.*

1. Fill in the blanks with correct answer from given options : **10**

1) No river can erode vertically beyond _____
   a) Mean Sea Level b) Local base level
   c) Valley floor d) Interfluve

2) River capture is the most characteristic feature of _____
   a) Youth stage b) Mature stage
   c) Old stage d) Rejuvenation

3) Radial drainage pattern indicates presence of _____
   a) Fold b) Dome c) Fault d) None of these

4) Slope angle between 0 and 0.5 can be classified as _____ slope.
   a) Level b) Almost level
   c) Very gentle d) Moderate

5) A point where river rejuvenate is known as _____ point.
   a) Summit b) Head c) Nick d) Kick

6) Eustatic rejuvenation is due to _____
   a) Increase in volume of water b) Heavy rain fall
   c) Tectonic activity d) Global lowering of sea level

7) Which one of the following is exogenetic process ?
   a) Earthquake b) Volcano c) Deposition d) None of these

8) Upliftment of stratas indicates _____ rejuvenation.
   a) Static b) Eustatic
   c) Both static and eustatic d) None

P.T.O.

9) Removal of upper deposition causes exposure of old landscape is known as _____ topography.

a) Exhumed b) Resurrected

c) Both exhumed and resurrected d) None of these

10) The most favourable evidences that indicate rejuvenation is _____

a) Water fall b) Incised meanders

c) River terraces d) All of these

2. Answer **any five** of the following : **10**

i) What is monadnock ?

ii) At which stage of river features like alluvial fans and alluvial cones occur ?

iii) What is base level of erosion ?

iv) What are the causes of static rejuvenation ?

v) Define landslide.

vi) What is convexo-concave slope ?

3. A) Answer **any two** of the following : **6**

i) Explain the term, “the present is the key to the past”.

ii) How the landscape of exfoliation domes are formed ?

iii) How incised meanders indicate rejuvenation ?

B) Write answer of **any one** : **4**

i) Explain in detail sliding.

ii) Explain static rejuvenation.

4. Answer **any two** of the following : **10**

i) Describe classification of slope based on its elements.

ii) What are characters of mature stage in cycle of erosion ?

iii) Explain any five preventive measures for mass movement.

5. Answer **any two** of the following : **10**

i) Describe types of rejuvenation.

ii) Describe in brief the concept of cycle of erosion.

iii) Explain exogenous and endogenous processes.

_____

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Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
MICROBIOLOGY (Special Paper – X)
Industrial Microbiology

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *neat labelled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentences by selecting correct answer from given alternatives : **10**

1) High performance liquid chromatography is used for recovery and purification of _____

a) interferon b) interleukin c) insulin d) invertase

2) Bruce Ames test is used in _____ testing.

a) pyrogenicity b) sterility c) carcinogenicity d) allergen

3) Activated charcoal is used in _____ chromatography.

a) gel b) affinity c) adsorption d) ion exchange

4) _____ is used for pretreatment of grape juice during wine production.

a) CO_2 b) SO_2 c) HCl d) NaCl

5) _____ enzyme is involved in nitrogen fixation.

a) Nitrogenase b) Nitrate reductase
c) Nitrite reductase d) Nitrate oxidase

6) _____ is an example of hard cheese.

a) Limberger b) Cambert c) Cottage d) Cheddar

7) Fermentation _____ the nutritive value of food.

a) increases b) decreases c) maintains d) none of these

8) Rabbits are used for _____ testing.

a) allergen b) pyrogenicity c) carcinogenicity d) assay

9) Interferon produced by rDNA technology is used as _____ protein.

a) anitbacterial b) antifungal

c) antiviral d) antitumor

10) E-coli auxotrophs and Aerobacter aerogens are used for production of _____

a) L-lysine b) streptomycin

c) citric acid d) interferon

2. Write short answers **any five** : **10**

a) List media used for sterility testing.

b) Define flocculation.

c) Define white table wine.

d) What is pyrogen and carcinogen ?

e) Uses of rDNA interferon.

f) Examples of lactic acid bacteria.

g) Types of cheese.

3. A) Write answers **any two** : **6**

a) Recovery of fermentation product by filteration.

b) Write adsorption elution.

c) Raw materials used in fermentation media.

B) Write in detail on food as substrate for microorganisms. **4**

4. Write short notes **any two** : **10**

a) rDNA product interferon.

b) Idli

c) Toxicity for pharmaceutical and health care and food products.

5. Write an essay on **any one** : **10**

a) Production and applications of Rhizofertilizers.

b) Lysine fermentation.

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Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
ELECTRONICS
Fundamentals of Communication (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*
4) ***Use*** *of logtable and calculator is* ***allowed****.*

1. Select the correct alternatives for the following : **10**

i) _____ is the name of dialing system used in modern telephone.
   a) Rotary b) DTMF
   c) Multitone alphanumeric d) Audio pulse

ii) Whenever handset is on the hook, speech circuitry is _____
   a) Connected b) Not connected
   c) Partly connected d) None of these

iii) In TV interlace scanning takes place in a _____ ratio.
   a) 4 : 3 b) 16 : 9 c) 2 : 1 d) 3 : 4

iv) Standard IF for Amplitude modulated receiver is _____
   a) 555 KHz b) 1600 Hz c) 455 KHz d) 10 MHz

v) Three basic elements of Yagi antenna are _____
   a) Dipole, Balloon, feed wire b) Dipole, Director, reflector
   c) Dipole, feedwire, repeator d) Dipole, reflector, Balloon

vi) Ionospheric communication takes place with the help of _____ wave.
   a) Ground b) Space
   c) Sky d) Tropospheric

vii) The amplitude of an audio signal is 25V and that of carrier is 50V, the percentage of modulation is _____
   a) 2% b) 50% c) 0.2% d) 100%

P.T.O.

viii) _____ is used in radio receiver.

a) Modulation b) Demodulation

c) Retardation d) All of these

ix) The noise figure in radio receiver is ratio of _____

a) $\frac{S/N \text{ input}}{S/N \text{ output}}$ b) $\frac{S/N \text{ output}}{S/N \text{ input}}$

c) S/N d) N/S

x) The data communication which takes place in one direction is _____ system.

a) Duplex b) Multiplex c) Simplex d) Triplex

2. Answer **any five** for the following : **10**

1) Define simplex and Duplex communication system.
2) Draw general block diagram of communication system.
3) What is modulation ? What are its types ?
4) What is radio wave propagation ? What are its types ?
5) What is Telephone communication ?
6) What is TV communication ?

3. A) Answer **any two** for the following : **6**

1) Explain concept of ASK and FSK.
2) Explain characteristic parameters of antenna.
3) Explain virtual hight and skip distance.

B) Explain AM receiver with neat block diagram. **4**

4. Answer **any two** for the following : **10**

1) Explain tropospheric wave propagation.
2) Explain AM with necessary mathematical derivation.
3) Explain composite video signal in TV communication.

5. Answer **any one** of the following : **10**

1) Explain Telephone communication system with necessary blocks involved in it.
2) Explain monochrom TV receiver with required block diagram.

_____

SLR-Z – 200

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
COMPUTER SCIENCE (New)
Core Java (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions** : 1) **All** questions are **compulsory.

*2) Figures to **right** indicate **full** marks.*

1. A) Choose correct alternatives : **7**

1) _____ class objects are immutable.

a) String b) StringBuffer

c) StringBuilder d) All of these

2) _____keyword used to refer current object.

a) Static b) This c) Object d) Super

3) Two or more methods in same class with same name and different signatures is called _____

a) Method overloading b) Method overriding

c) Both a) and b) d) None

4) _____ is default access specifier in Java.

a) Privative b) Protected c) Public d) Default

5) It is possible to compile and run Java program without main ( ) method.

a) True b) False

6) What is character encoding scheme used for char type in Java ?

a) TSCII b) ASCII c) UNICODE d) EBCDIC

7) _____ is super class for Exception class.

a) Throwable b) Runnable

c) Error d) None of these

P.T.O.

B) State whether **True** or **False** : **3**

1) Interface can contain instance variable.

2) Deserialization is a process by which we can store object contents into file.

3) FlowLayout is a default layout manager in frame.

2. Solve **any five** questions : **10**

1) Why pointers are eliminated in Java ?

2) Define-Typecasting.

3) What is mean by mutable and immutable object ?

4) Define – Inner class.

5) What is method overriding ?

6) What is access specifier ? List out different access specifiers in Java.

3. A) Solve **any two** questions : **6**

1) Explain structure of Java program.

2) Explain Datagram Packet.

3) What is JVM ?

B) Write a program to check given string is Palindrome or Not. **4**

4. Solve **any two** questions : **10**

1) Write a program that demonstrates use of 'super; keyword.

2) What is JApplet ? Write steps to create an JApplet.

3) What is wrapper class ? Give suitable example.

5. Solve **any two** questions : **10**

1) What is exception ? How to handle exceptions in Java ?

2) What is thread ? Explain thread life cycle with suitable example.

3) Write a program that copies content of one file into another file.

SLR-Z – 201

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
PHYSICS (Special Paper – XI) (New)
Classical Mechanics

Day and Date : Saturday, 7-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Neat diagrams must be drawn ***wherever*** *necessary.*

4) Use of log table or calculator is ***allowed****.*

1. Select correct alternative : **10**

1) The part which deals with the motion of bodies without any reference to the force or forces causing the motion is called

a) Kinematics b) Kinetics c) Statics d) Dynamics

2) The quantities like Ixy, Iyz, Izx are called the

a) Moment of Inertia b) Products of Inertia

c) Measures of Inertia d) Inertia

3) The constraints involved in the motion of a particle placed on the surface of a sphere is

a) holonomic b) non-holonomic

c) rheonomous d) scleronomous

4) A rigid body have _____ degrees of freedom.

a) 9 b) 6 c) 3 d) 4

5) The equation $\ddot{x}_2 + \left(\frac{g}{l} + \frac{2k}{m}\right)x_2 = 0$ represents S.H.M with frequency w_1 =

a) $\sqrt{\frac{g}{l} + \frac{2k}{m}}$ b) $\sqrt{\frac{g}{l} - \frac{2k}{m}}$ c) $\sqrt{\frac{2k}{m} - \frac{g}{l}}$ d) $\sqrt{\frac{2k}{m} + \frac{g}{m}}$

P.T.O.

6) The Brachistochrone problem shows that, the transit time of a particle from a higher to a lower point under the influence of gravity is _____ along a cycloid passing through the two points.

a) maximum b) minimum c) infinite d) zero

7) On the earth, the maximum magnitude of the coriolis acceleration is at the

a) equator b) north and south poles

c) latitude 45° d) latitude 60°

8) When constraints are introduced into a system, its number of degrees of freedom

a) is reduced b) is increased

c) remain the same d) becomes zero

9) If all forces of a system are generated from a single function, the system is called _____ system.

a) conservative b) monogenic

c) non conservative d) multigenic

10) The equation of motion of first pendulum in coupled system is

a) $m\ddot{x}_1 = mg\frac{x_1}{l} + k(x_2 - x_1)$ b) $m\ddot{x}_1 = -mg\frac{x_1}{l} + k(x_2 - x_1)$

c) $m\ddot{x}_1 = \frac{-mgx_1}{l} - k(x_2 - x_1)$ d) $m\ddot{x}_1 = \frac{-mgx_1}{l} - k(x_1 - x_2)$

2. Attempt **any five** : **10**

1) What are coupled systems ?

2) What are the advantages of Hamilton's formulation ?

3) Define inertial and non-inertial frames of reference.

4) State any two effects of coriolis force in a nature.

5) What are normal coordinates and normal modes of oscillations ?

6) Explain the term 'degrees of freedom'.

3. Attempt **any two** : **6**

   A) 1) State and explain Hamilton's principle.

      2) Write a note on inertia tensor.

      3) Explain the principle of Newtonion relativity.

   B) Obtain an expression for the shortest distance between two points in a plane. **4**

4. Attempt **any two** : **10**

   1) Derive the Euler's equations of motion of body.

   2) Explain the effect of coriolis force on a body falling freely under the action of gravity.

   3) Derive an expression for the total energy of a system of two coupled pendulums in terms of normal coordinates.

5. Attempt **any one** : **10**

   1) Derive expressions for time of flight and range of projectile moving in a resistive medium.

   2) Obtain Lagrange's equation from D′ Alemberts principle. Using Lagrange's equation obtain equation for Atwoods Machine.

SLR-Z – 202

Seat No.	

B.Sc. (Part – III) (Sem. V) Examination, 2015
CHEMISTRY (New)
Special Paper – XI : Organic Chemistry

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*
4) ***Use*** *of spectroscopic table provided by University is* ***allowed****.*

1. Select the correct alternative from the given below and rewrite the statement. **10**

i) TMS gives _____ signals in its NMR spectrum.

a) 1 b) 2 c) 3 d) 4

ii) _____ of the following is a magnetic nucleus.

a) $^{13}C_6$ b) $^{2}H_1$ c) $^{12}C_6$ d) $^{32}S_{16}$

iii) In mass spectroscopy cations are separated according to _____

a) mass b) charge

c) m/e ratio d) e/m ratio

iv) Aldehydes show an absorption band for aldehydic C-H bond at _____ in its IR spectrum.

a) 2700 cm^{-1} b) 1720 sm^{-1}

c) 2200 cm^{-1} d) 890 cm^{-1}

v) Ethyl aceto acetate is an ester of _____

a) acetic acid b) acetone

c) aceto acetic acid d) malonic acid

P.T.O.

vi) Enol form of ethyl aceto acetate is stable due to _____

a) Intermolecular H-bonding b) Intramolecular H-bonding

c) Conjugation d) Both b) and c)

vii) The internal bond angle between two adjacent c-c bonds in cyclohexane is _____

a) 60° b) 90° c) 120° d) 109° 28'

viii) In t-butyl cyclohexane, the tertiary butyl group is preferably located at _____ position.

a) equatorial b) axial

c) flagpole d) bowsprit

ix) A ketone on MPV reduction produces _____

a) an alkene b) an alcohol

c) an alkane d) a ketone

x) Cyclopropyl methyl alcohol on reaction with HCl produces cyclobutyl chloride. Name of this reaction is _____

a) Wittig reaction

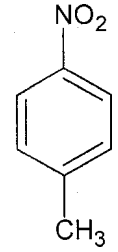
b) Wagner–Meerwein rearrangement

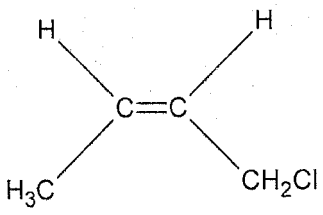
c) Hoffman rearrangement

d) Knoevanagel reaction

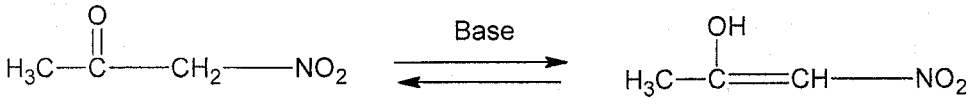
2. Attempt **any five** of the following : **10**

i) How many signals will be observed in the NMR spectrum of the following molecules ?

a) 

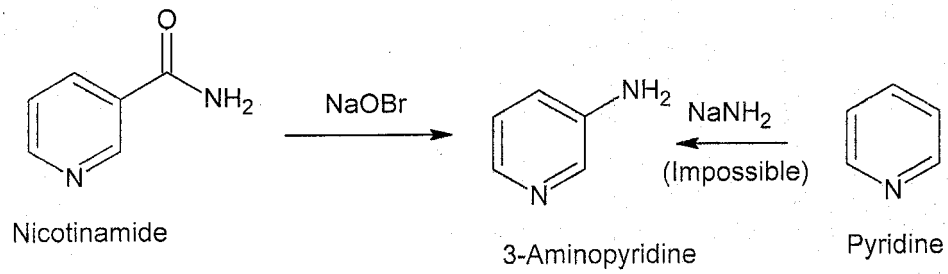
b) 

ii) Suggest mechanism for the following reaction



iii) Wittig reaction is more advantageous than other methods of alkene formation. Explain.

iv) Explain the following observation :



v) What do you mean by stereospecific and stereo-selective reactions ?

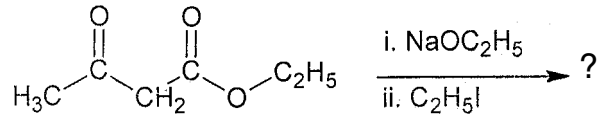
vi) 3-Pentanone shows only two signals in its NMR spectrum. Explain.

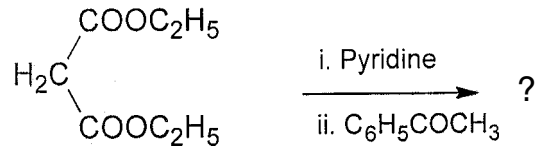
3. A) Attempt **any two** of the following : **6**

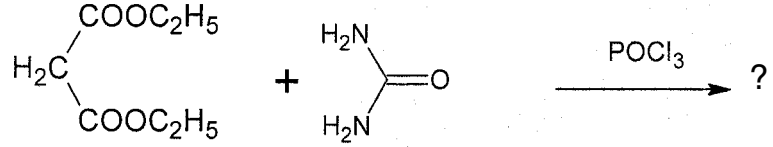
i) Draw neat labeled diagram of the mass spectrometer.

ii) Axial methyl cyclohexane is less stable than equatorial methyl cyclohexane. Explain.

iii) Complete the following reactions :

a) 

b) 

c) 

B) What do you mean by active methylene compound ? Explain acidic nature of ethyl aceto acetate. **4**

4. Attempt **any two** of the following : **10**

A) Assign structure to the molecule having following spectral data.

M.F. : $C_9H_{11}Cl$

NMR : singlet, 7.25 δ (5H)

multiplet, 3.40 δ (1H)

doublet, 2.75 δ (2H)

doublet, 1.45 δ (3H)

B) Compound A ($C_6H_{14}O$) with a t-butyl group absorbs at 3400 cm^{-1}. On oxidation it yields a ketone with same number of carbon atoms. On reaction with con. HCl it yields compound B($C_6H_{13}Cl$) having different carbon skeleton. But on reaction with con. H_2SO_4 it undergoes dehydration to yield an unsaturated compound C(C_6H_{12}), also having different carbon skeleton. Identify A, B and C. Name the reaction.

C) Discuss Bayer's strain theory. State its limitations.

5. Attempt **any two** of the following : **10**

A) Draw all possible conformations of cyclohexane. Explain, why the chair conformation is more stable than the boat conformation.

B) Discuss the mechanism of Stobbe condensation with the help of suitable example.

C) Write a short note on Oppenaur oxidation.

SLR-Z – 203

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
BOTANY (New)
Genetics (Special Paper – XI)

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory.***
2) ***All*** *questions carry* ***equal*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
4) Figure to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences choosing correct alternatives : **10**

1) Genes located on same locus but having different expression are _____

a) Multiple alleles b) Oncogenes
c) Polygenes d) Codominants

2) Colour blindness, bleeders disease are examples of _____

a) Jumping gene b) Sex linked
c) Autosomes d) Sex chromosomes

3) Holandric genes are situated on _____

a) X-chromosome b) Y-chromosome
c) Autosome d) Both X and Y

4) Which of the following diseases belong to the same category as colour blindness in man ?

a) Night blindness b) Presbyopia
c) Diabetes insipidus d) Haemophilia

5) Deuteranopsia is diseases when there is no perception of _____ colour.

a) Red b) Blue c) Green d) White

6) Which of the cytoplasm is responsible for cytoplasmic inheritance ?

a) Egg b) Sperm

c) Both of the above d) None of the above

7) Albinism in corn is due to_____

a) Deficiency of light b) Deficiency of minerals

c) Cytoplasmic inheritance d) Viruses

8) Euploidy is best explained as follows

a) One chromosome more than the haploid set

b) One chromosome more than the diploid set

c) Exact multiple of haploid set of chromosome

d) One chromosome less than haploid set

9) The loss of one single chromosome creates a condition called __

a) Trisomy b) Nullisomy

c) Monosomy d) Haploid

10) Datura is classical example of _____

a) Trisomy b) Triploid

c) Monosomic d) Nullisomic

2. Answer **any five** of the following : **10**

1) Why eye colour in Drosophila is example of multiple alleles ?

2) Explain sex chromosomes in man.

3) What is Haemophilia.

4) What is polygene theory ?

5) What is euploidy ? Enlist types.

6) Down's syndrome.

3. A) Answer **any two** of the following : **6**

   1) Colour blindness is sex linked inheritance in man explain.

   2) Explain sex chromosome in drosophila.

   3) Describe Holandric genes with suitable example.

   B) Self incompatibility in plants. **4**

4. Answer **any two** of the following : **10**

   1) Explain Hardy-Weinberg's law.

   2) Describe with suitable example plastid inheritance.

   3) What is aneuploidy ? What are types ? Explain trisomy with suitable example.

5. Answer **any two** of the following : **10**

   1) Describe in brief Bridge's experiment.

   2) Explain mitochondrial inheritance.

   3) Significance of Euploidy.

SLR-Z – 204

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
ZOOLOGY (Special Paper – XI) (New)
Comparative Anatomy of Chordates

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: I)* ***All*** *questions are* ***compulsory****.*
II) Figures to the ***right*** *indicate* ***full*** *marks.*
III) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Select the appropriate answer from **each** of the following and rewrite the sentence. **10**

1) Horns of cattle are derivatives of _____ of integument in vertebrates.
   a) Epidermis b) Dermis
   c) Keratin d) Connective tissue

2) Odontoid process is the peculiar feature of _____
   a) Axis b) Thoracic c) Caudal d) Lumber

3) Crop in bird is modification of _____
   a) Oesophagus b) Stomach c) Ileum d) Duodenum

4) Amphioxus possess _____ type of Kidney.
   a) Pronephros b) Mesonephros
   c) Metanephros d) Opisthonephros

5) Gills of _____ have filiform gill lamellae.
   a) Cartilage fish b) Bony fish
   c) Ascidian tadpole d) Frog tadpole

6) Focal length of lens of eye is controlled by
   a) Vitreous lumour b) Ciliary muscles
   c) Iris muscles d) All the above

7) Down feather present in _____
   a) Rat b) Hen
   c) Rabbit d) Frog

P.T.O.

8) Lungs of pigeon are provides with _____ air sacs.
   a) two b) six c) nine d) ten

9) Four chambered heart present in _____
   a) Frog b) Cow
   c) Labeo d) Calotis versicolar

10) Rhinoceros horn is modified of _____
   a) Scales b) Glandes c) Shields d) Hairs

2. Answer **any five** of the following. **10**
   1) Gills of Boney fishes.
   2) Synsacrum.
   3) Brain of scoliodon.
   4) Functions of skin.
   5) Eye of rat.
   6) Down feather.

3. A) Answer **any two** of the following. **6**
   1) Aortic arches in reptiles.
   2) Pelvic girdle of reptiles.
   3) Soft derivatives of Integument.

   B) Alimentary canal of rat. **4**

4. Answer **any two** of the following. **10**
   1) Describe hard derivatives of integument in vertebrates.
   2) Explain evolutionary changes in heart of vertebrates.
   3) Give an account on respiratory organs in Amphibians.

5. Answer **any one** of the following. **10**
   1) Describe the brain of vertebrates.
   2) Describe the evolution of aortic arches in vertebrates.

_____

SLR-Z – 205

Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
MATHEMATICS (Special Paper – XI)
Integral Calculus

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Choose the correct alternative for each of the following : **10**

i) Integral $\int_a^b f(x)\,dx$ is said to be improper if

a) Both the limits are finite
b) f(x) is bounded
c) One or both integration limits are infinite
d) None of these

ii) $\int_1^\infty \frac{dx}{x}$ is

a) Convergent b) Divergent
c) Oscillatory d) None of these

iii) Integral $\int_0^\infty \frac{x^{2n}}{1+x^{2m}}\,dx$ is convergent if

a) $n < m$ b) $n > m$ c) $n = m$ d) None of these

iv) $\int_0^\infty x^{n-1}e^{-x}dx$ is convergent when

a) $n > 0$ b) $n = 0$ c) $n < 0$ d) None of these

P.T.O.

v) Value of $\int_1^2 \int_0^{1/2} y\,dy\,dx$ is

a) $7/6$ b) $1/6$ c) $2/3$ d) $7/3$

vi) The area bounded by the curve $y = \phi(x)$, the x – axis and the lines x = a and x = b (a < b) is given by

a) $\int_a^b \int_0^{\phi(x)} y\,dx dy$ b) $\int_a^b \int_0^{\phi(x)} dx\,dy$

c) $\int_0^b \int_a^{\phi(x)} dx\,dy$ d) None of these

vii) Value of $\int_0^{\pi/2} \int_0^{\pi/2} \cos(x+y)\,dy dx$ is

a) 2 b) – 2 c) 0 d) None of these

viii) $\beta(m,n)$ is _____

a) $\int_0^\infty \frac{x^{m-1}}{(1+x)^n} dx$ b) $\int_0^\infty \frac{x^{n-1}}{(1+x)^n} dx$

c) $\int_0^\infty \frac{x^{m+n-1}}{1+x} dx$ d) $\int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}} dx$

ix) Value of $\int_0^\infty x^4 e^{-x} dx$ is

a) 24 b) 12 c) 48 d) 6

x) $\lceil 1/2 =$ _____

a) π b) $-\pi$ c) $\sqrt{\pi}$ d) $2\sqrt{\pi}$

2. Attempt **any five** : **10**

i) Show that $\int_0^1 \frac{dx}{1-x}$ is convergent.

ii) Define convergence of improper integral at the left end and at the right end.

iii) Evaluate $\Gamma\left(-\frac{3}{2}\right)$.

iv) Define Beta and Gamma functions.

v) Evaluate $\int_0^1\int_0^x e^{x+y}\,dy\,dx$.

vi) Evaluate $\int_0^{\pi}\int_0^{a\sin\theta} r\,d\theta\,dr$.

3. A) Attempt **any two** : **6**

1) Examine the convergence of $\int_1^{\infty}\frac{\log x}{x^2}dx$.

2) Evaluate $\int_0^{\infty}\frac{x^a}{a^x}dx$.

3) Evaluate $\iint_A xy\,dx\,dy$ over the positive quadrant of the circle $x^2 + y^2 = a^2$.

B) Prove that $\Gamma n\,\Gamma(1-n) = \frac{\pi}{\sin(n\pi)}$. **4**

4. Attempt **any two** : **10**

1) Show that $\int_0^{\infty}\frac{\sin x}{x}dx$ converges but not absolutely convergent.

2) Evaluate $\int_0^{\infty}\frac{dx}{1+x^4}$.

3) Evaluate $\iint xy(x+y)\,dx\,dy$ over the area between $y = x^2$ and $y = x$.

5. Attempt **any one** : **10**

1) Prove that $\Gamma m\,\Gamma\left(m+\frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m)$.

2) Change the order of integration in $\int_0^a\int_{\sqrt{ax-x^2}}^{\sqrt{ax}} f(x,y)\,dx\,dy$.

SLR-Z – 208

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
MICROBIOLOGY (Special Paper – XI) (New)
Agricultural Microbiology

Day and Date :Saturday, 7-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by selecting correct answer from given alternatives. **10**

   i) In vermicomposting on an average _____ no. of adult earthworms are necessary.
   a) 200 b) 2000 c) 20000 d) 20

   ii) The transformation of complex compounds to simple compounds by microorganisms in soil is _____ type of reaction.
   a) Degradation b) Detoxification c) Diffusion d) Activation

   iii) In nitrogen cycle, the degradation of organic nitrogen results in formation of
   a) Amino acids b) Proteins c) Peptides d) All of these

   iv) Phenol oxidase enzymes are involved in the oxidation of
   a) Cellulose b) Pesticides c) Lignin d) Hydrocarbons

   v) Coniferaldehyde is the product produced after the degradation of
   a) Pesticides b) Lignin c) Cellulose d) Methane

   vi) The flagellated protozoon belonging to class _____ are dominant in soil.
   a) Cilliata b) Sporogia c) Mastigophora d) All of these

   vii) The size of sand particles in soil ranges from _____ to _____ mm.
   a) 0.05 to 2.00 b) 0.001 to 0.01 c) 2.5 to 3.5 d) 4.0 to 4.5

viii) Most abundant compound of plant cell wall is

a) Pectin b) Cellulose c) Hemicellulose d) Lignin

ix) _____ enzyme act only on native cellulose molecules.

a) C_1 b) C_x c) C_{Native} d) Glucanases

x) _____ group of organisms dominate in soil.

a) Bacteria b) Fungi

c) Actinomycetes d) Algae

2. Answer **any five** of the following : **10**

i) What is Nitrification ?

ii) Common symptoms of soft rot of Potato.

iii) Define activation reaction in pesticide degradation.

iv) Write properties of soil.

v) What is Town Compost ?

vi) List Pesticide degrading microorganisms.

vii) What is solubilization of phosphorous ?

3. A) Answer the questions in brief **(any two)** : **6**

i) Explain process of green manuring.

ii) Discuss on environmental factors governing cellulose degradation.

iii) Write in detail role of microorganisms in Carbon Cycle.

B) Write on Lignin degradation. **4**

4. Answer **any two** of the following : **10**

i) Discuss in detail biochemistry of cellulose degradation.

ii) Explain in short nitrogen cycle.

iii) Write in detail biodegradation of pesticides.

5. Answer **any two** of the following : **10**

i) Write applications of biotechnology in agriculture.

ii) Write in brief soil as an ecosystem.

iii) Discuss in detail causative agent, symptoms and control of Whip Smut of Sugarcane.

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SLR-Z – 210

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
COMPUTER SCIENCE (Special Paper – XI) (New)
Operating System – I

Day and Date : Saturday, 7-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***N.B.**: 1) Figures to the **right** indicate **full** marks.*
*2) **All** questions are **compulsory**.*

1. 1) _____ is not application software. **10**

a) Word processing b) Spread sheet

c) Power-point d) Unix

2) Interval between the time of submission and completion of the job is called _____

a) waiting time b) turn-around time

c) throughput d) response time

3) Which of the following is not fundamental process state ?

a) ready b) halted c) running d) blocked

4) CPU can only execute program which are stored in _____

a) hard disk b) floppy disk

c) main memory d) CD-ROM

5) Process execution begins and ends with _____

a) I/O burst b) CPU burst

c) Both (a) and (b) d) None of these

6) _____ is the solution to critical section problem.

a) mutual exclusion b) race condition

c) system calls d) none of these

7) _____ describes technique which may not allows the deadlock.

a) deadlock preventation b) deadlock avoidance

c) deadlock detection d) all of these

P.T.O.

8) The critical section problem is problem faced by _____
   a) Co-operating process b) O.S. process
   c) User processes d) any 2 processes

9) The priority scheduling algorithm suffers by ____
   a) starvation b) aging c) deadlock d) all of these

10) Demand paging is a _____ system.
   a) virtual memory b) job scheduling
   c) CPU scheduling d) none of these

2. Answer **any five** of the following : **10**
   1) What is context switch ?
   2) What is program counter ?
   3) Define throughput and turn around time.
   4) Write a note on batch operating system.
   5) What are types of real time system ?
   6) What is bankers algorithm ?

3. A) Answer **any two** of the following : **6**
      1) Explain distributed operating system.
      2) What is the role of operating system in connection with main memory management ?
      3) Explain concept of virtual memory.
   B) What is paging ? Explain paging Hardware. **4**

4. Answer **any two** of the following : **10**
   1) Write a note on preemptive – SJF.
   2) Explain different types of schedular.
   3) Discuss round robin scheduling algorithm with example.

5. Answer **any two** of the following : **10**
   1) Write a note on resource allocation graph.
   2) Explain services provided by operating system.
   3) Explain swapping in memory management.

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SLR-Z – 211

Seat No.	

B.Sc. – III (Sem. – V) (New) Examination, 2015
PHYSICS (Special Paper – XII)
Nuclear Physics

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) ***Draw*** *neat diagram* ***wherever*** *necessary.*
iv) ***Use*** *of calculator or log table is* ***allowed****.*

1. Select the correct alternative. **10**

i) In cyclotron resonance condition breaks due to relativistic _____
   a) increase in velocity b) increase in mass
   c) decrease in mass d) decrease in velocity

ii) Betatron works on principle of _____
   a) ionisation b) transformer
   c) induction coil d) condensation

iii) The GM counter works on the principle of _____
   a) ionisation b) light sensing
   c) photoelectric effect d) bubble formation

iv) The energy equivalent to 1 amu = _____
   a) 931 MeV b) 831 MeV c) 921 MeV d) 731 MeV

v) The element having same mass number but different atomic number are called _____
   a) isotopes b) isobars c) isomers d) isotropic

P.T.O.

vi) In endothermic reaction Q value is _____

a) negative b) positive c) zero d) infinite

vii) Hydrons means _____

a) heavy b) bulky

c) light in weight d) zero in weight

viii) If T_α and Q_α are respectively the K.E. and disintegration energy of α-particle then _____

a) $T_\alpha > Q_\alpha$ b) $T_\alpha \cong Q_\alpha$ c) $Q_\alpha >>> T_\alpha$ d) $T_\alpha >> Q_\alpha$

ix) Neutrino hypothesis was postulated by _____

a) Einstein b) Rutherford c) Pauli d) J. J. Thompson

x) The liquid used in bubble chamber must be _____

a) non-conducting b) highly conducting

c) semi-conducting d) super conducting

2. Attempt **any five** of the following. **10**

i) Draw neat diagram of synchrocyclotron.

ii) State principle of scintillation counter.

iii) Define :

i) packing fraction

ii) mass defect.

iv) What is stripping reaction ?

v) Explain continuous β-ray spectrum.

vi) What are quarks ?

3. A) Attempt **any two** of the following. **6**

i) Explain binding energy curve.

ii) Obtain equation for threshold energy of nuclear reaction.

iii) Explain α-ray spectra.

B) Calculate the Q value of the following reaction and comment on its result. **4**

$$_1H^3 + _1H^2 \rightarrow _2He^4 + _0n^1$$

Given – Mass of $_1H^3$ = 3.0169982 amu

Mass of $_1H^2$ = 2.0147361 amu

Mass of $_2He^4$ = 4.0038727 amu

Mass of $_0n^1$ = 1.0089832 amu

4. Attempt **any two** of the following. **10**

i) Explain liquid drop model of nucleus.

ii) What is β-decay ? Explain the experimental study of β-decay.

iii) Explain classification of elementary particles.

5. Attempt **any one** of the following. **10**

i) Describe construction and working of cyclotron. Obtain equation of velocity of ion in cyclotron.

ii) Explain construction and working of GM-counter. Explain Geiger plateau, dead time and recovery time.

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SLR-Z – 212

Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
CHEMISTRY (Special Paper – XII)
Analytical and Industrial Physical Chemistry

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams and give equations* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the most correct alternative from among those given below and rewrite the sentence : **10**

1) Reciprocal of transmittance is called
   a) optical density b) opacity
   c) absorptivity d) extinction coefficient

2) In photovoltaic cell, selenium layer is covered with a transparent layer of
   a) silver b) platinum
   c) gold d) lead

3) Resistance of a solution is measured with the help of
   a) Wheatstone bridge b) Potentiometer
   c) Colorimeter d) Refractometer

4) For the determination of cell constant _____ electrolyte is used.
   a) NaCl b) KCl
   c) NH_4Cl d) HCl

5) For standardization of potentiometer, a standard cell having voltage _____ is generally used.
   a) 1.180 v b) 1.108 v
   c) 1.018 v d) 2.018 v

P.T.O.

6) In potentiometric measurements, calomel electrode is used as
   a) indicator electrode b) reference electrode
   c) inert electrode d) null electrode

7) In electroplating current density is usually expressed in
   a) A/mm^2 b) A/dm^2
   c) MA/dm^2 d) MA/mm^2

8) If cathode efficiency is greater than anode efficiency, the plating both becomes _____ in metal content.
   a) rich b) highly rich
   c) poor d) remains same

9) In premix burner _____ percent of sample is used.
   a) 100 b) 50
   c) 90 d) 5

10) In Lundergraph burner, sample used must be _____ form.
   a) solid b) gaseous
   c) liquid d) all of these

2. Answer **any five** of the following : **10**
   i) Name the equipments used in flame photometry.
   ii) Draw labelled circuit diagram of Wheatstone bridge.
   iii) State Lamberts law.
   iv) Give advantages of glass electrode.
   v) Explain the term electroforming.
   vi) Why direct current source can not be used in conductance measurement ?

3. A) Answer **any two** of the following : **6**
   i) What is conductivity water ? How it is prepared ?
   ii) State and explain Beer's law.
   iii) Give the role of brightners in electroplating.

   B) Discuss the applications of flame photometry in qualitative analysis. **4**

4. Answer **any two** of the following : **10**

   i) What do you understand by potentiometric titrations ? Give the various advantages of potentiometric titrations.

   ii) Describe construction and working of a single cell photoelectric colorimeter.

   iii) What is flame photometry ? Describe the general principles of flame photometry.

5. Attempt **any two** of the following : **10**

   i) Describe in detail the electroplating of nickel.

   ii) Mention different types of conductometric titrations. Explain the conductometric titration between weak acid and strong base.

   iii) Give the construction and working of quinhydrone electrode.

SLR-Z – 213

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
BOTANY (Special Paper – XII) (New)
Plant Biochemistry

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions: *i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences choosing the correct alternative. **10**

1) Sucrose is a _____
   a) Monosaccharide b) Disaccharide
   c) Polysaccharide d) Triose

2) The key enzyme in the regulation of fatty acid synthesis is _____
   a) acetyl CoA carboxylase b) AMP activated proteinkinase
   c) protein phosphatase d) none of these

3) Carbohydrates are organic compounds made up of _____
   a) Carbon, Hydrogen and Oxygen b) Carbon, Hydrogen
   c) Carbon, Hydrogen and nitrogen d) Carbon, Oxygen

4) Most of amino acids are usually soluble in _____
   a) Water b) Alcohole c) Petroleum d) Ether

5) The most common monomer of carbohydrate is _____
   a) Nucleotide b) Glucose c) Amino acids d) Maltose

6) Fat is organic molecule of _____
   a) carbohydrate b) lipid c) starch d) protein

7) The amino acids are held together in protein by _____ bonds.
   a) Glycosidic b) Hydrogen c) Peptide d) Phosphate

8) _____ is saturated fatty acid.
   a) Stearic acid b) Linoleic acid c) Linolenic acid d) Oleic acid

P.T.O.

9) α-D-glucose and β-D-glucose are _____
   a) Epimers b) Anomers c) Stereoisomer d) Ket-aldo pairs

10) Proteins are the building blocks of _____
   a) Glucose b) Fatty acids c) Amino acids d) Fructose

2. Answer **any five** of the following. **10**

1) Write classification of carbohydrates.

2) Give general structure of amino acid.

3) Mention any two chemical properties of saturated fatty acids.

4) Define isomers with example.

5) What is the significance of lipids ?

6) Write primary structure of protein.

7) Mention any two physical properties of sucrose.

3. A) Answer **any two** of the following. **6**

1) What are polysaccharides ? Explain any two properties of cellulose.

2) Define unsaturated fatty acids and mention their properties.

3) Explain characteristics of amino acids.

B) Describe the degradation of starch. **4**

4. Answer **any two** of the following. **10**

1) Explain gluconeogenesis of fatty acid during seed germination.

2) Give brief out line of protein synthesis in prokaryotes.

3) What are monosaccharide's ? Explain physical and chemical properties with examples.

5. Answer **any two** of the following. **10**

1) Describe pysico-chemical structure of protein.

2) Write note on biosynthesis of sucrose.

3) Explain β-oxidation of fatty acid.

_____

SLR-Z – 214

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
ZOOLOGY (Special Paper – XII) (New)
Developmental Biology

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B.** : 1) **All** questions are **compulsory.
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Select appropriate answer from **each** of the following and rewrite the sentences : **10**

1) The process of formation of egg is called as _____
   a) Spermatogenesis b) Mitosis
   c) Oogenesis d) Spermiogenesis

2) Macrolecithal egg is found in _____
   a) Chick b) Insect c) Fish d) Amphioxus

3) Polyspermy is avoided by _____ membrane.
   a) Plasma b) Fertilization c) Basement d) Foetal

4) 12 to 13 pairs of somites are found in chick embryo of about _____hrs. incubation.
   a) 33 b) 20 c) 28 d) 48

5) The role of yolk sac during embryonic development is _____in nature.
   a) Protective b) Excretory c) Nutritive d) Respiratory

6) Hensen's node of chick embryo is called as _____
   a) Primitive knot b) Amnion c) Chorion d) Somite

7) Placenta is found in _____
   a) Fishes b) Amphibians c) Aves d) Mammals

8) External fertilization is seen in _____
   a) Amphioxus b) Birds c) Mammals d) Insects

9) Blastodisc is observed in egg of _____
   a) Frog b) Chick c) Amphioxus d) Insect

10) Chalazae in hen's egg helps to _____
   a) Keep the ovum in position b) Develop chordamesoderm
   c) Develop placenta d) Develop foetal membrane

2. Answer **any five** of the following : **10**
   i) Structure of sperm of Amphioxus.
   ii) Fertilization membrane.
   iii) Centrolecithal egg.
   iv) Somites.
   v) Amnion.
   vi) Blastodisc.
   vii) External fertilization.

3. A) Answer **any two** of the following : **6**
   i) Fertilization in chick.
   ii) Discuss structure and functions of allantois.
   iii) Formation of notochord in Amphioxus.

   B) Functions of placenta. **4**

4. Answer **any two** of the following : **10**
   i) Gastrulation in Amphioxus.
   ii) Fate map.
   iii) Oogenesis.

5. Answer **any one** of the following : **10**
   i) Describe the chick embryo of about 72 hrs. incubation.
   ii) Describe the different types of cleavages.

SLR-Z – 215

Seat No.	

B.Sc. – III (Semester – V) (New) Examination, 2015
MATHEMATICS (Special Paper – XII)
Partial Differential Equations

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Select the correct alternative for each of the following : **10**

1) The equation $P_p + Q_q = R$ is known as _____
   a) Charpits equation b) Lagrange's equation
   c) Bernoullis equation d) Clairaut's equation

2) The solution of auxiliary equation $zp = -x$ is _____
   a) $\phi(x^3 + y^3, y) = 0$ b) $\phi(x^2 - z^2, y) = 0$
   c) $\phi(x^2 + z^2, y) = 0$ d) $\phi(x^3 - z^3, y) = 0$

3) The partial differential equation obtained by eliminating the arbitrary function ϕ from $z = \phi(x+y)$ is _____
   a) $z = pq$ b) $z = p + q$ c) $pq = 1$ d) $p = q$

4) The complete integral of $\sqrt{p} + \sqrt{q} = 1$ is _____
   a) $z = ax + (1 - a^2) + c$ b) $z = ax + (a - 1)^2 y + c$
   c) $z = ax + (1 - a^2)y + c$ d) $z = ax + (1 - \sqrt{a})^2 y + c$

5) The complete integral of $p^2 = qz$ is _____
   a) $\log z = a(x + ay) + b$ b) $z = a(x + ay) + b$
   c) $\log z = a(x - ay) + b$ d) $\log z = (x + ay) + b$

6) The first order partial differential equations $p = P(x, y)$, $q = Q(x, y)$ are compitible if and only if _____
   a) $\frac{\partial P}{\partial x} = \frac{\partial Q}{\partial y}$ b) $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$ c) $\frac{\partial P}{\partial x} = -\frac{\partial Q}{\partial y}$ d) $\frac{\partial P}{\partial y} = -\frac{\partial Q}{\partial x}$

P.T.O.

7) How many arbitrary constants are there in particular integral of $\phi(D, D')z = f(x, y)$ is _____

a) one b) two

c) order of equation d) none of these

8) The complete integral of $2r - 5s + 2t = 0$ is _____

a) $z = \phi_1(y + x/2) + \phi_2(y + 2x)$ b) $z = \phi_1(y - x/2) + \phi_2(y - 2x)$

c) $z = \phi_1(y - x) + \phi_2(y - 2x)$ d) $z = \phi_1(y + x) + \phi_2(y + 2x)$

9) The P.I. of $\frac{1}{(D + D')^2} e^{2x-3y}$ is _____

a) e^{2x-3y} b) $-e^{2x-3y}$ c) $\frac{1}{25} e^{2x-3y}$ d) $-\frac{1}{25} e^{2x-3y}$

10) The particular integral of $\frac{1}{D + mD'} f(x, y) =$ _____

a) $\int f(x, c - mx)dx$ b) $\int f(x, c + mx)dx$

c) $\int f(y, c + mx)dx$ d) $\int f(y, c - mx)dx$

2. Attempt **any five** of the following : **10**

1) Form a p.d.e. by eliminating arbitrary constant a, b from the relation $z = ax + (1 - a)y + b$.

2) Solve $\left(\frac{y^2 z}{x}\right)p + xzq = y^2$.

3) Show that the differential equation $\frac{\partial z}{\partial x} = 8x + 7y$, $\frac{\partial z}{\partial y} = 7x + 5y$ are compitable.

4) Find complete integral $p^2 + q^2 = m^2$.

5) Solve $\left(D^3 - 7DD'^2 + 6D'^3\right)Z = 0$.

6) Solve $\left(D^2 - D'^2 + D - D'\right)Z = 0$.

3. A) Attempt **any two** of the following : **6**

   1) Eliminating arbitrary functions f and g from $z = y f(x) + x g(y)$.

   2) Find singular integral from $2xz - px^2 - 2qxy + pq = 0$.

   3) Solve $(D^2 + 3DD' + 2D'^2)Z = 2x + 3y$.

   B) Explain the method of solving the equation of the form $f(p, q, z) = 0$. **4**

4. Attempt **any two** of the following : **10**

   1) Solve $z(x + y)\, p + z(x - y)q = x^2 + y^2$.

   2) If $(bD - aD')$ is factor of $f(D, D')$ then prove that

   $$\frac{1}{(bD - aD')^n}\phi(ax + by) = \frac{x^n}{n!\, b^n}\phi(ax + by).$$

   3) Solve $(D - D' - 1)(D - D' - 2)z = \sin(x + 2y)$.

5. Attempt **any one** of the following : **10**

   1) Explain the method of partial differential equation by eliminating arbitrary function ϕ from the equation $\phi(u, v) = 0$ where u and v are functions of x, y and z and hence solve $x + y + z = f(x^2 + y^2 + z^2)$.

   2) Explain Charpits method of the solving p.d.e. $f(x, y, z, p, q) = 0$ where x and y are independent variable and $p = \frac{\partial z}{\partial x}$, $q = \frac{\partial z}{\partial y}$ and hence solve $q = 3p^2$.

SLR-Z – 216

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
STATISTICS (Special Paper – XII) (New)
Operations Research and Applied Statistics

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Use of simple or scientific calculator is allowed.
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select most correct alternative : **10**

i) In standard form of LPP,
   a) the decision variables are unrestricted in sign
   b) the constraints are strict equations
   c) the constraints are inequalities of $\leq$ type
   d) the constraints are inequalities of $\geq$ type

ii) The transportation problem is balanced, if
   a) total demand equals total supply irrespective of the number of sources and destinations
   b) total demand and total supply are equal and the number of sources equals the number of destinations
   c) number of sources matches with the number of destinations
   d) none of the routes is prohibited

iii) Given a system of m simultaneous linear equations in n unknowns (m < n), the number of basic variables will be
   a) n b) n – m c) n + m d) m

iv) The initial solution of a transportation problem obtained by
   a) North-West corner rule would invariably be optimum
   b) VAM would invariably be very near to optimum solution
   c) Least cost method does not provide the least cost solution to a T.P.
   d) MODI method is infeasible

P.T.O.

v) If two constraints do not intersect in the positive quadrant of the graph, then
   a) one of the constraint is redundant
   b) the solution is unbounded
   c) the solution is infeasible
   d) none of these

vi) The assignment problem is a special case of transportation problem in which number of origins
   a) is less than or equal to the number of destinations
   b) is greater than the number of destinations
   c) equals the number of destinations
   d) is less than the number of destinations

vii) Network problems have advantage in terms of project
   a) scheduling b) planning
   c) controlling d) all of the above

viii) In a Single Sampling Plan if the lot size N is large relative to the sample size n, then we may write the equation of AOQ approximately as
   a) pnP_a b) $(1 - p)P_a$ c) pP_a d) none of these

ix) In critical path analysis, CPM is
   a) event oriented b) probabilistic in nature
   c) deterministic in nature d) dynamic in nature

x) In a Single Sampling Plan of n = 80 and c = 2, the lot is accepted if the number of observed defectives d is
   a) greater than 2 b) less than 2
   c) greater than or equal to 2 d) less than or equal to 2

2. Answer **any five** of the following : **10**

i) Define a L.P.P.

ii) Define an artificial variable.

iii) What is a balanced Transportation Problem ?

iv) What is an unbalanced Assignment Problem ?

v) Define Consumer's risk.

vi) Define most likely time in a PERT.

3. A) Answer **any two** of the following : **6**

i) Define a basic feasible solution, a degenerate solution and a non-degenerate solution to a LPP.

ii) Define total float, free float and independent float.

iii) Convert the following L.P.P. in its standard form.

Maximize $z = 30\ x_1 + 20\ x_2$

subject to :

$$x_1 + x_2 \geq -4$$

$$x_1 - x_2 \leq 2$$

and $x_1\ ,\ x_2 \geq 0$.

B) The following assignment problem shows the costs of assigning four jobs to four machines. Determine the optimum assignment schedule. **4**

		Machines			
		1	**2**	**3**	**4**
Jobs	A	80	40	20	60
	B	0	90	50	50
	C	30	80	90	20
	D	40	30	10	0

4. Answer **any two** of the following : **10**

i) In a Single Sampling Plan if N = 20,000, n = 100, c = 2, p = 0.01 and $P_a = 0.9397$, then calculate the average total inspection per lot and average outgoing quality.

ii) Explain North-West corner method.

iii) Write a procedure of Single Sampling Plan.

5. Answer **any one** of the following : **10**

i) Solve the following LPP by Graphical method

Minimize $z = 8x_1 + 4x_2$

subject to :

$x_1 + 2x_2 \geq 2$,

$3x_1 + x_2 \geq 3$,

$4x_1 + 3x_2 \geq 6$ and

$x_1, x_2 \geq 0$.

ii) A project schedule has the following activities and the time (in months) of completion of each activity is as follows :

Activity	1 – 2	2 – 3	2 – 4	3 – 5	4 – 5
Time	7	5	10	6	3

Draw the network diagram. Find the minimum time of completion of the project and slack time of each activity. Show the critical path.

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SLR-Z – 217

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
GEOLOGY (Special Paper – XII) (New)
Hydrogeology and Remote Sensing

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagram **wherever** necessary.*

1. Fill in the blanks with correct answer from the given options : **10**

1) A rock or sediment that stores and transmits water, but not enough to be economic is called an _____

a) aquifer b) aquiclude
c) aquitards d) none of the above

2) In a group of nearby wells, the well that produces the most water probably is the one with _____

a) the smallest cone of depression
b) the largest cone of depression
c) the highest water table
d) none of the above

3) If the water in a piezometer tapping an aquifer stands above ground level the aquifer is said to be _____

a) equipotential b) artesian
c) confined d) perched

4) Which of the following is likely to be an AQUICLUDE ?

a) sandstone b) shale
c) conglomerate d) none of the above

5) The water table _____
   a) parallels the land surface
   b) parallels the land surface but has less relief
   c) parallels the land surface but has greater relief
   d) is a mirror image of the land surface

6) The overlap in the photograph is _____% in hilly terrain.
   a) 15 – 30 b) 20
   c) 30 d) 60

7) Principal point is the point of _____ of the photograph.
   a) genetic center b) geometric center
   c) the center of field of view d) both a) and c)

8) The vertical aerial photographs are used for _____ study.
   a) cartography b) natural resources
   c) both a) and b) d) none of the above

9) Scale of the photograph is the function of _____
   a) flying height of the aircraft
   b) focal length of the camera
   c) both a) and b)
   d) none of the above

10) Ground water existence can be marked in sedimentary terrain if the aerial photograph shows _____
   a) forest b) sand dunes
   c) dyke d) crater

2. Answer **any five** of the following : **10**

1) What is Quanat ?
2) Define surface runoff.
3) What is spring ?
4) What is Remote sensing ?
5) What is sensor ?
6) What is platform ?

3. A) Answer **any two** of the following : **6**
   1) Write the historical background of ground water.
   2) Scale of aerial photograph.
   3) Uses of ground water.

   B) Contact spring. **4**

4. Answer **any two** of the following : **10**
   1) Explain what ground water basin is and add note on watershed development.
   2) Describe the elements of photo recognition.
   3) Write note on types of sensors.

5. Answer **any two** of the following : **10**
   1) What is ground water ? Describe the secondary porosity in rocks and how it affects the ground water. Give examples.
   2) Draw figure of artesian aquifer and explain it.
   3) Explain main types of platforms used in photo geology/RS.

SLR-Z – 218

Seat No.	

B.Sc.-III (Semester – V) (New) Examination, 2015
MICROBIOLOGY (Special) (Paper No. XII)
Immunology

Day and Date : Monday, 16-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1) Figures to* ***right*** *indicate* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*
3) Draw ***neat labelled*** *diagrams* ***wherever*** *required.*

1. Rewrite the sentences after choosing correct answer from the given alternatives : **10**

i) One principle function of complement is to _____
   a) inactivate perforins
   b) mediate the release of histamine
   c) bind antibodies attached to cell surface and to lyse these cells
   d) phagocytise antigens

ii) T-suppressor cells carry _____ molecules as its specific marker.
   a) CD4 b) CD8 c) CD9 d) CD3

iii) _____ is an example of type III hypersensitive reaction.
   a) anaphylaxis b) autoimmune haemolytic anaemia
   c) serum sickness d) contact dermatitis

iv) Person with 'O' blood group lacks _____ antigen on his RBCs.
   a) B only b) A only c) Both A and B d) H antigens

v) Autoantibodies against acetyl-choline receptors are produced in _____
   a) Rheumatoid arthritis b) Myasthenia gravis
   c) Goodpasture's syndrome d) Pernicious anaemia

vi) Cytokines _____
   a) are lymphokines
   b) are monokines
   c) help to control and regulate immune response
   d) all of these

P.T.O.

vii) IgE is produced by _____ cells.
a) Mast cells b) T cells c) B cells d) Macrophage

viii) T-helper cells carry _____ molecules as its specific marker.
a) CD4 b) CD8 c) CD9 d) CD3

ix) How many polypeptide chains are present in IgG molecule ?
a) 1 b) 2 c) 4 d) 8

x) The predominant antibody in saliva is
a) IgG b) IgA c) IgM d) IgD

2. Answer in **one** or **two** sentences (**any five**) : **10**

i) Macrophase

ii) IgM antibody

iii) Autoimmunity

iv) Monoclonal antibody

v) Antigen

vi) B-Lymphocyte.

3. A) Write in brief (**any two**) : **6**

i) Rh blood group system.

ii) Diagnosis of SLE.

iii) Describe functions of cytokines.

B) Describe production of monoclonal antibodies by using hybridoma technology. **4**

4. Answer **any two** : **10**

i) Describe what is autoimmunity with two examples.

ii) How ABO and Rh blood grouping is done ?

iii) Write on HLA typing.

5. Answer **any two** : **10**

i) Mechanism of antibody production.

ii) ABO blood group system.

iii) Write on mechanisms of immunological tolerance.

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SLR-Z – 219

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
ELECTRONICS (Special Paper – XII) (New)
Sensors and Instrumentation

Day and Date : Monday, 16-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagrams **wherever** necessary.*
*4) **Use** of log-table and calculator is **allowed**.*

1. Select correct alternative : **10**

i) The smallest change in the measured variable to which the instrument responds is called _____

a) sensitivity b) reproducibility

c) range or span d) linearity

ii) The behavior of a measurement system subjected to rapidly changing input quantity is called _____

a) fidelity b) dynamic error

c) dynamic response d) measurement lag

iii) The transducer used in weighing machine is _____

a) LVDT b) load cell

c) Piezoelectric sensor d) capacitive transducer

iv) The photoconductive material used in LDR is _____

a) gallium arsenide

b) gallium phosphide

c) cadmium sulphide

d) silicon dioxide

v) In electromagnetic relay, the moving arm is _____

a) yoke b) pivot

c) NC or NO contacts d) armature

vi) As far as power consumption is concerned LCD displays consume _____ power when compared to LED displays.

a) more b) less c) same power d) no power

vii) An electronic circuit in which low frequency dc signal is converted into an ac signal, amplified by a standard amplifier and finally converted back to dc signal is called _____

a) inverter b) rectifier

c) clamper d) chopper

viii) In instrumentation amplifier, the output voltage is the product of _____

a) gain and difference of input signals

b) difference and sum of input signals

c) gain and ratio of input signals

d) none of these

ix) Normally, a data acquisition system is an _____ measurement system and data logger is an _____ measurement system.

a) on-line, off-line b) on-line, on-line

c) off-line, off-line d) off-line, on-line

x) In multichannel data acquisition system _____ unit is used to scan the conditioned outputs from different input channels.

a) multiplexer b) controller

c) A/D converter d) Buffer

2. Answer **any five** (**two** marks **each**) : **10**

i) Define accuracy and precision of a measurement system.

ii) Give the classification of sensors.

iii) List the important specifications of LM35 sensor.

iv) Draw the diagram for common-anode seven segment LED display.

v) Give the advantages of instrumentation amplifier.

vi) Give the objectives of data acquisition system.

3. A) Answer **any two** (**three** marks **each**) : **6**

   i) Draw the block diagram of a measurement system and explain in brief.

   ii) Discuss in brief angular displacement sensor.

   iii) Explain the construction and working of electromagnetic relay.

   B) Write a note on X-Y recorder. **4**

4. Answer **any two** (**five** marks **each**) : **10**

   i) Explain the role of grounding, shielding and isolation in a signal conditioning system.

   ii) Discuss the principle, construction and operation of solar cell.

   iii) Write a note on single channel DAS.

5. Answer **any one** : **10**

   i) Explain with suitable circuit diagram the working of bridge amplifier as a signal conditioner and obtain the equation for output voltage.

   ii) Explain the principle, construction and operation of bonded strain gauge. Give the equation for gauge factor.

SLR-Z – 220

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
Computer Science (Special Paper – XII) (New)
DATA COMMUNICATION AND NETWORKING – I

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative. **10**

1) Radio waves are _____
   a) unidirectional b) omnidirectional
   c) bidirectional d) none

2) _____ refers to the variation in the packet arrival time.
   a) De facto standard b) Protocol
   c) Semantic d) Jitter

3) In _____ topology every device is connected to every other device.
   a) Bus b) Star c) Ring d) Mesh

4) The _____ protocol is used to associate a logical address with physical address.
   a) ICMP b) IGMP c) ARP d) CIP

5) The _____ layer is responsible for moving frames from one hop to next.
   a) Network b) Transport c) Data link d) Physical

6) _____ scheme maintains synchronization between two communicating devices without clocking signal.
   a) Synchronous b) Asynchronous
   c) FDM d) TDM

7) Congestion in network may occur if the _____ on the network.
   a) accident b) load c) abnormality d) all

8) _____ technique increases the data rate of Modem.
   a) Error correction b) Error detection
   c) Compression d) Packaging

9) The stop and wait ARQ, Go back N ARQ are for _____
   a) noisy b) noiseless c) both d) none

10) Router operates in _____ layer of OSI model.
   a) 1 b) 3 c) 4 d) 6

2. Solve **any five**. **10**
   1) Which entities are required for communication ?
   2) What is collision ?
   3) What is modem ?
   4) Explain Fiber optics.
   5) Explain Multicast Routing.
   6) List various types of Errors.

3. A) Solve **any two**. **6**
   1) What is CSMA/CD ?
   2) State Nyquist and Shannon's theorem.
   3) Write various applications of Internet.

   B) Explain OSI Vs TCP/IP. **4**

4. Solve **any two**. **10**
   1) What is Packet switching ? List the advantages.
   2) Explain stop and wait ARQ protocol.
   3) Write the difference between connection oriented and connection less services.

5. Solve **any two**. **10**
   1) Write a note on unguided media.
   2) What is Routing ? Explain shortest path algorithm.
   3) What is congestion ? What are the causes of congestion ?

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SLR-Z – 221

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
ENGLISH (Comp.) (Old)
Countdown – English Skills for Success

Day and Date : Thursday, 29-10-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct alternative : **10**

1) C. V. Raman was born on _____
   a) 8th November b) 8th March c) 8th May d) 8th June

2) C. V. Raman completed his school education at the age of _____
   a) 09 b) 11 c) 13 d) 10

3) Anu George talks about how the district administration _____
   a) Was taken by surprise b) Was helpless
   c) Copes with disaster d) Was idle

4) According to Ravindranath Tagore for a boy of _____ his own home is the only Paradise.
   a) Ten b) Twelve c) Fourteen d) One

5) According to the poet the human soul _____
   a) Is deathless
   b) Is not what it seems
   c) Slumbers and the eventually dies
   d) Does not exist

6) The speaker in 'Village Song' calls upon _____ during a crisis that may befall her.
   a) Her mother b) Divine intervention
   c) Her brother d) Her father

7) The speaker of 'Village Song' was lured by _____
   a) The Horseman's Song b) The Boatman's Song
   c) The Natural Beauty d) Flowing River

P.T.O.

8) Look how cloudy it is ! There _____ be rain tonight.
   a) Will b) Been c) Are d) Was

9) I _____ have given you a lift to office.
   a) Can b) Could c) Should d) May

10) If the reported speech is a question sentence starting with a helping verb, the conjunction _____ is used.
   a) If or whether b) Said c) That d) Who

2. Answer **any five** of the following within **three** to **four** sentences : **10**

1) Why did Raman move to Calcutta ?

2) Why did Raman express his gratitude to the person who disqualified him from the Indian Civil Service ?

3) Why was the district administration in a hurry to dispose of dead bodies ?

4) What steps were taken to facilitate communication between the people involved in the relief work ?

5) How was Phatik's relationship with his mother ?

6) How did Phatik's aunt treat him during his stay in Calcutta ?

3. A) Write in brief of **any two** of the following questions : **6**

1) What does the poet, H. W. Longfellow, compare our heartbeats to ? Why ?

2) What is the advice of the poet in 'A Psalm of Life' ?

3) What is the theme of 'Village Song' ?

B) Attempt **any two** of following : **4**

1) What are the different kinds of presentations ?

2) What are the steps of preparation of presentation ?

3) Write a brief news-report on 'Flood in Jammu-Kashmir'.

4. A) Write a report on 'A trip to Mahabaleshwar'. **10**

OR

B) Write a detailed note on the use of language for presentation. **10**

5. Write group discussion on 'Corruption of Some Political Leaders'. **10**

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SLR-Z – 222

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
PHYSICS (Special Paper – IX)
Mathematical Physics and Statistical Physics (Old)

Day and Date : Thursday, 5-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Draw diagrams ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) Use of calculators is ***allowed****.*

1. Select the correct alternatives : **10**

1) The three coordinates of spherical polar co-ordinates system are

a) (x, y, z) b) (r, θ, ϕ) c) (r, θ, z) d) (r, θ, x)

2) In Cartesian coordinate system $h_1 = h_2 = h_3 =$ _____

a) 0 b) 1 c) r. d) ϕ

3) The scalar product of the three vectors a, b and c is defined as

a) a . (b . c) b) a . (b × c) c) a × (b × c) d) a × (b . c)

4) Gradient of scalar point function is

a) a scalar b) a vector c) a tensor d) none of above

5) Phase space is the combined _____ space.

a) position and moment b) position and momentum

c) moment and momentum d) position and displacement

6) All accessible microstates corresponding to a possible macrostate are _____

a) less probable b) more probable

c) equally probable d) unequally probable

P.T.O.

7) The most probable speed for the molecules in an assembly on Maxwell Boltzmann law of distribution is

a) $V_{mp} = \sqrt{\frac{2kT}{m}}$ b) $V_{mp} = \sqrt{\frac{3kT}{2m}}$

c) $V_{mp} = \sqrt{\frac{kT}{2m}}$ d) $V_{mp} = \sqrt{\frac{kT}{m}}$

8) Which of the following particals are Bosons ?

a) electrons b) gas molecules

c) photons d) neutrons

9) Stefan's constants σ, Planck's constant h and Boltzmann constant k are related by expression

a) $\sigma = \frac{2\pi^5 k^4}{15 h^3 c^2}$ b) $\frac{2c^5 h^4}{15 k^3 \pi^2}$

c) $\frac{2k^5 \pi^4}{15 c^3 h^2}$ d) $\frac{4k^2 \pi^3}{17 c^3 h^2}$

10) The energy of the highest filled quantum state in an atom is called the _____

a) Free energy b) Fermi energy

c) Fermi-Dirac energy d) Bose energy

2. Answer **any five** of the following : **10**

1) What is phase space ?

2) State physical significance of divergence of vector function.

3) Define : Macrostate and Microstate of system.

4) Define ensembles and give its types.

5) Define molecular speeds and partition function.

6) Define most probable speed and give its relation.

3. A) Answer **any two** of the following : **6**
   1) Distinguish between M-B and B-E statistics.
   2) Obtain an expression for laplacian operator ∇^2 in orthogonal curvilinear coordinates.
   3) Derive the expression for relation showing entropy and probability.

   B) From M-B distribution law for speed, derive an expression for average velocity. **4**

4. Answer **any two** of the following : **10**
   1) Obtain an expression for Steafan's law from Planck's formula.
   2) Derive an expression for curl of vector in orthogonal curvilinear coordinate system.
   3) What are the thermodynamic functions ? Express them in terms of the Boltzmann partition function.

5. Answer **any one** of the following : **10**
   1) Derive an expression for Fermi Dirac distribution law.
   2) State and explain Gauss divergence theorem.

SLR-Z – 224

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
BOTANY (Special Paper – IX)
Biology of Cryptogams (Old)

Day and Date : Thursday, 5-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) ***All*** *questions carry* ***equal*** *marks.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) Draw neat and labeled diagrams ***wherever*** *necessary.*

1. Rewrite the sentences by choosing correct alternative : **(1×10 = 10)**

1) Ascocarp is formed by _____ fungus
   a) *Polyporus* b) *Albugo*
   c) *Uncinula* d) *Puccinia*

2) Sexual reproduction by somatogamy is observed in
   a) *Chara* b) *Polyporus*
   c) *Albugo* d) *Uncinula*

3) In *Albugo*, the plasmogamy occurs by
   a) gametangial contact b) gametangial copulation
   c) somatogamy d) planogametic copulation

4) _____ type of sexual reproduction is observed in *Chara*
   a) Isogamous b) Oogamous
   c) Anisogmous d) Both a and b

5) Haplontic type life cycle is dominated by _____ generation.
   a) tetraploid b) diploid c) triploid d) haploid

6) The sporophyte of *Marchantia* is without

a) foot b) seta c) capsule d) columella

7) Carpogonium is the sex organ of

a) *Chara* b) *Sargassums*

c) *Batrachospermum* d) Both a and b

8) One gemma body of *Marchantia* gives rise to _____ plants after germination

a) two b) three c) four d) five

9) Corticating threads are formed in

a) *Polyporus* b) *Ectocarpus* c) *Albugo* d) *Chara*

10) _____ is known as wood rotting fungus.

a) *Albugo* b) *Uncinula* c) *Polyporus* d) *Puccinia*

2. Answer **any five** of the followings : **(5×2 = 10)**

i) Sketch and label, the aerial stem T. S. of *Psilotum*.

ii) State the economic importance of Mushrooms.

iii) Sketch and label the cleistothecium of *Uncinula*.

iv) State the economic importance of *Albugo*.

v) What is phycology ?

vi) Define sex in algae.

3. A) Answer **any two** of the followings : **(2×3 = 6)**

i) Describe the diplohaplontic type life cycle in algae.

ii) Describe the origin of sex in algae.

iii) Describe the sori of pteridophytes.

B) Describe the sexual reproduction in *Ectocarpus*. **4**

4. Answer **any two** of the followings : **(2×5 = 10)**
   i) Describe the sexual reproduction in *Chara*.
   ii) Describe the vegetative reproduction in *Marchantia*.
   iii) Describe the carposporophyte of *Batrachospermum*.

5. Answer **any two** of the followings : **(2×5 = 10)**
   i) Describe the multicellular forms of algae with suitable example.
   ii) Describe the asexual reproduction in *Albugo*.
   iii) Describe the sporocarp of *Marsilea*.

SLR-Z – 225

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
ZOOLOGY (Special Paper – IX) (Old)
Non-Chordates

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Select the appropriate answer from **each** of the following and rewrite the sentence : **10**

i) _____ is a function of gastrozoids in coelenterate colony.
a) Respiration b) Reproduction
c) Digestion d) Excretion

ii) Nauplius is a larva of _____
a) Mollusca b) Crustacea
c) Sporozoa d) Mastigophora

iii) Ecdysone hormone in insects is secreted by _____
a) Carpora allata b) Carpora cardiaca
c) Cerebral neurosecretory cells d) Prothoracic gland

iv) Peripatus belongs to _____
a) Onychophora b) Thysanura
c) Mollusca d) Echinodermata

v) Leech is _____
a) Carnivorous b) Frugivorous
c) Herbivorous d) Sanguivorous

vi) Number of testes in hirudinaria are _____
a) 2-pairs b) 21-pairs c) 6-pairs d) 11-pairs

vii) _____ crop chambers are found in Leech.
a) 8 b) 9 c) 10 d) 11

viii) In sea star, stone canal connects the _____ of water-vascular system.
a) Ring canal with pollian vesicles
b) Ring canal with radial canal
c) Madriporite with ring canal
d) Madriporite with pollian vesicles

ix) Sea star belongs to the class _____
a) Cucumaria b) Holothoroidia
c) Echinoidia d) Asteroidia

x) Cell drinking phenomenon is termed as _____
a) Ingestion b) Pinocytosis
c) Phagocytosis d) Circumfluence

2. Answer **any five** of the following : **10**
i) Autotropic nutrition protozoa.
ii) Leuconoid type of canal system.
iii) Multiple fission in protozoa.
iv) Cocoon of Leech.
v) Oligopoda larva.
vi) Salient features of Lingula.

3. A) Answer **any two** of the following : **6**
i) Bipinnaria larva.
ii) Locomotion in Leech.
iii) Megalopa larva.

B) Describe coral reef formation. **4**

4. Answer **any two** of the following : **10**
i) Describe digestive system of Leech.
ii) Describe polymorphism in Coelenterata.
iii) Explain different types of insect larvae.

5. Answer **any one** of the following : **10**
i) Describe male reproductive system in Leech.
ii) Describe water-vascular system in sea star.

SLR-Z – 226

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MATHEMATICS (Old)
Real Analysis (Special Paper – IX)

Day and Date : Thursday, 5-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose correct alternative for **each** of the following : **10**

1) The set of real numbers in (0, 1) is
   a) Countable b) Uncountable
   c) Both a) and b) d) None of these

2) Which is not correct for $f : X \to Y$ where $A, B \subseteq X$ $P, Q \subseteq Y$?
   a) $f(A \cup B) = f(A) \cup f(B)$ b) $f(A \cap B) = f(A) \cap f(B)$
   c) $f^{-1}(P \cup Q) = f^{-1}(P) \cup f^{-1}(Q)$ d) $f^{-1}(P \cap Q) = f^{-1}(P) \cap f^{-1}(Q)$

3) Sequence {1, 2, 1, 4, 1, 6 ...} is
   a) Convergent b) Divergent c) Oscillatory d) None of these

4) Sequence $\{\text{Cos}(n)\}_{n=1}^{\infty}$ is
   a) Monotonic increasing b) Non-monotonic
   c) Monotonic decreasing d) None of these

5) If $a_n \le b_n \le c_n$ and $\lim_{n\to\infty} a_n = 5 = \lim_{n\to\infty} c_n$ then $\lim_{n\to\infty} b_n$
   a) 0 b) 5
   c) ∞ d) None of these

6) $\lim_{n\to\infty} \inf(-n) =$ _____
   a) ∞ b) $-\infty$ c) 0 d) None of these

P.T.O.

7) Monotonic decreasing sequence is convergent if it is
   a) Bounded above
   b) Bounded below
   c) Oscillating
   d) None of these

8) The series $1 + r + r^2 + \ldots$ diverges to $+\infty$ if
   a) $r = -1$
   b) $r = 1$
   c) $r < 1$
   d) None of these

9) The series $\sum a_n$ of positive terms such that $\lim_{n \to \infty} \frac{a_n + 1}{a_n} = l$ then the series diverges if
   a) $l = 1$
   b) $l > 1$
   c) $l < 1$
   d) None of these

10) The series $\sum \frac{1}{n^p}$ is convergent if
   a) $p < 1$
   b) $p > 1$
   c) $p = 1$
   d) None of these

2. Attempt **any five** out of **six** : **10**

1) For f (n) = n + 2 g (n) = Sin (n) find fof and (gog).

2) Prove that $|a - b| \geq ||a| - |b||$ for any two real numbers a and b.

3) Prove that $\{s_n\}$ is convergent if both sequences $\{s_{2n-1}\}$ and $\{s_{2n}\}$ are convergent.

4) Show that $\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$ is monotonic decreasing.

5) Using comparison test, test the convergence of $\sum_{n=2}^{\infty} \frac{1}{n^2 \log^n}$.

6) State D′ Alembert's ratio test.

3. A) Attempt **any two** out of **three** : **6**

   1) Let $f : X \to Y$ and for $A \subseteq X, B \subseteq X$ whether $f(A \cup B) = f(A) \cup f(B)$.

   2) If $\{S_n\}_{n=1}^{\infty}$ is a sequence of real numbers which is convergent then prove that $\{S_n\}_{n=1}^{\infty}$ is bounded.

   3) Define conditional and absolute convergence series with an illustration.

   B) State and prove Cauchy's general principle of convergence. **4**

4. Attempt **any two** of the following : **10**

   1) Prove $f : X \to Y$ is one to one and onto where for $x \in X, y \in Y$ $Y = 3x^2 + 5$.

   2) Prove that every Cauchy sequence is bounded.

   3) Test the convergence of $1 + \frac{x}{1!} + \frac{2^2x^2}{2!} + \frac{3^3x^3}{3!} + ...$

5. Attempt **any one** : **10**

   1) For each $n \in I$; let $I_n = [a_n, b_n]$ be non-empty closed bounded intervals of real numbers such that $I_1 \supset I_2 \supset I_3 \supset ... \supset I_n \supset I_{n+1} \supset ....$ and $\lim_{n \to \infty} (b_n - a_n) = 0$ then prove that $\bigcap_{n=1}^{\infty} I_n$ contains precisely one point.

   2) Discuss the convergence of $\sum_{n=1}^{\infty} \frac{1}{n^p}$ for positive integer p.

SLR-Z – 227

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
STATISTICS (Old)
Statistical Inference – I (Special Paper – IX)

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Multiple choice questions. Choose the correct alternative : **10**

i) Population characteristics is called a
   a) Statistic b) Parameter
   c) Both a) and b) d) None of the above

ii) Estimate is the numerical value of
   a) Estimator b) Statistic
   c) Both a) and b) d) None of the above

iii) The property of efficiency of an estimator is related to
   a) sample size b) variance
   c) both a) and b) d) none of the above

iv) For the population mean, the estimator $\overline{X}$ is
   a) unbiased b) consistent
   c) efficient d) all the above

v) The unbiased estimator for θ of $f(x, \theta) = \frac{1}{\theta} e^{-x/\theta}$ is

   a) $\overline{X}$ b) $\overline{X}^2$ c) $1/\overline{X}$ d) $1/\overline{X}^2$

vi) If T is sufficient for θ, then $\phi(T)$ is sufficient for $\phi(\theta)$ if the function ϕ is
   a) Linear b) Continuous
   c) Exponential d) One-to-one

P.T.O.

vii) For an estimator to be consistent, the property of unbiasedness is

a) Sufficient b) Necessary

c) Both a) and b) d) None of the above

viii) Cramer Rao Inequality is valid in case of

a) continuous variables b) discrete variables

c) both a) and b) d) neither a) nor b)

ix) The Maximum Likelihood Estimator (MLE) for θ of N(0, θ) is

a) $\sum X_i^2/n$ b) $\sqrt{\sum X_i^2/n}$

c) $\sum X_i^2/\sqrt{n}$ d) None of the above

x) The sufficient estimator for θ of $f(x, \theta) = \frac{1}{\theta}; 0 \le x \le \theta$ is

a) $\sum X_i/n$ b) $\sum X_i^2/n$

c) Max (X_1, X_2, ..., X_n) d) Min (X_1, X_2, ..., X_n)

2. Answer **any five** of the following : **10**

i) Define a random sample and a statistic.

ii) Giving two examples, define an estimate.

iii) Giving an example, define a biased estimator.

iv) Define Minimum Variance Unbiased Estimator (MVUE).

v) Show that sample mean $\overline{X}$ is a consistent estimator of population mean μ.

vi) Define likelihood function of a random sample.

3. A) Answer **any two** of the following : **6**

i) Explain the concept of point estimation.

ii) Show that sample mean square is an unbiased estimator of population variance.

iii) State the regularity conditions of Cramer-Rao inequality.

B) Let X_1, X_2, ..., X_n be a random sample (r.s.) from B(1, p) distribution. Show that $\sum_1^n X_i$ is sufficient for p. **4**

4. Answer **any two** of the following : **10**

   i) If T is an unbiased estimator of θ, then show that $\phi(T)$ need not be unbiased for $\phi(\theta)$.

   ii) If L is the likelihood function of a r.s. $X_1, X_2, ..., X_n$ from $f(x, \theta)$, show that

   $$E\left(\frac{\partial \log L}{\partial \theta}\right)^2 = -E\left(\frac{\partial^2 \log L}{\partial \theta^2}\right).$$

   iii) Find Fisher information function $I(\theta)$ based on a random sample $X_1, X_2, ..., X_n$ from a Poisson distribution with parameter θ.

5. Answer **any two** of the following : **10**

   i) Let $X_1, X_2, ..., X_n$ be a r.s. from $N(\mu, \sigma^2)$, σ^2 is known. Find Cramer-Rao lower bound for the variance of an unbiased estimator of μ.

   ii) Obtain the MLE of the parameter P based on a r.s. $X_1, X_2, ..., X_m$ from B(n, p) population with n known.

   iii) Let $X_1, X_2, ..., X_n$ be a r.s. from $U(0, \theta)$ distribution. Find the estimator of θ by the method of moments.

SLR-Z – 228

Seat No.	

B.Sc. – III (Semester – V) (Old) Examination, 2015
GEOLOGY (Special Paper – IX)
Earth's Physics and Dynamics

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Draw** neat labelled diagrams **wherever** necessary.*

1. Fill in the blanks with correct answer from given options : **10**

1) The magnetic normals reversals are well documented in the rocks flanking the _____
   a) Mid-Oceanic ridges b) Transform faults
   c) Oceanic trenches d) Dip-slip faults

2) Which one of following plates is larger plate ?
   a) China plate b) Arabian plate
   c) Cocoas plate d) Indian plate

3) Lithosphere constitute _____
   a) Sial and Sima b) Crust and mantle
   c) Crust and upper mantle d) Lower mantle and upper core

4) The oldest sea is _____
   a) Red Sea b) Arabian Sea
   c) Dead Sea d) Black Sea

5) Airy postulated the hypothesis of isostasy considering the _____ density of the outer crust.
   a) Varying b) Uniform c) Very high d) Very low

6) Coal is a climatic indicator of _____ climate.
   a) Humid b) Cold c) Arid d) Dry

7) _____ fossils have been discovered in the lands of Gondwana.
   a) Glossopteris b) Productus c) Pectene d) Physa

P.T.O.

8) Mid-Atlantic oceanic ridge is an example of _____ plate boundary.
   a) Transform fault b) Convergent
   c) Divergent d) Passive

9) The movement along transform fault is _____ slip.
   a) Dip b) Strike c) Oblique d) Rotational

10) In _____ zone all kinds of earthquakes are originated.
   a) Rift b) Shear c) Shatter d) Benioff

2. Answer **any five** of the following : **10**

   i) What are the types of orogenic forces ?

   ii) Classification of mountains based on their height.

   iii) State Heiskanen's hypothesis.

   iv) Where benioff zone is located ?

   v) What is average thickness of asthenosphere ?

   vi) Define subduction zone.

3. A) Answer **any two** of the following : **6**
   i) What is level of compensation ?
   ii) Describe palaeo-climatic evidences of continental drift.
   iii) What are the characteristics of Fold Mountains ?

   B) Explain mechanism of plate motion. **4**

4. Answer **any two** of the following : **10**

   i) Explain in detail plate margin and plate boundary.

   ii) Write short notes on tectonic mountains.

   iii) Describe in brief Wegener's theory of continental drift.

5. Answer **any two** of the following : **10**

   i) Describe convergent plate boundaries.

   ii) Explain in detail Pratt's hypothesis for isostasy.

   iii) Describe evidences of sea floor spreading.

_____

SLR-Z – 229

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MICROBIOLOGY (Special Paper – IX) (Old)
Virology, Extremophiles and Bioinformatics

Day and Date : Thursday, 5-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentences after choosing correct answer from the given alternatives : **10**

1) One step growth experiment was devised by _____
   a) Watson b) Crick c) Lederberg d) Delbruk

2) Influenza virus is with _____
   a) Non segmented genome b) Segmented genome
   c) Spherical genome d) Linear genome

3) Breast Cancer in mice is caused by _____
   a) Raus Sarcoma Virus b) Adenovirus
   c) Poxvirus d) Bittner virus

4) Polystyrene latex is used for enumeration of viruses in sample by _____
   a) Pock method b) Direct microscopic count
   c) Acid end point method d) Hemagglutation assay

5) _____ grows at extreme acidic pH of acid mine range.
   a) Vibrio spp. b) Hydrogenomonas
   c) Thiobacillus spp. d) Pseudomonas spp.

6) LHT system of viral classification grouped DNA viruses into _____ class.
   a) Retroviruses b) Deoxyvira c) Retroviridae d) Deoxyvira

7) The naturally occurring alkaline environment on earth is _____
   a) Hot spring b) Deep ocean c) Soda lake d) Deep wells

P.T.O.

8) _____ organism can grow at temperature range 70°C – 100°C at pH-6.
   a) Desulfococcus b) *Thermotoga maritima*
   c) Methanomonas d) Sulfolobus

9) _____ is process of discovering meaningful patterns and relationships, which is hidden in very large data base with automated analysis.
   a) Database b) Datamining c) Annotation d) Algorithm

10) In the term BLAST the letter "B" stands for _____
   a) Basic b) Biological
   c) Bioinformatics d) Biotechnology

2. Answer **any five** of the following : **10**
   i) Explain hyperthermophiles.
   ii) What is NCBI ?
   iii) Define bioinformatics.
   iv) Define vertical transmission process in animal viruses.
   v) Explain Eclipse period.
   vi) Define Barophilic organisms.
   vii) What is latent period ?

3. A) Answer **any two** of the following : **6**
   a) Describe briefly cell cultures used for cultivation of viruses.
   b) Discuss in detail the reproduction of T_4 Bacteriophages.
   c) Briefly explain intracellular development of influenza virus.

   B) Discuss briefly adenoviruses. **4**

4. Answer **any two** of the following : **10**
   i) Explain in detail oncogenesis.
   ii) Briefly explain the LHT system of viral classification.
   iii) Give the detailed account of lysogeny of lambda phage.

5. Write in short on **any two** of the following : **10**
   i) Explain in detail applications of bioinformatics.
   ii) Give the detailed account of extremophiles.
   iii) Describe briefly methods used for cultivation of viruses.

_____

SLR-Z – 231

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
Visual Programming (Old)
COMPUTER SCIENCE (Special Paper – IX)

Day and Date : Thursday, 5-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

1. Choose the correct alternative : **10**

1) In a Hash table key cannot be null but value can be

a) True b) False

2) In which of the following collections is the input/output index-based ?

a) Stack b) Queue

c) Bit Array d) Array List

3) Which of the following is NOT a .NET Exception class ?

a) Exception b) Stack Memory Exception

c) Divide By Zero Exception d) Out Of Memory Exception

4) In C#.NET if we do not catch the exception thrown at runtime then which of the following will catch it ?

a) Compiler b) CLR

c) Linker d) Loader

5) Which of the following can be declared in an interface ?

a) Properties b) Methods

c) Enumeration d) Events

6) Which of the following is the necessary condition for implementing delegates ?

a) Class declaration b) Inheritance

c) Run-time Polymorphism d) None of these

7) An enumeration is set of

a) Integer b) Constant

c) Named integer and constants d) None of these

8) The mechanism of linking a function with an object at compile time is

a) Static binding b) Late binding

c) Early binding d) Dynamic binding

9) The abstract classes cannot be declared as sealed

a) True b) False

10) The Dictionary is collection of

a) Value b) Key

c) Number d) Value and Key

2. Attempt **any five** of the following : **10**

1) What is inclusion Polymorphism ?

2) Explain the looping constructs in C# with syntax and example.

3) Write short notes on the following controls :

i) Radio button

ii) Group box

4) Explain in detail about the activities of CLR.

5) Explain about enumerators and structures in C#.

6) Explain about various Namespaces of .NET framework.

3. A) Answer **any two** of the following : **6**

   1) What is status bar ? Write a program to create status bar and explain.

   2) What is event ? How events are created ? Give example.

   3) Explain in detail about Exception Handling.

   B) Write a program for the controls List box and Combo box. **4**

4. Answer **any two** of the following : **10**

   1) Explain in detail about various methods for handling files and directories .

   2) What is the use of Binary Reader and Binary Writer ? Explain with suitable example program.

   3) Explain about interfaces in C#.

5. Answer **any two** of the following : **10**

   1) What is the use of Stream Reader and Stream Writer ? Explain with suitable example.

   2) What are multicast delegate ? Explain with example.

   3) What is Thread Synchronization ? Explain with example.

SLR-Z – 232

Seat No.	

B.Sc. – III (Semester – V) (Old) Examination, 2015
PHYSICS (Special Paper – X)
Solid State Physics

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct alternative : **10**

1) The total number of atoms in unit cell of SC structure is _____
   a) 1 b) 2
   c) 6 d) 4

2) The relation of length of axes of unit cell in triclinic structure is given by _____
   a) $a \neq b \neq c$ b) $a \neq b = c$
   c) $a = b = c$ d) $a = b \neq c$

3) Braggs law of X-ray diffraction is _____
   a) $d\sin\theta = n\lambda$ b) $2d\sin\theta = n\lambda$
   c) $d\sin\theta = 2/n\lambda$ d) $2d\cos\theta = n\lambda$

4) Which of the properties could be explained by free electron theory ?
   a) Ohm's law b) Compton effect
   c) Band theory d) Black body radiation

5) At T=0°k, all energy states below E_f(i.e. $E < E_f$) have a probability of occupancy a is _____
   a) Zero b) Unity
   c) 1/2 d) Infinite

P.T.O.

6) If the thickness of the material field is increased, the Hall voltage developed.

a) Decreases b) Increases

c) Remains constant d) Change the direction

7) The bond that exits in a semiconductor is _____

a) Ionic bond b) Covalent bond

c) Hydrogen bond d) Metallic bond

8) The magnetic susceptibility of paramagnetic material is _____

a) Negative b) Zero

c) Positive d) Infinity

9) Hysteresis loop is generally observed in _____ material.

a) Paramagnetic b) Ferromagnetic

c) Diamagnetic d) Antiferromagnetic

10) Superconductivity is exhibited by _____

a) Hydrogen at 4.2 K b) Mercury at 4.0 K

c) Mercury at 4.2 K d) Potassium at 4.2 K

2. Attempt **any five** of the following : **10**

a) What do you mean by unit cell and primitive cell ?

b) Define the term reciprocal lattice.

c) What is mobility ?

d) What is conduction and valance band ?

e) How do antiferromagnetic material becomes paramagnetic ?

f) Write the Fermi-Dirac distribution function and plot it as a function of energy.

3. A) Attempt **any two** of the following : **6**

   a) Distinguish between metals, semiconductors and insulators on the basis of band theory of solids.

   b) What are ferrites ? Give their applications.

   c) State the drawbacks of classical free electron theory on the basis of Drude-Lorentz model.

   B) X-rays with wavelength of 1.54 A.U. are used to calculate the spacing (200) planes in aluminium. The Bragg angle for first order reflection is 22.4 A.U. What is the size of unit cell of the aluminium crystal ? **4**

4. Attempt **any two** of the following : **10**

   a) Show that the number atoms per unit cell in FCC is 4.

   b) Discuss Hall effect.

   c) Derive electrical conductivity on the basis of free electron model and hence show that electrical conductivity is inversely proportional to the absolute temperature.

5. Attempt **any one** of the following : **10**

   a) What are Miller indices ? How they are determined ? Obtain an expression for interplaner distance $d_{hkl} = a/\sqrt{h^2 + k^2 + l^2}$.

   b) What is superconductor ? Describe types of superconductor and explain Meissener effect.

SLR-Z – 233

Seat No.	

B.Sc. (Semester – V) Examination, 2015
CHEMISTRY (Special Paper No. – X) (Old)
Inorganic Chemistry

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams and give equations* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for the following and rewrite the sentences : **10**

1) MOT explain about
   a) Charge transfer spectra b) π bonding
   c) σ bonding d) All of these

2) According to CFT bonding between metal and ligand in the complex is
   a) Covalent b) 100% ionic c) Metallic d) Any type

3) For age determination by tracer technique _____ isotope is used.
   a) C^{14} b) C^{12} c) N^{15} d) O^{17}

4) The _____ stores oxygen and provides to muscle whenever necessary.
   a) globin b) protein c) myoglobin d) haemoglobin

5) In the oxy-haemoglobin sixth coordination site can be occupied by
   a) O_2 b) Fe c) N-histadene d) CO

6) One nanometer (nm) is _____ meter.
   a) 10^{-8} b) 10^{-9} c) 10^{-7} d) 10^{-10}

7) If degree of polymerisation is above 100, than it is known as _____ polymer.
   a) high b) normal c) low d) organic

8) The polymer backbone is _____ of atoms in polymer.
   a) frame work b) union c) pool d) gathering

P.T.O.

9) Uranium 238 is
   a) Man-made element b) Transuranic element
   c) Non-radioactive element d) Fertile nuclear fuel

10) The CFSE is maximum for _____ transition metal ions.
   a) 4d b) 3d c) 5d d) All of these

2. Answer **any five** of the following : **10**

   i) Define nanoparticle and give their important properties.

   ii) Distinguish between chemical reactions and nuclear reactions.

   iii) What are nuclear fusion reactions ?

   iv) Distinguish between high spin and low spin complexes.

   v) Draw neat labelled diagram showing splitting of 'd' orbitals in octahedral complexes.

   vi) Calcium is the most important element of human body. Explain.

3. A) Answer **any two** of the following : **6**

   i) Give the difference between organic polymer and inorganic polymer.

   ii) Distinguish between Haemoglobin and Myoglobin.

   iii) Give the important merits and demerits of MOT.

   B) Explain the brief account of nuclear fission reactions. **4**

4. Write a short notes on **any two** : **10**

   1) Draw MO diagram for $[CO(NH_3)_6]^{3+}$ and comment on its magnetic behaviour.

   2) What are metalloporphyrins ? Explain the structure of haemoglobin.

   3) What are silicones ? Give their preparation, properties and uses.

5. Answer **any two** of the following : **10**

   1) With the help of MO diagram explain magnetic properties of $[Fe(CN)_6]^{3-}$.

   2) What are different applications of radioisotopes as tracers ? Explain in detail structural determination of PCl_5.

   3) What are phosphonitritic polymers ? Discuss their preparation, properties and uses.

SLR-Z – 234

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
BOTANY (Special Paper – X) (Old)
Gymnosperms and Palaeobotany

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *I)* ***All*** *questions are* ***compulsory****.*
II) ***All*** *questions carry* ***equal*** *marks.*
III) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
IV) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences choosing correct alternative : **(1×10=10)**

1) Zamia belongs to order _____
   a) Cycadales b) Coniferales c) Gnetales d) Taxales

2) In Zamia the leaves are _____
   a) simple b) compound
   c) palmately compound d) pinnately compound

3) Most of the characters of Gnetum are homologous with _____
   a) monocot-Angiosperms b) Dicot-Angiosperms
   c) Pteridophytes d) Bryophytes

4) Because of only _____ Gnetum is included in Gymnosperms.
   a) Polyembryony b) Orthrotropous ovule
   c) Pollination by wind d) Naked seeds

5) Calculation of geological age of fossil specimens is called _____
   a) Carbon dating b) Sulphur dating
   c) Nitrogen dating d) Calcium dating

6) _____ era is called as modern era.
   a) Palaeozoic b) Mesozoic c) Cenozoic d) Pre-Cambrian

7) Coal is _____ type of fossil.
   a) impression b) compression c) petrification d) cast

P.T.O.

8) In calamostachys the sporangiophore makes _____ angle with axis.
   a) 30° b) 45° c) 60° d) 90°

9) Enigmocarpon belongs to family _____
   a) Lytharaceae b) Myrtaceae c) Liliaceae d) Fabaceae

10) Oil and gas are drawn from _____ rock.
   a) Igneous b) Metamorphic c) Sedimentary d) None of these

2. Answer **any five** of the following : **10**
   1) Sketch and label the sporophyte of Zamia.
   2) What is polyembryony ?
   3) What is Amber ?
   4) Enlist geological eras.
   5) Give systematic position of Enigmocarpon.
   6) What are microfossils ?

3. A) Answer **any two** of the following : **6**
      1) Describe in brief V.S. of Gnetum ovule.
      2) Describe female cone of Zamia.
      3) Give classification of Lyginopteris, enlist different organ generas.

   B) What is geological time scale ? Give fossil flora of cenozoic era with environmental conditions. **4**

4. Answer **any two** of the following : **10**
   1) Describe the structure of male cone and male gametophyte of Zamia.
   2) What are fossils ? Describe petrification and Amber type of fossils.
   3) Describe the process of fossilization with favorable conditions.

5. Answer **any two** of the following : **10**
   1) Describe anomalous secondary growth of Gnetum.
   2) Give process of carbon dating.
   3) Explain coal and oil are biotic in origin.

_____

SLR-Z – 235

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
ZOOLOGY (Special Paper – X) (Old)
Biostatistics, Bioinformatics, Medical Zoology and Evolutionary Genetics

Day and Date : Friday, 6-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Complete the sentence selecting appropriate answer. **10**

1) _____ is defined as sum of all the values derived by the total number of value.

a) Mean b) Variable c) Median d) Mode

2) _____ disease is caused by a pathological agent *salmonella*.

a) Dengue b) AIDS
c) Typhoid d) Swine flue

3) Acquired immuno deficiency syndrome (AIDS) in human society is caused by _____

a) Mosquito b) H_1V_1 virus
c) Entamoeba d) Human immune virus

4) CPU is _____ device in bioinformatics.

a) Storage b) Input c) Print d) Output

5) A mathematical relationship was developed to explain the equilibrium between frequencies and allele is called as _____

a) Mendelism b) Hardy-Weinberg law
c) Darwinism d) Morghanism

P.T.O.

6) The biostatistics is also known as _____
   a) Bioinformatics b) Biophysics
   c) Biometry d) Biotechnology

7) The disease Chikungunya is related with the abnormality of _____
   a) Heart b) Blood
   c) Lymph d) Joint of bone ligaments

8) Ctrl + V command used to _____ in computer used to.
   a) Paste b) Delete c) Select d) Save

9) _____ is defined as systematic arrangement of data in rows and column.
   a) Ogive curve b) Frequency distribution
   c) Tabulation d) Co-relation

10) In a perfect negative co-relation the value 'r' is _____
   a) +1 b) –1 c) 0.1 d) 0

2. Write short notes on following **(any five)** : **10**
   i) Google
   ii) Elephantiasis
   iii) Polio-virus
   iv) Standard deviation
   v) Output devices
   vi) Mode.

3. A) Answer **any two** of the following : **6**
   i) Explain the application of Bio-informatics.
   ii) Write an account of Genetic drift.
   iii) Write about Rabies virus.

   B) Plot a histogram from the given data. **4**

Class	10–20	20–30	30–40	40–50	50–60	60–70	70–80	80–90
Frequency	6	8	10	16	14	12	10	6

4. Answer **any two** of the following : **10**

   i) Explain the Karl-parson's coefficient co-relation.

   ii) Describe the pathogenecity of plasmodium.

   iii) Give an account of *Salmonella* and its pathogenecity.

5. Answer **any one** of the following : **10**

   i) What is Bioinformatics ? Describe the three levels of bioinformatics.

   ii) Define the statistical table. Describe the different types of statistical tables.

SLR-Z – 236

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
MATHEMATICS (Special Paper – X) (Old)
Abstract Algebra

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative for **each** of the following. **10**

1) If a and b are integers with $b > 0$ then $\exists$ unique integers q and r such that $a = bq + r$ where

a) $0 \leq r < b$ b) $0 \leq b < r$ c) $0 \leq r \leq b$ d) $0 \leq q < r$

2) If n is the order of element 'a' of a group G, then $a^m = e$ an identity element iff

a) $m \mid n$ b) $m + n$ c) $n \mid m$ d) $n + m$

3) If p is prime number then $\phi(p) =$ _____ where ϕ is Euler's ϕ function.

a) p b) $p - 1$ c) $p + 1$ d) p^2

4) The characteristic of $z_5 \times z_5$ is

a) 5 b) 25 c) 10 d) 1

5) Let ϕ be homomorphism from ring R to S then $\ker\phi =$ _____

a) $\{r \in R \mid \varphi(r) = 0\}$ b) $\{r \in R \mid \varphi(r) = r\}$

c) $\{r \in R \mid \varphi(r) \neq 0\}$ d) None of these

6) In a commutative ring with unity

a) Every ideal is maximal b) Every maximal ideal is prime

c) Every prime ideal is maximal d) Every ideal is maximal iff it is prime

7) A commutative ring R with unity is field iff its only ideals are

a) {0} b) {0} & R c) R d) None of these

P.T.O.

8) The set of integers defined by $a * b = ab$ where $*$ is binary operation is not group since it does not satisfy properly _____

a) Closure b) Associative c) Identity d) Inverse

9) Which of the following is not an example of integral domain ?

a) Set of Integers b) Set of rational numbers

c) Set of complex numbers d) Set of even integers

10) The set of rational numbers has characteristic _____

a) 0 b) 1 c) 2 d) 3

2. Attempt **any five**. **10**

1) Prove that if every element of group G has its own inverse then G is abelian.

2) State Euler's theorem.

3) If G & H are isomorphic groups and G is abelian then prove that H is abelian group.

4) If R is ring then for all a, $b \in R$ prove that $a \cdot 0 = 0 \cdot a = 0$.

5) Define prime and maximal ideal of ring R.

6) What are the zero divisors of Z_{10} ?

3. A) Attempt **any two** of the following. **6**

1) Prove that every group of prime order is cyclic.

2) Find all solutions of the congruence $12x \equiv 27 \pmod{18}$.

3) Prove that every field is an Integral domain.

B) State and prove Lagrange's theorem. **4**

4. Attempt **any two**. **10**

1) Prove that factor group of a cyclic group is cyclic.

2) Prove that intersection of two ideals of ring R is again an ideal of R but not the union.

3) Show that centre Z(G) of group G is normal subgroup of G.

5. Attempt **any one** of the following. **10**

1) Let I be an ideal of ring R and let R/I denote the set of all right cosets of I for

$I + a \in R/I$ and $I + b \in R/I$ define

$(I + a) + (I + b) = I + (a + b)$ and

$(I + a)(I + b) = I + (a \cdot b)$

With these notation show that R/I is ring.

2) Prove that every group G is isomorphic to group of permutation.

SLR-Z – 237

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
STATISTICS (Old)
Sampling Techniques (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Soundless calculators are ***allowed****.*

1. Choose most appropriate alternative from those given in each case : **10**

i) Probability of selection varies at each draw is
   a) sampling without replacement b) sampling with replacement
   c) both (a) and (b) d) neither (a) nor (b)

ii) Sampling frame is term used for
   a) a list of random numbers
   b) a list of voters
   c) a list of sampling units of a population
   d) none of these

iii) In a Simple Random Sampling with Replacement (SRSWR) the same sampling unit may be included in the sample
   a) only once b) only twice
   c) more than once d) none of these

iv) Under equal allocation in stratified sampling, the sample from each stratum is
   a) proportional to stratum size
   b) same size from each stratum
   c) in proportion to the per unit of cost
   d) all the above

v) How many types of optimum allocation are in common use ?
   a) three b) two c) one d) none of these

P.T.O.

vi) A systematic sample does not yield good results if
   a) variation in units is periodic
   b) units at regular intervals are correlated
   c) both (a) and (b)
   d) none of (a) and (b)

vii) Which of the following advantage of systematic sampling you approve ?
   a) easy selection of sample
   b) economical
   c) spread of sample over the whole population
   d) all of these

viii) What precautions makes cluster sampling more efficient ?
   a) by taking clusters of small size
   b) choosing clusters having largest within variation
   c) choosing clusters having least variation between clusters
   d) all of these

ix) The discrepancy between estimates and population parameter is known as
   a) human error
   b) sampling error
   c) non sampling error
   d) none of these

x) Stratified sampling belongs to the category of
   a) Judgement sampling
   b) Controlled sampling
   c) Subjective sampling
   d) None of these

2. Attempt **any five** of the following : **10**

i) Give concept of non-sampling errors.

ii) Explain simple random sampling.

iii) Give real life situations where cluster sampling is used.

iv) Describe proportional allocation.

v) Explain Neyman's allocation.

vi) Give situations where ratio method is appropriate.

3. A) Answer **any two** of the following : **6**

   i) Explain multistage sampling.

   ii) Explain regression estimators of population mean and population total.

   iii) Explain systematic sampling as a particular case of cluster sampling.

   B) State the characteristics of a good questionnaire. **4**

4. Attempt **any two** of the following : **10**

   i) Describe the method of determining the sample size (n), in case of simple random sampling for estimating 'p' for given margin of error and confidence coefficient.

   ii) Describe cluster sampling. Show that sample mean is unbiased estimator of population mean.

   iii) Describe stratified random sampling. Obtain an unbiased estimator of population total in case of Neyman's optimum allocation.

5. Answer **any two** from the following : **10**

   i) Obtain an unbiased estimator of population mean and population total for systematic sampling.

   ii) State the advantages of sample survey over the census survey.

   iii) Obtain an unbiased estimator of population mean and derive its standard error in case of proportional allocation.

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SLR-Z – 238

Seat No.	

B.Sc. – III (Semester – V) (Old) Examination, 2015
GEOLOGY
Geomorphology (Special Paper – X)

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Fill in the blanks with correct answer from given options : **10**

1) Upliftment of stratas indicates _____ rejuvenation.
   a) Static b) Eustatic
   c) Both Static and Eustatic d) None of these

2) Which of the following is indicative of rejuvenation ?
   a) Ox-bow lake b) Incised meanders
   c) Point bar d) None of these

3) Removal of upper deposition causes exposure of old landscape is known as _____ topography.
   a) Exhumed
   b) Resurrected
   c) Both exhumed and resurrected
   d) None of these

4) Which one of these is NOT a feature of mature stage of river ?
   a) Well integrated drainage system
   b) Presence of deep 'V' shaped valleys
   c) Presence of braided river channels
   d) Starting of river widening through active lateral erosion

5) Drainage pattern formed over fold and fault is _____
   a) Parallel b) Braided
   c) Dendritic d) Trellis

6) As the river rejuvenate _____ starts in its downstream.
   a) Valley widening b) Deposition
   c) Valley deepening d) None of these

7) _____ slope grows in height.
   a) Convex b) Free face
   c) Rectilinear element d) Concave element

8) No landscape on the earth is older than _____
   a) Oligocene b) Miocene
   c) Pliocene d) Pleistocene

9) River capture is the most characteristic feature of _____
   a) Youth stage b) Mature stage
   c) Old stage d) Rejuvenation

10) Eustatic rejuvenation is due to _____
   a) Increase in volume of water b) Heavy rain fall
   c) Tectonic activity d) Global lowering of sea level

2. Answer **any five** of the following : **10**
   i) At which stage of river potholes occur ?
   ii) What are multicyclic landscapes ?
   iii) What is monadnock stage ?
   iv) What is convexo-concave slope ?
   v) What are the causes of eustatic rejuvenation ?
   vi) Describe water divides in mature stage.

3. A) Answer **any two** of the following : **6**
   i) What is anticlinal valley and synclinal ridges landscape ?
   ii) Explain the principle of uniformitarianism.
   iii) What is transitional sliding ?

   B) Explain in detail the role of water in mass movement. **4**

4. Answer **any two** of the following : **10**
   i) What are characters of youth stage in cycle of erosion ?
   ii) Explain exogenous and endogenous processes.
   iii) Describe classification of slope based on its elements.

5. Answer **any two** of the following : **10**
   i) Define rejuvenation. Describe types of rejuvenation.
   ii) What are characters of old stage in cycle of erosion ?
   iii) What are topographic expressions of rejuvenation ?

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SLR-Z – 240

Seat No.	

B.Sc. – III (Semester – V) (Old) Examination, 2015
ELECTRONICS
Special Paper – X : Fundamentals of Communication

Day and Date : Friday, 6-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagram **wherever** necessary.*
*4) **Use** of calculator and log table is **allowed**.*

1. Select the correct alternative for the following : **10**

1) Communication is the process of _____
   a) Broadcasting b) Internet
   c) Telecasting d) Exchange of information

2) Noise figure in radio receiver is the ratio of _____
   a) $\frac{S/N \text{ input}}{S/N \text{ output}}$ b) N/S
   c) S/N d) $\frac{S/N \text{ output}}{S/N \text{ input}}$

3) The amplitude of side band in AM wave is _____
   a) Independent of carrier amplitude
   b) Independent of modulation index
   c) $\frac{1}{2}$ × carrier amplitude × modulation index
   c) Carrier amplitude × modulation index

4) The O/P of frequency modulator is _____
   a) Constant b) Randomly varing
   c) Periodically varing d) None of these

P.T.O.

5) The current distribution in half wave dipole antenna is _____

a) Uniform b) Non uniform

c) Both a) and b) d) None

6) The lowest existing layer in ionosphere is _____

a) E layer b) D layer

c) F_1 layer d) F_2 layer

7) Which section is responsible for image frequency ?

a) RF amplifier b) IF amplifier

c) Mixer d) Local oscillator

8) In TV scanning system, another name for retrace is _____

a) Ringing b) Damper

c) Burst d) Fly back

9) _____ tone is not used in modern telephone.

a) Dial b) Ring

c) Busy d) Pulse

10) Vice frequency range is _____

a) 20 Hz to 20 KHz b) 300 Hz to 20 KHz

c) Above 20 KHz d) None of these

2. Answer **any five** of the following : **10**

1) Give SSB Principle.

2) Define the term De-modulation.

3) What do you mean by vestigial side band ?

4) Draw circuit diagram of ratio detector.

5) What is the function of RF tuner in radio receiver ?

6) What are the merit and demerit of FM ?

3. A) Answer **any two** of the following : **6**

   i) Differentiate between AM and FM.

   ii) Explain characteristics of radio receiver.

   iii) Explain DTMF Dialer.

   B) A sinusoidal carrier voltage of frequency 1 MHz and amplitude 100 V is modulated by sinusoided voltage of frequency 5 KHz respectively producing 50% modulation. Calculate frequency and amplitude of USB and LSB. **4**

4. Answer **any two** of the following : **10**

   i) Define Electronic Communication. Explain its types.

   ii) Explain Envelope detector.

   iii) Explain principle of antenna.

5. Answer **any two** of the following : **10**

   i) Explain amplitude modulation with necessary mathematical derivation.

   ii) Explain interlace scanning used in TV.

   iii) Explain Telephone Communication with necessary block diagram.

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SLR-Z – 242

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
PHYSICS (Special Paper – XI) (Old)
Classical Mechanics and Spectroscopy

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Neat*** *diagrams should be drawn* ***wherever*** *necessary.*
4) Calculator or log table is ***allowed****.*

1. Select correct alternative : **10**

i) If the total force acting on a particle is zero, then _____ of the particle is conserved.

a) linear momentum b) angular momentum
c) energy d) none of these

ii) The constraint involved in the motion of a particle placed on the surface of a sphere is _____

a) holonomic b) non-holonomic
c) rheonomous d) scleronomous

iii) The principal of virtual work deals only the cases of _____

a) statics b) dynamics
c) kinematics d) kinetics

iv) If a particle is at rest in a rotating frame of reference, the Coriolis force acting on it is _____

a) zero b) minimum
c) maximum d) constant

v) In a cyclone in the northern hemisphere the wind whirls in the _____ sense.

a) clockwise b) anticlockwise
c) opposite d) same

P.T.O.

vi) The doublet separation in spectra of alkali metals increases with _____

a) atomic number (z)
b) principal quantum number (n)
c) orbital quantum number (l)
d) spin quantum number (s)

vii) Effect of external electric field on spectral lines is known as _____

a) Zeeman effect
b) Paschen-back effect
c) Stark effect
d) Compton effect

viii) Capacity of sub-shell to hold electron is _____

a) $(2l + 1)$
b) $2(2l + 1)$
c) $2n^2$
d) n^2

ix) The interaction energy due to orbital motion of electron in external magnetic field $\overline{B}$ is given by _____

a) $\overline{\mu}_l \cdot \overline{B}$
b) $m_l \frac{eh}{4\pi m} \overline{B}$
c) $l \frac{eh}{4\pi m}$
d) both a) and b)

x) The molecular system can be stable if the total energy possessed by the system is _____

a) zero
b) maximum
c) minimum
d) infinite

2. Attempt **any five** : **10**

1) State conservation theorem of angular momentum of a particle.
2) State the principle of virtual work.
3) Give the electronic configuration of Sodium (Na).
4) State any two characteristics properties of Raman lines.
5) What is covalent bond ?
6) Define degree of freedom.

3. A) Attempt **any two** : **6**

   i) What are constraints ? Explain with examples holonomic and non-holonomic constraints.

   ii) Write note on spectrum of sodium.

   iii) Obtain an expression for vibrational energy levels of a diatomic molecules.

   B) Explain Atwood's machine. **4**

4. Attempt **any two** : **10**

   i) Discuss the effect of Corioli's force on a body falling freely under the action of gravity.

   ii) Distinguish between Raman Spectra and infra-red spectra.

   iii) Obtain an expression for rotational energy of a diatomic molecule.

5. Attempt **any one** : **10**

   i) State and prove the conservation theorem of energy of a particle.

   ii) Explain anomalous Zeeman effect and obtain an expression for term shift.

SLR-Z – 243

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
CHEMISTRY
Organic Chemistry (Special Paper – XI) (Old)

Day and Date : Saturday, 7-11-2015 Total Marks : 50

Time : 2.30 p.m. to 4.30 p. m.

N.B. : *1) **All** questions are **compulsory**.*
*2) Draw neat diagrams and give equations **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) Spectroscopic data chart supplied by university is **allowed**.*

1. Choose the most correct alternative from those given below and rewrite the sentence. **10**

i) How many signals in the NMR spectrum of 1, 3 - diphenyl acetone are observed ?
a) 2 b) 3 c) 4 d) 1

ii) Boat conformation of cyclohexane is unstable due to
a) fp-fp interaction
b) Eclipsing of hydrogen atoms on C_2, C_3 and C_5, C_6
c) Interaction between bowsprit hydrogen atoms
d) Both a and b

iii) The preferred method for alkene formation is
a) Dehydration of alcohols
b) Dehydrohalogenation of alkyl halides
c) Wittig reaction
d) Reformatsky reaction

iv) _____ is a magnetic nucleus.
a) $_1H^2$ b) $_7N^{14}$ c) $_6C^{13}$ d) $_2He^4$

v) $Ph - CH_2 - NH_2$ is obtained by reacting _____ with NaOBr.
a) $PhCOCH_2NH_2$ b) $PhCH_2CONH_2$
c) $PhCH_2NHCHO$ d) $Ph\text{-}CONHCH_3$

P.T.O.

vi) 4 - methyl uracil is obtained by condensation of urea with
a) Malonyl nitrile b) Diethyl malonate
c) Ethyl aceto acetate d) Ethyl acetate

vii) The internal angle at any carbon in cyclopentane is
a) 120° b) 108° c) 109°28′ d) 108°9′

viii) In openaur oxidation secondary alcohol is oxidised to
a) Alkene b) Tertiary alcohol
c) Ketone d) Aldehyde

ix) In cyclohexane there are _____ distinct sets of hydrogen atoms.
a) 3 b) 6 c) 2 d) 1

x) Ethyl cinnamate can be prepared by
a) Reformatsky reaction b) Knoevenagel condensation
c) Wittig reaction d) All the three a, b, c

2. Answer **any five** of the following : **10**

i) What is angle strain ?

ii) What are magnetic nucleii ?

iii) Ethyl aceto acetate is acidic in nature. Explain.

iv) Equatorial methyl cyclohexane is more stable than axial methyl cyclohexane. Explain.

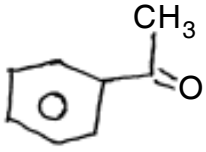
v) What do you mean by nuclear resonance ?

vi) How can we determine the number of signals (peaks) in a NMR spectrum of any organic molecule ?

3. A) Attempt **any two** of the following. **6**

i) Explain the principle of mass spectroscopy.

ii) Complete the following reaction sequence.



$\xrightarrow[CH_3.CHOH.CH_3]{Al[OCH(CH_3)_2]_3}$ A $\xrightarrow[CH_3COCH_3]{Al[OC(CH_3)_3]_3}$ B

$\xrightarrow{Ph_3PCHCOOC_2H_5}$ C

iii) Explain the acidic nature of diethyl malonate.

B) Explain the stability order of cyclohexane conformations. **4**

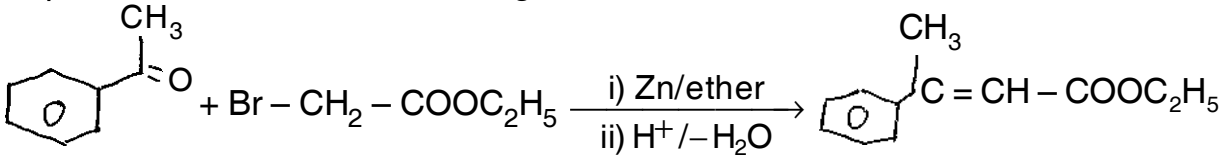
4. Answer **any two** of the following. **10**

i) What are active methylene compounds ? How is ethyl aceto acetate prepared ? How will you convert ethyl aceto acetate into

a) Cinnamic acid

b) Succinic acid

ii) Explain the mechanism of following transformation.



Name this reaction.

iii) What is spin-spin splitting ? Explain the splitting of PMR signals of CH_3CH_2Br at high resolution.

5. Attempt **any two** of the following. **10**

i) Assign the structure consistent with the following data.

a) Molecular formula : $C_9H_{10}O$

b) IR : $1720\ cm^{-1}$

c) PMR i) $1.05\ \delta$ (t, 3H)

ii) $2.50\ \delta$ (q, 2H)

iii) $7.95\ \delta$ (s, 5H)

ii) Write a short note on types of vibrations in IR spectroscopy.

iii) Explain stereospecific and stereoselective reactions with the help of suitable examples.

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SLR-Z – 244

Seat No.	

B.Sc. – III (Botany) (Semester – V) Examination, 2015
Special Paper – XI : GENETICS (Old)

Day and Date : Saturday, 7-11-2015 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Draw ***neat*** *diagram* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentences choosing correct answer from given alternatives : **10**

1) In monohybrid cross a typical genotype ratio is _____
A) 3 : 1 B) 9 : 7 C) 9 : 3 : 3 : 1 D) 1 : 2 : 1

2) The formation of multivalents at meiosis in diploid organism is due to _____
A) deletion B) inversion
C) monosomy D) reciprocal translocation

3) Polyploidy means _____
A) occurrence of haploid set of chromosome
B) occurrence of diploid set of chromosome
C) occurrence of three or more set of chromosome
D) all of these

4) Monosomy is depicted by _____
A) n B) n – 1 C) 2n – 1 D) 2n – 2

5) Deuteranopsia is disease when there is no perception of _____ colour.
A) red B) blue C) green D) white

6) The frequency of crossing over would be higher if _____
A) two genes are located closely
B) two genes far apart on a chromosome
C) two genes located on same chromosome
D) none of the above

7) Gametes are never hybrid, this is statement of _____
A) law of segregation B) law of dominance
C) law of independent assortment D) law of random fertilization

P.T.O.

8) Raphanobrassica is a/an _____
   A) autopolyploid B) allotetraploid
   C) hexaploid D) none of the above

9) Holandric genes located on _____
   A) X chromosome B) Y chromosome
   C) autosome D) none of the above

10) Linkage groups in maize are _____
   A) 20 B) 5 C) 10 D) 15

2. Write **any five** of the following : **10**
   1) What is law of dominance ?
   2) Define linkage.
   3) What are blood groups in man ?
   4) What is holandric genes ?
   5) What is quantitative inheritance ?
   6) Define inhibitory gene interaction.

3. A) Write **any two** of the following : **6**
      1) Explain law of segregation with suitable example.
      2) Describe complete and incomplete linkage.
      3) Sex chromosome in Drosophila.

   B) Explain mechanism of sex determination in man. **4**

4. Write **any two** of the following : **10**
   1) Describe Hardy – Weinberg's law.
   2) Explain plastid inheritance.
   3) Describe duplication with figure.

5. Write **any two** of the following : **10**
   1) Explain Darlington's Breakage and reunion theory.
   2) Describe colour blindness in man.
   3) What is polyploidy ? What are different kinds of polyploidy ? Explain with suitable example.

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SLR-Z – 245

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
ZOOLOGY(Special Paper – XI) (Old)
Comparative Anatomy of Chordates

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p. m. to 4.30 p. m.

N.B.** : 1) **All** questions are **compulsory.
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary .*

1. Select the appropriate answer from **each** of the following and rewrite the sentence. **10**

i) Gills of _____ have filiform gill lamellae.
a) Cartilage fish b) Bony fish
c) Frog tadpole d) Ascidian tadpole

ii) Horns of cattle are derivatives of _____ integument in vertebrate.
a) Epidermis b) Dermis
c) Connective tissue d) Keratin

iii) _____ eggs possess moderate amount of yolk.
a) megalecithal b) mesolecithal c) microlecithal d) alecithal

iv) Axis vertebra of mammals is characterised by
a) Procoelous centrum b) Deltoid process
c) Odontoid process d) Amphicoelous centrum

v) In _____ roof of cerebral hemisphere is poorly developed and is almost non-nervous.
a) Fish b) Mammals c) Human beings d) Birds

vi) Stomach of ruminent mammals shows _____ chambers.
a) One b) Two c) Four d) Five

vii) Lungs of pigeon are provided with _____ air sacs.
a) 10 b) 9 c) 8 d) 4

P.T.O.

viii) Gastric juice is secreted by _____

a) Intestinal gland b) Liver c) Gastric gland d) Salivary gland

ix) Focal length of lens of eye regulated by _____

a) Pupil b) Iris muscles c) Vitrous humour d) Eye bones

x) Pectin is found in the eyes of _____

a) Birds b) Fishes c) Mammals d) Amphibians

2. Answer **any five** of the following. **10**

1) Brain of Reptiles
2) Heart of Rat
3) Typical vertebra of frog
4) Columella auris
5) Skin of Scoliodon
6) Mucous gland of Amphibia
7) Types of feathers.

3. A) Answer **any two** of the following. **6**

1) Soft glands in mammals
2) Fore gut in birds
3) Air sacs in birds

B) Write the answer. **4**

1) Describe metanephrous kidney.

4. Answer **any two** of the following. **10**

1) Describe aortic arches in mammals.
2) Describe membranous labyrinth of Dog fish.
3) Give an account on respiratory organs in Amphibia.

5. Answer **any one** of the following. **10**

1) Give an account on scales of cartilagenous and bony fishes.
2) Describe brain of Scolodon and compare with that you have studied and compare with that of frog.

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SLR-Z – 246

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MATHEMATICS (Special Paper – XI) (Old)
Complex Analysis

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select correct alternative for **each** of the following : **10**

I) The residue at z = a is the coefficient of _____ in the expansion of f(a + t).

a) $\frac{1}{t-a}$ b) $\frac{1}{t}$ c) $\frac{1}{t+a}$ d) none of these

II) If f(z) is regular except at finite number of poles within closed contour C and continuous on the boundary of C then $\int_C f(z)dz =$ _____ where R is the residues of f(z) at its poles.

a) $2\pi\Sigma R$ b) $2\pi i\Sigma R$ c) $2\pi\Sigma R^2$ d) $2\pi i\Sigma R^2$

III) Laplaces equation is _____

a) $\frac{\partial^2\phi}{\partial x^2} = \frac{\partial^2\phi}{\partial y^2}$ b) $\frac{\partial^2\phi}{\partial x^2} = -\frac{\partial^2\phi}{\partial y^2}$ c) $\frac{\partial\phi}{\partial x} = -\frac{\partial\phi}{\partial y}$ d) $\frac{\partial\phi}{\partial x} = \frac{\partial\phi}{\partial y}$

IV) The complex integral of f(z) along L has the property _____

a) $\left|\int_L f(z)dz\right| = \int_L |f(z)|\,|dz|$ b) $\left|\int_L f(z)dz\right| < \int_L |f(z)|\,|dz|$

c) $\left|\int_L f(z)dz\right| \le \int_L |f(z)|\,|dz|$ d) $\left|\int_L f(z)dz\right| > \int_L |f(z)|\,|dz|$

P.T.O.

V) The value of the complex integral $\int_L dz$ where L is a closed rectifiable arc is _____

a) finite b) one c) zero d) infinity

VI) Residue at infinity is $-\frac{1}{2\pi i}\int_C f(z)dz$ where integral along C is performed in the _____ direction.

a) straight line b) clockwise

c) anti-clockwise d) none of these

VII) If a closed interval [a, b] is divided into n subintervals by inserting n – 1 intermediate points satisfying $a = t_0 < t_1 < ... < t_{n-1} < t_n = b$ is called _____ of the interval [a, b].

a) norm b) contour c) partition d) none of these

VIII) Polar form of the Cauchy-Riemann equations is _____

a) $r\frac{\partial u}{\partial r} = \frac{\partial v}{\partial \theta}, \ \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ b) $\frac{1}{r}\frac{\partial u}{\partial r} = \frac{\partial v}{\partial \theta}, \ r\frac{\partial v}{\partial r} = -\frac{\partial u}{\partial \theta}$

c) $\frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}, \ -r\frac{\partial u}{\partial \theta} = \frac{\partial v}{\partial r}$ d) none of these

IX) The circle defined by $z = \cos t + i \sin t$, $0 \le t \le 2\pi$, is _____ curve.

a) closed and simple b) closed but not simple

c) not closed but simple d) not closed and not simple

X) Norm is the _____ number of the numbers of the $t_1 - t_0, t_2 - t_1, ..., t_n - t_{n-1}$.

a) largest b) smallest c) any d) none of these

2. Attempt **any five** of the following : **10**

a) If f(z) and g(z) are analytic functions in a domain $\mathbb{D}$, then prove that

$$\frac{d}{dz}\left[\frac{f(z)}{g(z)}\right] = \frac{g(z)\frac{d}{dz}[f(z)] - f(z)\frac{d}{dz}[g(z)]}{[g(z)]^2}, \ g(z) \neq 0 .$$

b) Show that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ is harmonic.

c) Evaluate $\int_C \frac{1}{z} dz$ along the arc of circle $|z| = 1$ from -1 to $+1$ above the axis.

d) Define Laurent's series for analytic function f(z) in the ring-shaped region $\mathbb{D}$ bounded by two concentric circles.

e) Expand cosz in a Taylor's series about z = 0.

f) Find the poles and their orders for the function given by

$$f(z) = \frac{z^2 + 1}{(z-1)^2 (z-3)^3 (z-4)(z-5)}$$

3. A) Attempt **any two** of the following : **6**

a) State and prove Cauchy-Riemann equations in the polar form.

b) Find the analytic function for which real part is $e^{-x}[(x^2 - y^2)\cos y + 2xy\sin y]$.

c) Expand $f(z) = \frac{z+3}{z^3 - z^2 - 2z}$ in a Laurent's series valid for the regions $|z| < 1$, $1 < |z| < 2$ and $|z| > 2$.

B) Prove that $\int_0^{\pi} \frac{a d\theta}{a^2 + \sin^2\theta} = \frac{\pi}{\sqrt{1+a^2}}$, $a > 0$. **4**

4. Attempt **any two** of the following : **10**

a) Find the residue of $\frac{1}{(z^2+1)^3}$ at its pole.

b) State and prove Cauchy's fundamental theorem.

c) For what values of z do the domain w defined by z = sinhu cosv + icoshu sinv cease to be analytic.

5. Attempt **any one** of the following : **10**

a) Show that the continuous single valued function f(z) is analytic in the domain $\mathbb{D}$, if four partial derivatives u_x, u_y, v_x, v_y exists and continuous and satisfy Cauchy-Riemann equations at each point of the domain $\mathbb{D}$.

b) State and prove Cauchy's Residue theorem.

SLR-Z – 247

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
STATISTICS (Special Paper – XI) (Old)
Probability Distributions and Stochastic Process

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of scientific calculators and Statistical tables is* ***allowed****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select most correct alternative : **10**

i) In a Markov Chain (M.C.) with one step Transition Probability Matrix (TPM) $P = \begin{bmatrix} 0.6 & 0.4 \\ 0.5 & 0.5 \end{bmatrix}$ with initial probabilities [0.3, 0.7], the unconditional probabilities after one transition are _____

a) [0.53, 0.47] b) [0.52, 0.48]
c) [0.47, 0.53] d) [0.4, 0.6]

ii) For Cauchy distribution _____

a) $\gamma_1 > 0$ b) $\gamma_1 < 0$
c) $\gamma_1 = 0$ d) γ_1 not exists

iii) If X is exp (θ) r.v. truncated below 10, then E_T (X) = _____

a) $\frac{1}{\theta}$ b) θ
c) $10 + \frac{1}{\theta}$ d) $10 - \frac{1}{\theta}$

iv) If the difference of two non-negative random variables follows Laplace distribution, then the two variables possibly be _____

a) iid normal variates b) iid exponential variates
c) iid lognormal variates d) bivariate normal r.v.

P.T.O.

v) Markov property is based on _____

a) unconditional probability b) expectation

c) conditional expectation d) none of these

vi) We say that state i leads to state j if _____

a) $P_{ij}^{(n)} \geq 1$ b) $P_{ij}^{(n)} = 0$

c) $P_{ij}^{(n)} > 0$ d) none of these

vii) Let X ~ N (0, 1) then $v(e^X)$ = _____

a) $e^2 - e$ b) e^2

c) $e^{\frac{1}{2}}$ d) $e^2 + e$

viii) If (x, y) ~ BN $(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2\ \rho)$ and if X and Y are independent then _____

a) $\rho = 1$ b) $\rho = -1$

c) $\rho = 0$ d) $0 < \rho < 1$

ix) In bivariate normal distribution E(y | X = x) is a function of _____

a) x b) y

c) both x and y d) constant

x) If (x, y) ~ BN (5, 10, 9, 0.5) then $E(X^2)$ = _____

a) 9 b) 27

c) 29 d) 18

2. Attempt **any five** from the following : **10**

a) If X is lognormal (0, 1) write expression for mean.

b) If X ~ C (μ , λ) write expression for Q. D.

c) If (x, y) ~ BN $(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$, write the expressions for regression of y on X and X on y.

d) Suppose one step TPM is $P = \begin{bmatrix} 0.6 & 0.4 & 0.0 \\ 0.3 & 0.3 & 0.4 \\ 0.1 & 0.3 & 0.6 \end{bmatrix}$ construct two step TPM.

e) Define stochastic process.

f) What is truncation ? Explain with the help of obtaining the pmf of a r.v. truncated below a.

3. A) Attempt **any two** from following : **6**

i) Suppose one step TPM is

$$P = \begin{bmatrix} 0.5 & 0.3 & 0.2 \\ 0.10 & 0.7 & 0.2 \\ 0.10 & 0.4 & 0.5 \end{bmatrix}$$

with initial distribution $S_0 = [0.7, 0.2, 0.1]$ find S_1.

ii) If (x, y) ~ BN (1, 2, 3, 4, 0.5) then find $E(y^2)$ and cov (X, y).

iii) Write the expressions for Q_1, Q_2 and Q_3 for Laplace (μ , λ) distribution.

B) Obtain pdf of truncated normal r.v.. truncated below a and above b. **4**

4. Answer **any two** from the following : **10**

a) If (x, y) ~ BN (0, 0, 1, 1, ρ), find the distribution of $\frac{X}{Y}$.

b) State and prove relationship between Cauchy r.v. and two iid standard normal variates.

c) Obtain pmf of truncated p(λ) distribution, truncated at X = 0 and find its mean.

5. Answer **any two** from following : **10**

a) If $\{X_n, n \geq 0\}$ be a M.C. with 3 states 1, 2, 3 and one step TPM

$$P = \begin{array}{c} \\ 1 \\ 2 \\ 3 \end{array} \begin{array}{c} \begin{array}{ccc} 1 & 2 & 3 \end{array} \\ \begin{bmatrix} 3/4 & 1/4 & 0 \\ 1/4 & 1/2 & 1/4 \\ 0 & 3/4 & 1/4 \end{bmatrix} \end{array}$$

and initial distribution $X_0 = \left[\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right]$ find joint distribution of X_0 and X_1.

b) If X is lognormal (μ, σ^2) r.v. then find the distribution of :

i) ax a > 0 and

ii) $\frac{1}{X}$.

(You may use property of normal distribution If X ~ N (μ, σ^2) then ax + b ~ N $(a\mu + b, \sigma^2)$)

c) If X follows Laplace distribution with pdf.

$$f(x) = \frac{1}{2} e^{-|x|} \qquad -\infty < x < \infty$$

Show that $\mu_r = 0$ if r is odd

= r! if r is even.

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SLR-Z – 248

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
GEOLOGY (Special Paper – XI) (Old)
Environmental Geology

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions** : 1) **All** questions are **compulsory.
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagram **wherever** necessary.*

1. Fill in the blanks with correct answer from the given options : **10**

1) Pressure of water stored in the dams can cause _____
   a) tsunami b) subsidence c) landslide d) salination of soil

2) River channelization is solution for _____ hazard.
   a) volcanic b) flood c) contamination d) landslide

3) Tropical climate in the hilly region frequently causes _____
   a) landslides b) flood
   c) subsidence d) volcanic hazard

4) Slope stabilization reduces the possibility of _____ hazard.
   a) volcanic b) flood c) Contamination d) landslide

5) Fire caused in coal mine is due to _____
   a) methane b) CO_2 c) O_2 d) gas

6) Slides are more likely where rock layers dip _____
   a) parallel to slope b) into the slope c) steeply d) gently

7) Disposal of _____ is main problem in open cast miming.
   a) ore b) dump
   c) mineral d) heavy machinery

8) Fluid extraction produces subsidence due to
   a) compaction b) consolidation
   c) hydrocompaction d) settlement

P.T.O.

9) In state disaster management team _____ is the chief person.
   a) Chairman b) Prime Minister c) Collector d) Chief Minister

10) In disaster management cycle, that includes the stages/phases; most important phase is _____
   a) Response phase b) Rehabilitation phase
   c) Risk Reduction phase d) Preparedness phase

2. Answer **any five** of the following : **10**
   1) Meshing.
   2) River diversion.
   3) Artificial levee.
   4) Define Hazard. Give example.
   5) Define Disaster. Give example.
   6) Describe structure of district disaster management team.

3. A) Attempt **any two** of the following : **6**
      1) Describe hazards of dam.
      2) Describe significance of channel/river deepening, widening and removal of its sediment load.
      3) Describe how to treat the slopes to avoid flood.

   B) Write note on hazardous products of volcano and how they are hazardous. **4**

4. Answer **any two** of the following : **10**
   1) Describe the control measures of flood.
   2) Describe the preparedness of volcanic hazard.
   3) Describe the causes of subsidence.

5. Answer **any two** of the following : **10**
   1) Describe how man causes flood.
   2) Write any two solutions to prevent landslide. Draw Diagrams.
   3) Describe hazardous nature of mine dump.

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SLR-Z – 249

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MICROBIOLOGY (Old)
Agricultural Microbiology (Special Paper – XI)

Day and Date : Saturday, 7-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate marks.*

1. Rewrite the following sentences by selecting correct answer from given alternatives. **10**

   i) Chemical which results in the formation of acid rain is _____
   a) NO_3 b) H_2SO_4 c) Ozone d) HCl

   ii) Loss of productivity of soil is a phenomenon of _____
   a) Reduction b) Disgeneration
   c) Desertification d) Bifragmentation

   iii) The importance of ecosystem lies in _____
   a) Flow of energy b) Oxygen production
   c) CO_2 production d) Bacterial degradation

   iv) Melting of ice caps is due to _____
   a) Green house effect b) Eutrophication
   c) Depletion of ozone d) Acid rain

   v) The ecological niche of an organism is its _____
   a) Way of life b) Habitat c) Territory d) Foraging area

   vi) In Farm Yard Manure the proportion of cattle dung and urine is _____
   a) 1 : 1 b) 2 : 1 c) 3 : 1 d) 1 : 2

   vii) Of all algae, the property of nitrogen fixation is restricted to _____
   a) Phaeophyta b) Chlorophyta
   c) Endophyta d) Cyanophyta

P.T.O.

viii) Rhizobium in legume root nodules fixes nitrogen in the form of _____
   a) Nitrate b) Ammonia
   c) Glutamic acid d) Nitrite

ix) The bacteria involved in organic matter decomposition are _____
   a) Rhizobium b) Cellulomonas
   c) Alternaria d) Azotobacter

x) Oil spots on pomegranate are caused by member of _____
   a) Xanthomonas b) Erwinia
   c) Bacillus d) Pseudomonas

2. Answer **any five** of the following. **10**
   1) Define 'soft rot'.
   2) Define 'ecosystem'.
   3) Define 'green manure'.
   4) Give various sources of nitrogen in atmosphere.
   5) What is composition of Farm Yard Manure ?
   6) Define 'pesticides'.

3. A) Answer **any two** of the following. **6**
   1) Give significance of town compost.
   2) Explain biological nitrogen fixation.
   3) Give significance of phosphorus in nature.

   B) Write a note on – Role of soil microorganisms. **4**

4. Answer **any two** of the following. **10**
   1) Write a note on 'sulphur cycle'.
   2) Explain various measures for control of plant diseases.
   3) Write an essay on 'compost production'.

5. Answer **any two** of the following. **10**
   1) Explain biodegradation of Lignin.
   2) Explain various modes of transmission of 'White Smut of Sugarcane'.
   3) Write an essay on 'Carbon Cycle'.

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SLR-Z – 251

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
COMPUTER SCIENCE
Special Paper – XI : Operating System – I (Old)

Day and Date : Saturday, 7-11-2015 Total Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*

ii) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Choose the correct alternative. **10**

1) To access the services of operating system, the interface is provided by the
   a) System calls b) API
   c) Library d) Assembly instructions

2) A process stack does not contain
   a) function parameters b) local variables
   c) return addresses d) PID of child process

3) The Process Control Block is
   a) Process type variable b) Data Structure
   c) A secondary storage section d) A Block in memory

4) What is a medium-term scheduler ?
   a) It selects which process has to be brought into the ready queue
   b) It selects which process has to be executed next and allocates CPU
   c) It selects which process to remove from memory by swapping
   d) None of these

5) Suppose that a process is in “Blocked” state waiting for some I/O service. When the service is completed, it goes to the
   a) Running state b) Ready state
   c) Suspended state d) Terminated state

P.T.O.

6) What is the reusable resource ?
   a) That can be used by one process at a time and is not depleted by that use
   b) That can be used by more than one process at a time
   c) That can be shared between various threads
   d) None of the mentioned

7) A deadlock avoidance algorithm dynamically examines the _____, to ensure that a circular wait condition can never exist.
   a) resource allocation state
   b) system storage state
   c) operating system
   d) resources

8) The Banker's algorithm is _____ than the resource allocation graph algorithm.
   a) less efficient
   b) more efficient
   c) both (a) and (b)
   d) none of these

9) A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock
   a) can never occur
   b) may occur
   c) has to occur
   d) none of these

10) Which one of the following is the address generated by CPU ?
   a) physical address
   b) absolute address
   c) logical address
   d) none of the mentioned

2. Answer **any five** of the following : **10**
   1) What is external fragmentation ?
   2) What is address binding ?
   3) What is scheduling ?
   4) Write note on rollback.
   5) What is time quantum ?
   6) What is a farm ?

3. A) Answer **any two** of the following : **6**

   1) What is Operating System ? Explain parallel operating system.

   2) Write note on swapping.

   3) Explain deadlock prevention.

   B) Difference between short and long term scheduling. **4**

4. Answer **any two** of the following : **10**

   1) Explain scheduling algorithm.

   2) Explain monolithic and layered system.

   3) What is co-operating process ? Explain it.

5. Answer **any two** of the following : **10**

   1) Explain classic problem of synchronization.

   2) What is deadlock ? Explain deadlock recovery.

   3) Explain term paging.

SLR-Z – 252

Seat No.	

B.Sc. III (Semester – V) Examination, 2015
PHYSICS (Special Paper – XII) (Old)
Electrodynamics

Day and Date : Monday, 16-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct alternative : **10**

i) Electric field intensity $\vec{E}$ in terms of scalar potential ϕ is given by

a) $\vec{E} = \nabla\phi$ b) $\vec{E} = -\nabla\phi$

c) $\vec{E} = \frac{1}{\nabla\phi}$ d) $\vec{E} = -\nabla\phi$

ii) To find potential distribution due to a spherical shell, the Laplacian should be expressed in

a) Cartesian coordinates b) Rectangular coordinates

c) Cylindrical coordinates d) Spherical coordinates

iii) The line integral of electric force per unit charge over a closed path is

a) current b) magnetic induction

c) emf d) electric flux

iv) Generation of motional emf is the principle of

a) generator b) battery

c) voltaic cell d) photovoltaic cell

v) Electric dipole moment per unit volume of polarized medium is called

a) Magnetization $(\vec{M})$ b) Poynting's vector $(\vec{N})$

c) Displacement vector $(\vec{D})$ d) Polarization vector $(\vec{P})$

P.T.O.

vi) In vacuum, polarization and magnetization are

a) present b) of same magnitude

c) absent d) of different magnitude

vii) Light is a _____ wave.

a) Electric b) Magnetic

c) EM d) Longitudinal

viii) Phase velocity of electromagnetic wave in non-conducting material medium is given by

a) $\nu = \sqrt{\mu \in}$ b) $\nu = \frac{1}{\sqrt{\mu \in}}$

c) $\nu = \sqrt{\mu_0 \in_0}$ d) $\nu = \frac{1}{\sqrt{\mu_0 \in_0}}$

ix) When a wave gets reflected from the surface of a denser medium, there occurs a phase change of

a) 0° b) 45° c) 180° d) 360°

x) The intensity of radiation along the axis of electric dipole is

a) infinite

b) finite value depending upon distance

c) zero

d) finite value independent of distance

2. Answer **any five** of the following **:** **10**

i) Explain Biot-Savart's law.

ii) Write down Laplace's equation with meaning of each term.

iii) State Poynting's theorem.

iv) What is the relation between transmission coefficient and reflection coefficient of electromagnetic wave ?

v) Explain in short retarded time.

vi) What is retarded potential ?

3. A) Answers **any two** of the following : **6**

   i) State and explain Ampere's law.

   ii) Write a note on total internal reflection.

   iii) Obtain expression for total power radiated by an electric dipole.

   B) Calculate the radius of circular orbit of an electron of 5 KeV in a magnetic field of 10^{-4} T. **4**

   [Given : m = 9.1×10^{-31} kg, e = 1.6×10^{-19} C].

4. Answer **any two** of the following : **10**

   i) State Maxwell's equations for vacuum and explain the physical significance of each equation.

   ii) Discuss the nature of trajectory of a charged particle entering a uniform electric field ($\vec{E}$), such that it's initial velocity is perpendicular to $\vec{E}$.

   iii) Obtain the boundary conditions for electromagnetic field vectors $\vec{D}$, $\vec{E}$, $\vec{B}$ and $\vec{H}$ at the interface of two media.

5. Answer **any one** of the following : **10**

   i) Explain electromagnetic induction. Obtain integral and differential form of Faraday's law.

   ii) State Maxwell's equations for vacuum giving meaning of each term. Explain the physical significance of Maxwell's equations.

SLR-Z – 253

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
CHEMISTRY (Special Paper – XII) (Old)
Analytical and Industrial Physical Chemistry

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** diagrams and give equations **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Select the most correct alternative from among those given below and rewrite the sentence : **10**

1) The ratio $\frac{I_t}{I_o}$ is called _____

a) absorbance b) transmittance c) opacity d) optical density

2) In photovoltaic cell selenium layer is covered with a transparent layer of _____

a) silver b) platinum c) lead d) gold

3) For a given conductivity cell, the ratio l/a represents _____

a) specific conductance b) cell constant
c) equivalent conductance d) molecular conductance

4) For the determination of cell constant _____ electrolyte is used.

a) NaCl b) KCl c) NH_4Cl d) NaOH

5) A glass electrode contains _____ M HCl.

a) 0.01 b) 0.1 c) 1.0 d) 0.001

6) In potentiometric measurements, saturated calomel electrode is used as _____

a) indicator electrode b) reference electrode
c) inert electrode d) null electrode

P.T.O.

7) In electroplating current density is usually expressed as _____

a) A/mm^2 b) A/dm^2

c) MA/mm^2 d) MA/dm^2

8) If cathode efficiency > anode efficiency, the plating bath becomes _____ in metal content.

a) rich b) highly rich c) poor d) adequate

9) In the equation, $\frac{N}{N_0} = Ae^{\frac{-\Delta E}{KT}}$ the constant K is known as _____

a) Molar gas constant b) Planks constant

c) Boltzmann constant d) Avogadros constant

10) In Lundergraph burner sample used must be in _____ form.

a) solid b) gaseous c) liquid d) all of these

2. Answer **any five** of the following : **10**

i) What is the function of burners in flame photometry ?

ii) Draw a labelled circuit diagram of Wheatstone bridge.

iii) Define the terms :

a) optical density and

b) extinction coefficient.

iv) Give the advantages of quinhydrone electrode.

v) Explain the term current density in electroplating.

vi) Why direct current source can not be used in conductance measurement ?

3. A) Answer **any two** of the following : **6**

i) How cell constant is determined ?

ii) Explain sulphuric acid method of anodising.

iii) State and explain Beer's law.

B) Discuss the applications of flame photometry in qualitative analysis. **4**

4. Answer **any two** of the following : **10**

   i) What do you understand by potentiometric titration ? Give the various advantages of potentiometric titrations.

   ii) Draw a schematic diagram for photoelectric colorimeter and explain its working.

   iii) What is flame photometry ? Describe the general principles of flame photometry.

5. Answer **any two** of the following : **10**

   i) Give the construction and working of quinhydrone electrode.

   ii) Describe in detail, the electroplating of nickel.

   iii) What are conductometric titrations ? Discuss conductometric titration of weak acid and strong base.

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SLR-Z – 254

Seat No.	

B.Sc. (Part – III) (Semester – V) (Old) Examination, 2015
BOTANY (Special Paper – XII) (Plant Biochemistry)

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Instructions *: i) Figures to the* ***right*** *indicate* ***full*** *marks.*
ii) ***Draw*** *neat labeled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentence by choosing proper answer : **10**

i) Amino acids are the building blocks of _____
a) Proteins b) Lipids c) Starch d) Cellulose

ii) _____ is a disaccharide.
a) Starch b) Cellulose c) Sucrose d) Ribose

iii) In potato _____ starch grains are present.
a) Excentric b) Concentric
c) Polygonal d) Dumbbell shaped

iv) _____ are amphipathic.
a) Polar lipids b) Proteins
c) Carbohydrates d) Nucleic acids

v) _____ is the saturated fatty acid.
a) Palmatic acid b) Oleic acid
c) Linoleic acid d) Eladic acid

vi) _____ used the term lipid for the first time.
a) Bloor b) Korenberg
c) Har Govind Khorana d) H. Kreb

vii) Amino acid containing one amino groups and two carboxylic groups is designated as _____
a) Monoamino mono carboxylic b) Diamino mono carboxylic
c) Monoamino dicarboxylic d) Diamino dicarboxylic

viii) _____ is a dipolar ion.
a) Cation b) Anion c) Zwitterion d) None of these

P.T.O.

ix) _____ is a sulphur containing amino acid.

a) Alanine b) Glycine c) Valine d) Cysteine

x) Triplet codon is suggested by _____

a) Gamo (1954) b) Hogland (1956)

c) Temin (1963) d) Holley (1964)

2. Answer **any five** of the following : **10**

i) Draw the structure of any one saturated fatty acid you have studied.

ii) Explain one physical and one chemical property of monosaccharides.

iii) Define enantiomers.

iv) Define protein and enlist any two sources of proteins.

v) What is the role of ribosomes in protein synthesis ?

vi) Mention any two properties of lipids.

3. A) Answer **any two** of the following : **6**

i) What are disaccharides ? Mention any two properties of lactose.

ii) Explain primary structure of proteins.

iii) Write an outline of classification of lipids.

B) Explain the roles of different RNA molecules that are involved in protein synthesis. **4**

4. Answer **any two** of the following : **10**

i) Explain the steps involved in protein biosynthesis.

ii) Explain in brief the functions of lipids.

iii) What is optical activity ? Explain epimers by giving suitable example.

5. Answer **any two** of the following : **10**

i) Write brief account of post – transitional modifications of proteins.

ii) Explain in brief about the synthesis of sugars from lipids.

iii) Write brief account of sucrose biosynthesis.

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SLR-Z – 255

Seat No.	

B.Sc. (Part – III) (Semester – V) (Old) Examination, 2015
ZOOLOGY (Special Paper – XII)
Developmental Biology

Day and Date : Monday, 16-11-2015 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labeled diagrams* ***wherever*** *necessary.*

1. Select the appropriate answer for **each** of the following and complete the sentences. **10**

1) The egg of amphioxus is termed as _____ egg.
   a) Microlecithal b) Megalecithal
   b) Macrolecithal d) Polylecithal

2) The smallest spermatozoan is found in
   a) Chick b) Amphioxus c) Frog d) Human

3) The cleavage in Amphioxus is
   a) Meroblastic b) Discoblastic
   c) Holoblastic and unequal d) Superficial

4) In chick hatching occurs after about _____ days.
   a) 21 b) 28 c) 35 d) 42

5) The broad end of hen's egg shows presence of
   a) Air Space b) Albumen c) Yolk d) Water

6) The main function of allantois is storage of _____ in chick.
   a) Glycogen b) Lipid
   c) Yolk d) Excretory product

7) Major nutritive foetal membrane in chick embryo is
   a) Amnion b) Allantois c) Yolksac d) Chorion

8) _____ egg is found in insects.
   a) Centrolecithal b) Polylecithal c) Microlecithal d) Megalecithal

9) Chalazae in hen's egg are useful for
   a) Development of ectoderm b) Development of mesoderm
   c) Development of endoderm d) To keep the ovum in centre

10) The process in which non-motile spermatids are converted into motile sperm is called
   a) Spermeogenesis b) Gametogenesis
   c) Oogenesis d) Ovulation

2. Answer **any five** of the following. **10**
   i) Sperm of chick.
   ii) Non-cleidoic egg.
   iii) Radial cleavage.
   iv) Yolk.
   v) Fertilization membrane.
   vi) Organizer.

3. A) Answer **any two** of the following. **6**
   i) Shell of hen's egg.
   ii) Telolecithal egg.
   iii) Amnion.

   B) Surrogated mother. **4**

4. Answer **any two** of the following. **10**
   i) Spermatogenesis.
   ii) Blastula of Amphioxus.
   iii) Types of eggs according to amount of yolk.

5. Answer **any one** of the following. **10**
   i) Describe chick embryo of about 24 hours incubation.
   ii) What is placenta ? Describe different types of placenta.

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SLR-Z – 256

Seat No.	

B.Sc. – III (Semester – V) Examination, 2015
MATHEMATICS (Special Paper – XII) (Old)
Programming in C

Day and Date : Monday, 16-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for **each** of the following. **10**

1) _____ operator in C is used to combine multiple expression in to single expression.

a) Arithmetic b) Comma c) Ternary d) Conditional

2) The _____ type has no values.

a) void b) main c) char d) int

3) The operator not equal to is

a) ? = b) ! = = c) ! = d) ? = =

4) The range of int data type varies from _____ to _____

a) – 32768 to 32767 b) – 128 to 127

c) 3.4 e^{-38} to 3.4 e^{+38} d) none of these

5) In C, – 14% – 3 =

a) 2 b) –2 c) 4 d) 4.6

6) The return statement can take one of the following form

a) End ; b) Stop ; c) Return () d) Return ;

7) To declare array of 30 entries we need

a) m [30] [2] b) m [30] c) m {30} d) none of these

P.T.O.

8) C language was developed by
   a) Martin Richards
   b) Dennis Ritchei
   c) Ken Thompson
   d) None of these

9) By default functions return
   a) Character value
   b) Integer value
   c) Float value
   d) None of these

10) Input data through key board using the _____ function.
   a) print f
   b) scan f
   c) double
   d) float

2. Answer **any five** of the following : **10**

1) What does void main means ?

2) Write a simple program of substraction two numbers.

3) What is the comma operator in C ?

4) Explain size of operator.

5) Explain do...while statement.

6) Evaluate x + y * x – z where x = 4, y = 7, z = 8.

3. A) Answer **any two** of the following : **6**

1) Explain if statement with syntax and flow chart.
2) Write a note on executing a 'C' program.
3) Explain switch statement.

B) Explain logical operators in C. **4**

4. Answer **any two** of the following : **10**

1) Explain declaration of one-dimensional arrays.

2) Explain if...else statement in C.

3) Write a program to calculate reverse of given number.

5. Answer **any one** of the following : **10**

1) Write a C program of salesman's salary.

2) a) Explain relational operator in C.

   b) Write note on C-token's.

SLR-Z – 257

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2015
STATISTICS (Paper – XII)
Operations Research and Acceptance Sampling

Day and Date : Total Marks : 50

Time :

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Use of simple or scientific calculator is allowed.
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select most correct alternative. **10**

i) In standard form of LPP,

a) the decision variables are unrestricted in sign

b) the constraints are inequalities of $\leq$ type

c) the constraints are inequalities of $\geq$ type

d) the constraints are strict equations

ii) The transportation problem is balanced, if

a) Total demand equals total supply irrespective of the number of sources and destinations.

b) Total demand and total supply are equal and the number of sources equals the number of destinations.

c) Number of sources matches with the number of destinations

d) None of the routes is prohibited

iii) Given a system of m simultaneous linear equations in n unknowns (m<n), the number of basic variables will be

a) m b) n

c) n – m d) n + m

P.T.O.

iv) The initial solution of a transportation problem obtained by
   a) North-West corner rule would invariably be optimum
   b) VAM would invariably be very near to optimum solution
   c) Least cost method does not provide the least cost solution to a T.P.
   d) MODI method is infeasible

v) If two constraints do not intersect in the positive quadrant of the graph, then
   a) One of the constraint is redundant
   b) The solution is infeasible
   c) The solution is unbounded
   d) None of these

vi) The assignment problem is a special case of transportation problem in which number of origins
   a) Is less than or equal to the number of destinations
   b) Is greater than the number destinations
   c) Is less than the number of destinations
   d) Equals the number of destinations

vii) Network problems have advantage in terms of project
   a) Scheduling
   b) Planning
   c) Controlling
   d) All of the above

viii) In a single sampling plan if the lot size *N* is large relative to the sample size n, then we may write the equation of AOQ approximately as
   a) pnP_a
   b) $(1 - p)P_a$
   c) pP_a
   d) None of these

ix) In a single sampling plan of n = 80 and c = 2, the lot is accepted if the number of observed defectives d is
   a) greater than 2
   b) less than 2
   c) greater than or equal to 2
   d) less than or equal to 2

x) In critical path analysis, CPM is
   a) event oriented
   b) probabilistic in nature
   c) deterministic in nature
   d) dynamic in nature

2. Answer **any five** of the following : **10**

   i) Define a L.P.P.

   ii) Define an artificial variable.

   iii) What is a balanced Transportation problem ?

   iv) What is an unbalanced Assignment Problem ?

   v) Define Consumers's risk.

   vi) Define most likely time in a PERT.

3. A) Answer **any two** of the following : **6**

   i) Define a basic feasible solution, a degenerate solution and a non-degenerate solution to a LPP.

   ii) Define total float, free float and independent float.

   iii) Convert the following L.P.P. in its standard form

   Maximize $z = 3x_1 + 2x_2$

   Subject to :

   $x_1 + x_2 \leq 4$, $x_1 - x_2 \leq 2$, and $x_1, x_2 \geq 0$.

   B) The following assignment problem shows the costs of assigning four jobs to four machines. Determine the optimum assignment schedule **4**

Machines

Jobs	1	2	3	4
A	8	4	2	6
B	0	9	5	5
C	3	8	9	2
D	4	3	1	0

4. Answer **any two** of the following : **10**

   i) Solve the following LPP by Graphical Method.

   Minimize $z = 8x_1 + 4x_2$

   Subject to :

   $x_1 + 2x_2 \geq 2$, $3x_1 + x_2 \geq 3$, $4x_1 + 3x_2 \geq 6$ and $x_1, x_2 \geq 0$.

ii) Explain North-West corner method.

iii) Write a procedure of Single Sampling Plan.

5. Answer **any two** of the following : **10**

i) A manufacturer produces bulbs and tubes. It takes 1 hour of work on machine M_1 and 3 hours of work on machine M_2 to produce one package of bulbs. While it takes 2 hours of work on machine M_1 and 4 hours of work on machine M_2 to produce one package of tubes. He earns a profit of Rs. 13.50 per package of bulbs and Rs. 55 per package of tubes. Formulate the LPP for how many packages of each item should be produced each day so as to maximize his profit, if he operates the machine M_1 for at most 10 hours a day and the machine M_2 for at most 12 hours a day.

ii) In a single sampling plan if N = 20000, n = 100, c = 2, p = 0.01 and $P_a = 0.9397$, then calculate the average total inspection per lot and average outgoing quality.

iii) The duration of completion of the project follows normal distribution with the expected duration 17 weeks and variance 9 weeks. What is the probability that the project will be completed at least 4 weeks earlier than expected ?

Given that the area under the standard normal distribution curve from Z = 0 to Z = 1.33 is 0.4082.

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Seat No.	

B.Sc. – III (Semester – V) (Old) Examination, 2015
Computer Science
Special Paper – XII : DATA COMMUNICATIONS AND NETWORKING – I

Day and Date : Monday, 16-11-2015 Max. Marks : 50

Time : 2.30 p.m. to 4.30 p.m.

***Note** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative. **10**

1) Sink tree is generated in _____ routing algorithm.
   a) Multicast b) Broadcast
   c) Shortest Path d) Optimality Principle

2) _____ is a collection of point-to-point links that may form a circle.
   a) LAN b) MAN c) WAN d) Ring Topology

3) In the _____ random access method there is no collision.
   a) ALOHA b) CSMA/CD c) CSMA/CA d) Token passing

4) _____ is a reliable connection oriented protocol.
   a) TCP b) UDP c) FTP d) RARP

5) _____ encoding has a transition at the middle of each bit.
   a) RZ b) Manchester c) Diff. Manchester d) All of the above

6) _____ are bounded media.
   a) Twisted pair b) Optical fibre c) Co-axial d) All of these

7) Which topology requires a multipoint connection ?
   a) Mesh b) Bus c) Star d) Ring

8) A computer network permits sharing of
   a) Information b) Resources c) Both a and b d) None of these

9) Physical addressing mechanism implemented by _____ layer.
   a) Physical b) Data link c) Transport d) Session

10) In fibre optics the signal source is _____ waves.
   a) Radio b) Infrared c) Light d) Microwave

2. Answer the following (**any 5**). **10**

1) What is meant by synchronization ?
2) What is meant by period and frequency ?
3) What is definition of LAN ?
4) What is a hamming distance ?
5) What is the use of routing algorithms ?
6) What is meant by Optimality principle ?

3. A) Answer the following (**any 2**). **6**

1) Which are different characteristics of Data Communications system ?
2) Explain the types of errors.
3) What are the various elements of protocol ?

B) Explain Shannon's Capacity formula. **4**

4. Answer the following (**any 2**). **10**

1) Explain distance Vector routing.
2) Explain functions of session layer.
3) Explain message switching in detail.

5. Answer the following (**any 2**). **10**

1) Explain selective Repeat – ARQ protocol.
2) Explain architecture of Internet.
3) What is the difference between virtual circuit and datagram subnet ?

_____

SLR-Z – 262

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
ENGLISH (Compulsory)
Countdown – English Skills for Success

Day and Date : Thursday, 29-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing the correct alternative : **10**

   1) A person who is loved and admired by everyone
      a) will definitely have high self-esteem
      b) will definitely not have high self-esteem
      c) may not necessarily have high self-esteem
      d) is not human being

   2) Haldane's purpose of writing 'The Scientific Point of View' is
      a) to promote a scientific theory
      b) to promote a particular outlook
      c) to promote objectivity in science
      d) to promote a scientist

   3) As a young man, Rahim Khan was
      a) rebellious and resentful b) strong and athletic
      c) sly and deceitful d) very talkative

   4) Rahim Khan decided to _____ on the day of his marriage.
      a) run away and join the circus b) hate everyone around him
      c) care for the sparrows d) love animals

5) An idiom is a group of words in a fixed order whose meaning
   a) can be known by looking at the meaning of each word
   b) can not be known by looking at the meaning of each word
   c) is found in dictionary
   d) is not clear

6) _____ is the noun with noun collocation.
   a) Address book b) take a bath
   c) free offer d) strongly support

7) Wordsworth compares the daffodils to the
   a) waves b) breeze c) milky way d) stars

8) According to Wordsworth, he wandered lonely as a _____ that floats on high over vales and hills.
   a) moon b) sun c) bird d) cloud

9) Madonna and child refer to
   a) Refugee mother and child b) Nigeria and poet
   c) Mother Mary and Jesus d) Mother and ghost

10) The refugee mother would have to forget her soon, because he is going to
   a) die soon b) his real mother
   c) do a risky job d) none of the above

2. Answer **any five** of the following : **10**
   1) Why is self-esteem an intimate experience ?
   2) What are the important components of self-esteem according to Bradem ?
   3) How is a scientist more impartial than anyone ?
   4) How do people react to the issue of African American in an emotional rather than in a scientific manner ?
   5) What ambitions did Rahim Khan have as a young man ?
   6) How were Rahim Khan's relationship with the villagers ?

3. A) Answer in brief **any two** of the following questions : **6**
   1) What is the central idea of 'Refugee Mother and Child' ?
   2) What is the effect of the daffodils on the poet's view of life ?
   3) How does Wordsworth describe the daffodils ?

B) Write short notes on **any two** of the following : **4**

1) Adaptability
2) Time management
3) Stress management.

4. A) What are the steps of problem solving ? Discuss. **10**

OR

B) Describe your friend focussing his character, thoughts and mood. **10**

5. Write a summary on the following passage : **10**

June came and the hay was almost ready for cutting. On Midsummer's Eve, which was a Saturday, Mr. Jones went into Willingdon and got so drunk at the Red Lion that he did not come back till midday on Sunday. The men had milked the cows in the early morning and then had gone out rabbiting, without bothering to feed the animals. When Mr. Jones got back he immediately went to sleep on the drawing room sofa with the news of the world over his face, so that when evening came, the animals were still unfed. At last they could stand it no longer. One of the cows broke in the door of the storeshed with her horns and all the animals began to help themselves from the bins. It was just then that Mr. Jones woke up. The next moment he and his four men were in the storeshed with whips in their hands, lashing out in all directions. This was more than the hungry animals could bear. With an accord, though nothing of the kind had been planned beforehand, they flung themselves upon their tormentors. Jones and his men suddenly found themselves being butted and kicked all from sides. The situation was quite out of their control. They had never seen animals behave like this before, and this sudden uprising of creatures whom they were used to thrashing and maltreating just as they chose, frightened them atmost out of their wits. After only a moment or two they gave up trying to defend themselves and took to their heels. A minute later all five of them were in full flight down the cart-track that led to the main road, with the animals pursuing them in triumph.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
PHYSICS (Special Paper – XIII)
Nuclear Physics

Day and Date : Friday, 30-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*

*2) Figures to the **right** indicate **full** marks.*

*3) Draw neat diagrams **wherever** necessary.*

*4) Use of calculator or log-table is **allowed**.*

1. Select correct alternative : **10**

i) An accelerator in which one dec is used called _____
   a) Synchrocyclotron b) Cyclotron
   c) Betatron d) Synchrotron

ii) When liquid is heated above its boiling point then it is said to be _____
   a) Critically heated b) Super heated
   c) Sub heated d) Non heated

iii) The radius of nucleus is given by _____
   a) $R_0A^{2/3}$ b) $R_0A^{1/3}$ c) R_0A d) R_0A^2

iv) In stripping reaction product and target nuclei are _____
   a) isomers b) isobars
   c) isotopes d) both isomers and isobars

v) In nuclear fission reaction the nucleus breaks into _____ fragments.
   a) two b) three c) four d) five

vi) Leptons are _____
   a) fermions b) bosons c) hydrons d) nuons

P.T.O.

vii) In cyclotron time for semicircular path of ion is _____ for every revolution.
a) Increases b) Decreases c) Constant d) Zero

viii) Scintillation counter works on the principle of _____
a) emission of light
b) visualisation of track
c) measuring discharge current due to ionisation
d) absorption of light

ix) Mass defect per nucleon is called _____
a) nucleus fraction b) binding energy
c) packing fraction d) nuclear mass

x) In nuclear reactor _____ is used as moderator.
a) heavy water b) sodium c) lithium d) lanthanium

2. Attempt **any five** of the following : **10**
i) State betatron condition.
ii) Define dead time and recovery time.
iii) Define binding energy.
iv) What is stripping reaction ?
v) Write four factor formula for nuclear reactor.
vi) Which are the types of quarks ?

3. A) Attempt **any two** of the following : **6**
i) Write note on electrical quadrupole moment.
ii) Obtain Q value of nuclear reaction.
iii) Explain chain reaction.

B) Calculate the Q value of given nuclear reaction **4**

$_{7}N^{14} + _{2}He^{4} \rightarrow _{8}O^{17} + _{1}H^{1} + Q$

Given – mass of N^{14} – 14.00753 amu.

mass of He^{4} – 4.00 387 amu.

mass of O^{17} – 17.00 450 amu.

mass of $_{1}H^{1}$ – 1.00814 amu.

4. Attempt **any two** of the following : **10**

   i) Explain classification of elementary particles.

   ii) Explain nuclear energy programme in India.

   iii) Explain liquid drop model of nucleus.

5. Attempt **any one** of the following : **10**

   i) Explain construction and working of cyclotron. What are its limitations ?

   ii) Explain construction and working of GM counter. Hence explain Geiger Plateau region.

SLR-Z – 264

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
CHEMISTRY
Physical Chemistry (Special Paper – XIII)

Day and Date : Friday, 30-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*
4) ***Use*** *of logarithmic table/scientific calculator is* ***allowed****.*

1. Choose the most correct alternative and write the sentence : **10**

1) At constant volume ΔG =

a) ΔA b) ΔV

c) ΔH d) ΔS

2) The equation $W_{max} = RT \ln Kp + \Delta nRT$ represents

a) Clapeyron equation b) Gibb's-Helmholtz equation

c) Van't Hoff isochore d) Van't Hoff isotherm

3) The variation of melting point of solid with pressure is given by

a) Arrhenius equation b) Gibb's-Helmholtz equation

c) Clausius-Clapeyron equation d) Hess's law

4) The reaction 2 CH_3 COO Ag + HCOO Na $\rightarrow$ 2Ag + CO_2 + CH_3COOH + CH_3COONa is an example of _____ order reaction.

a) Zero b) First

c) Third d) Second

5) The temperature coefficient of most of the reactions lies between

a) 1 and 2 b) 2 and 3

c) 3 and 4 d) None of these

P.T.O.

6) Unit of rate constant for third order reaction is

a) sec^{-1} b) mole dm^{-3} sec^{-1}

c) $mole^{-2}$ dm^{6} sec^{-1} d) $mole^{2}$ dm^{-6} sec^{-1}

7) The radiation used to study vibrational spectra of a molecule is

a) near infrared b) visible

c) ultraviolet d) radio-waves

8) The distance between two nearest troughs or crests is known as

a) frequency b) wave number

c) wavelength d) all of these

9) The vapour will contain relatively _____ proportion of the more volatile component than does the liquid phase.

a) more b) equal

c) less d) none of these

10) If P represents the atmospheric pressure, then condition for boiling the mixture of two liquid components A and B is

a) $P = P_A + P_B$ b) $P = P_A - P_B$

c) $P = P_A \times P_B$ d) $P = P_A/P_B$

2. Answer **any five** of the following : **10**

1) Explain in brief vapour pressure of ideal solution.

2) Heteronuclear diatomic molecules give vibrational spectra while homonuclear molecules donot. Explain.

3) Explain with suitable example the reversible reactions.

4) Explain the term energy of activation.

5) Give the criteria for thermodynamic equilibrium and spontaneity.

6) Define fugacity and activity coefficient.

3. A) Answer **any two** of the following : **6**

1) Explain the variation of function A with volume and temperature.

2) Show that for third order reaction $t_{1/2} = \frac{3}{2K} \cdot \frac{1}{a^2}$.

3) State and explain Raoult's law.

B) A solution of CO in an innert solvent absorbs radiations at the frequency 6.4×10^{13} sec^{-1}. Calculate the force constant for the bond in CO.

Given – Reduced mass of CO = 1.14×10^{-26} Kg

$\pi = 3.14, C = 3 \times 10^8$ ms^{-1} **4**

4. Answer **any two** of the following : **10**

1) Explain the isotope effect in the study of rotational spectra. What are the limitations of rotational spectra ?

2) Derive thermodynamically the law of mass action.

3) Derive an expression of velocity constant of third order reaction in which the reactants are at the same initial concentration.

5. Answer **any two** of the following : **10**

1) Discuss phenol-water system for maximum solution temperature type.

2) For a certain reaction the temperature coefficient K_{35}/K_{25} is 1.75. Calculate the energy of activation. R = 8.314 JK^{-1} $mole^{-1}$.

3) Calculate the equilibrium constant for the following reaction at 298 K.

$C_{graphite} + 2H_2 \rightarrow CH_{4(g)}$

The standard enthalpy and entropy change are –74.85 KJ and – 80.67 J K^{-1} $mole^{-1}$ respectively. (R = 8.314 JK^{-1} $mole^{-1}$).

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SLR-Z – 265

Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
BOTANY (Special Paper – XIII)
Microbiology and Plant Pathology

Day and Date : Friday, 30-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions : *I)* ***All*** *questions are* ***compulsory****.*
II) ***All*** *questions carry* ***equal*** *marks.*
III) Draw neat and labelled diagrams ***wherever*** *necessary.*
IV) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternative : **(1×10=10)**

1) Bangadi disease of potato is mainly caused by _____ solanacearum.
   a) Cercospora b) Pseudomonas
   c) Sphacelotheca d) Cystopus

2) Anthracnose of bean is a _____ disease.
   a) Fungal b) Bacterial
   c) Mycoplasma d) Viral

3) Downy mildew of bajra disease is control by _____ thiram.
   a) 0.5% b) 0.4% c) 0.3% d) 0.2%

4) The most common sterilizer in use is autoclave which was designed by Chamber Land in
   a) 1881 b) 1882 c) 1883 d) 1884

5) _____ was the first to suggest the use of agar as a solidifying agent.
   a) Faru Hesse b) Charu Hesse
   c) Naru Hesse d) Taru Hesse

6) The _____ scientist Louis Pasteur is concerned with the great discoveries in the field of microbiology.
   a) German b) French
   c) Dutch d) None of these

P.T.O.

7) During the metabolism of microbes the carbohydrates are converted into
   a) Organic acid b) Fumaric acid
   c) Folic acid d) Oxalic acid

8) Recently recombinant _____ technology has helped microbes used in industrial process.
   a) RNA b) DNA c) rRNA d) mRNA

9) Idly is prepared by fermentation from dehulled rice and
   a) Green gram b) White gram
   c) Black gram d) Red gram

10) There are about _____ families of viruses which are pathogenic to insects.
   a) 14 b) 13 c) 12 d) 11

2. Answer **any five** of the following : **(5×2=10)**
   I) Define the pure culture medium.
   II) What are biofungicides ?
   III) Give the uses of gibberellic acid.
   IV) Explain the symptoms of white rust of crucifer.
   V) Give the control measures of grain smut of jawar.
   VI) Define sterilization.

3. A) Answer **any two** of the following : **(2×3= 6)**
   I) Explain the two methods of sterilization by radiation.
   II) Give the general characters of viruses as microbes.
   III) Explain the symptoms and control measures of little leaf of brinjal.
   B) Explain the classification of plant diseases based on transmission of pathogen. **4**

4. Answer **any two** of the following : **(2×5= 10)**
   I) Explain the mycopesticides and protozoan as pesticides studied by you.
   II) Describe the production of ghee and butter by fermentation process.
   III) Explain the symptoms, causal organism and control measures of leaf curl of chilli.

5. Answer **any two** of the following : **(2×5=10)**
   I) Explain any three methods of pure culture media studied by you.
   II) Give the characteristic features of eubacteria as microbes.
   III) Explain the commercial production of citric acid and itonic acid with their uses.

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SLR-Z – 266

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
ZOOLOGY (Special Paper – XIII)
Physiology

Day and Date : Friday, 30-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Draw*** *neat labelled diagrams* ***wherever*** *necessary.*

1. Select the appropriate answer from each of the following and rewrite the sentence : **10**

1) The emulsification fat is carried by _____ juice.
a) Intestinal b) Gastric c) Bile d) Pancreatic

2) _____ vitamin causes night blindness in children.
a) A b) D c) E d) K

3) In glycolysis the glucose in converted in to _____
a) Citric acid b) Malic acid c) Pyruvic acid d) Fumaric acid

4) With increased CO_2 concentration in blood the O_2 carrying capacity of Hb is _____
a) Increases b) Decreases
c) Becomes half d) Becomes doubled

5) For completion of single cardiac cycle requires _____ second.
a) 0.4 b) 0.2 c) 0.8 d) 0.1

6) The plasma membrane of striated muscle is called as _____
a) Neurolemma b) Plasmolemma
c) Sarcolemma d) Nodes of Ranvier

7) The medullary Sheath of nerve fibre is interrupted at some intervals by _____
a) Crypt's Lieberkuhn b) Lamina propria
c) Glia d) Nodes of Ranviers

8) Filtration of blood in the region of glomerulus of Bowmann's capsule is called as _____

a) Active secretion b) Selective reabsorption

c) Ultra-filtration d) Selective elimination

9) Functional connection between pre and post synaptic membrane is firstly discovered by _____

a) R. E. Davis b) H. E. Huxley

c) Sherrington d) Ian-Pavlov

10) Gastric digestion occurs in _____

a) Stomach b) Intestine c) Oesophagus d) Mouth

2. Write short notes on **(any five)** : **10**

1) Define ultrafiltration.

2) Draw neat labelled diagram of ECG.

3) Depolarization.

4) Roles of Vitamin A

5) What is emulsification ?

6) Myosin protein.

3. A) Answer **any two** of the following : **6**

1) Describe chemical digestion in stomach.

2) Describe glyconeogenesis.

3) Natural sources of Vitamin C.

B) Describe physiological role of Vitamin D. **4**

4. Answer **any two** of the following : **10**

1) Blood pressure

2) Structure of synapse

3) Deamination.

5. Answer **any one** of the following : **10**

1) Describe the transport of gases.

2) Describe origin and conduction of heart beats.

_____

SLR-Z – 267

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
MATHEMATICS
Metric Spaces (Special Paper – XIII)

Day and Date : Friday, 30-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*

ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative for each of the following : **10**

   i) Let $f : J \to \mathbb{R}$ where $J \subset \mathbb{R}$ and if f is non-increasing on J then f is strictly increasing on J if and only if f is

   a) One-one b) Onto

   c) Both one-one and onto d) None of these

   ii) The following sequences are elements of l^2 space

   a) $\left\{\frac{1}{n}\right\}_{n=1}^{\infty}$ b) $\left\{\frac{1}{\sqrt{n}}\right\}_{n=1}^{\infty}$

   c) both a and b d) None

   iii) A subset A of $\mathbb{R}_d$ is totally bounded if and only if A contains

   a) Finite number of points b) Infinite number of points

   c) No points d) None

   iv) f is continuous at $a \in M$ iff $f^{-1}\{B[f(a); \in]\}$ contains

   a) $B[f(a); \in]$ b) $B[f(a); \delta]$ c) $B[a; \delta]$ d) $B[a; \in]$

   v) Every compact metric space is

   a) Complete and not bounded

   b) Complete and totally bounded

   c) Complete and not totally bounded

   d) Not complete and bounded

P.T.O.

vi) Let E = $\{e_1, e_2, e_3, ...\}$ where k^{th} component of e_k is one then diam.of E =

a) $\sqrt{2}$ b) $\sqrt{3}$ c) 0 d) 1

vii) Consider the two statements

A) In $\mathbb{R}^1$, bounded and totally bounded are equivalent

B) In $\mathbb{R}_d$, bounded and totally bounded are not equivalent

a) Only A is false b) Only B is false

c) Both A and B are false d) Both A and B are true

viii) Let $\langle M, \rho \rangle$ be a metric space and let T be the contraction on M, then exactly one of the following holds

a) $\rho(Tx, Ty) \leq \frac{5}{4}\rho(x,y)$ b) $\rho(Tx, Ty) \leq \frac{4}{3}\rho(x,y)$

c) $\rho(Tx, Ty) \leq \frac{1}{2}\rho(x,y)$ d) $\rho(Tx, Ty) \leq \frac{22}{7}\rho(x,y)$

ix) If f is continuous function from a compact metric space X into a metric space Y then f(X) is

a) a closed but not bounded subset of Y

b) a bounded but not closed subset of Y

c) a bounded and closed subset of Y

d) not bounded and not closed subset of Y

x) The function h is defined on $\mathbb{R}^1$ by $h(x) = \frac{1+x^3}{1+x^2}$ then

a) h is continuous on $\mathbb{R}^1$ b) h is not continuous on $\mathbb{R}^1$

c) h is not continuous at 0 d) h is not continuous at 1

2. Attempt **any five** : **10**

1) If G_1 and G_2 are open subsets of metric space M then show that $G_1 \cap G_2$ is also open.

2) State the properties of norm for the sequences in l^2 space.

3) Let $f(x) = x^2 + 4x$; find $\delta > 0$ such that $|f(x) - 5| < \frac{1}{10}; (0 < |x - 1| < \delta)$.

4) Define metric space $\langle M, \rho \rangle$.

5) If $u = \{u_n\}_{n=1}^{\infty} \in l^2$ and $Tu = \left\{\frac{u_n}{2}\right\}_{n=1}^{\infty}$ then show that T is contraction on l^2.

6) If the real-valued function f is continuous on compact metric space M then prove that f attains maximum value at some point of M.

3. A) Attempt **any two** : **6**

1) If f and g are real-valued functions, if f is continuous at a and g is continuous at f(a) then prove that $g \circ f$ is continuous at a.

2) Prove that if the subset A of metric space $\langle M, \rho \rangle$ is totally bounded then A is bounded.

3) Let l^{∞} denote the set of all bounded sequences of real numbers. If $x = \{x_n\}_{n=1}^{\infty}$ and $y = \{y_n\}_{n=1}^{\infty}$ are points in l^{∞}, define $\rho(x, y) = \underset{1 \le n < \infty}{\text{l.u.b.}} |x_n - y_n|$ prove that ρ is metric on l^{∞}.

B) Prove that the metric space $\langle M, \rho \rangle$ is compact if and only if every sequence of points in M has a subsequence converging to a point in M. **4**

4. Attempt **any two** : **10**

1) State and prove Schwarz inequality in l^2 space.

2) Let E be a subset of the metric space M, then prove that the point $x \in M$ is a limit point of E if and only if every open ball B[x; r] about x contains at least one point of E.

3) Let f be a continuous function from the compact metric space M_1 into a metric space M_2, then prove that the range $f(M_1)$ of f is also compact.

5. Attempt **any one** : **10**

1) If the metric space M has the Heine-Borel property then prove that M is compact.

2) Let $\langle M, \rho \rangle$ be a metric space, then show that, the subset A of M is totally bounded if and only if every sequence of points of A contains a Cauchy subsequence.

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SLR-Z – 268

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
STATISTICS (Special Paper – XIII)
Statistical Inference – II

Day and Date : Friday, 30-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions**: 1) **All** questions are **compulsory** and carry **equal** marks.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the most correct alternative : **10**

i) 99% confidence limits for μ of N (μ, σ^2) when σ is known as

a) $\bar{x} \mp 1.64 \frac{\sigma}{\sqrt{n}}$ b) $\bar{x} \mp 2.58 \frac{\sigma}{\sqrt{n}}$

c) $\bar{x} \mp 1.96 \frac{\sigma}{\sqrt{n}}$ d) None of these

ii) 95% confidence interval (C.I.) for θ of $f(x, \theta) = \frac{1}{\theta} e^{-x/\theta}$ is

a) $\left(\frac{\bar{x}}{1 + \frac{1.96}{\sqrt{n}}}, \frac{\bar{x}}{1 - \frac{1.96}{\sqrt{n}}} \right)$ b) $\left(\frac{\bar{x}}{1 + \frac{1.645}{\sqrt{n}}}, \frac{\bar{x}}{1 - \frac{1.645}{\sqrt{n}}} \right)$

c) $\left(\frac{\bar{x}}{1 + \frac{2.58}{\sqrt{n}}}, \frac{\bar{x}}{1 - \frac{2.58}{\sqrt{n}}} \right)$ d) None of these

P.T.O.

iii) Which of the following is a simple null hypothesis ?

a) $H_0 : \mu = 2$ b) $H_0 : \mu < 0$

c) $H_0 : \mu > 2$ d) $H_0 : \mu \neq 0$

iv) Reduction in the size of a test results into

a) Decrease in its power

b) Increase in its power

c) No change in its power

d) All the above

v) A test based on a test Statistic is called

a) Randomized test

b) Sequential test

c) Bayes test

d) Non-randomized test

vi) The sample size in Sequential Probability Ratio Test (SPRT) is

a) Fixed b) Random variable

c) Small d) Large

vii) The tests used for testing a simple null hypothesis against a composite alternative hypothesis are

a) Sequential tests

b) Nonparametric tests

c) Likelihood ratio tests

d) None of the above

viii) In SPRT the constants A and B are

a) $A = \frac{1-\beta}{\alpha}, B = \frac{\beta}{1-\alpha}$ b) $A = \frac{\alpha}{1-\beta}, B = \frac{1-\alpha}{\beta}$

c) $A = \frac{\beta}{1-\alpha}, B = \frac{\alpha}{1-\beta}$ d) None of these

ix) The assumptions required in non parametric (NP) tests are

a) Very large b) Very few

c) Mild d) None of these

x) A sequence of symbols shows lack of randomness if the number of runs observed are

a) Very large b) Very few

c) Both (a) and (b) d) None of these

2. Answer **any five** of the following : **10**

i) Give the steps involved in the use of pivotal quantity method to obtain C.I.

ii) Explain in short the method of obtaining C.I. for a parameter θ in large samples.

iii) Define a simple hypothesis and composite hypothesis.

iv) Define probability of Type – I error, probability of Type – II error and power of a test.

v) Explain the need of Likelihood Ratio Tests (LRT) in testing of hypothesis.

vi) Explain in short the SPRT for testing $H_0 : \theta = \theta_0$ against $H_1 : \theta = \theta_1$.

3. A) Answer **any two** of the following : **6**

i) Write the steps of graphical procedure of SPRT.

ii) Write the advantages of nonparametric methods over parametric methods.

iii) For testing the randomness of a given sample, explain the one sample run test.

B) If $x \geq 1$ is the critical region for testing $H_0 : \theta = 2$ against $H_1 : \theta = 1$, on the basis of a single observation from the population, **4**

$f(x, \theta) = \theta e^{-\theta x}$, $x \geq 0$,

obtain the values of α and β.

4. Answer **any two** of the following : **10**

   i) Obtain 100 $(1 - \alpha)$ % confidence interval for $(\mu_1 - \mu_2)$ based on a random sample from a bivariate normal population.

   ii) Let $x_1, x_2, ..., x_n$ be a random sample of size n from $N(\mu, \sigma^2)$, where σ^2 is known. Show that there exists a UMP test for testing $H_0 : \mu = \mu_0$ against $H_1 : \mu = \mu_1 > \mu_0$ by using Neyman-Pearson lemma.

   iii) Explain the Kolmogorov – Smirnov two sample test.

5. Answer **any two** of the following : **10**

   i) Based on a large sample from $f(x, \theta) = \frac{1}{\theta} e^{-x/\theta}$, $x \geq 0$, $\theta > 0$. Obtain 95% confidence limits for θ.

   ii) Let $x_1, x_2, ..., x_n$ be a random sample of size n from $P(x, \lambda) = \frac{e^{-\lambda} \lambda^x}{x!}$: $x = 0, 1, 2, ...$. Show that the M.P. critical region of size α for testing $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda = \lambda_1$ is the form $\bar{x} \leq A_\alpha$ if $\lambda_0 > \lambda_1$, where A_α is a constant.

   iii) Develop the SPRT for testing $H_0 : \theta = \theta_0$ against $H_1 : \theta = \theta_1 < \theta_0$ on the basis of a random sample from $f(x, \theta) = \frac{1}{\theta} e^{-x/\theta}$, $x > 0$, $\theta > 0$.

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Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
GEOLOGY (Special Paper – XIII)
Crystallography, Principles of Stratigraphy and Earth's History

Day and Date : Friday, 30-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*

1. Fill in the blanks with correct answer from the given options. **10**

   1) Dodecahedron have _____ faces.

      (12, 24, 8, 32)

   2) Indices of macropinacoid are _____

      (100, 101, 110, 011)

   3) In a combination form, cube and octahedron ; front vertical face is of _____

      (cube, octahedron, dodecahedron, prism)

   4) Four vertical, rectangular faces can be _____

      (cube, prism, pyramid, pinacoid)

   5) 'Present is the _____ to the past' is a principle of stratigraphy.

      (lock, idea, key, link)

   6) The example for the principle – 'present is the indicator of past process that shapes the earth' is _____

      (ripple mark, rock colour, fossils, minerals)

   7) Chronostratigraphic unit corresponding to Era is _____

      (system, stage, series, erathem)

P.T.O.

8) Smallest time unit in Geological Time Scale is _____
(phase, age, epoch, period)

9) Larger time unit in Geological Time Scale is _____
(Era, Period, Eon, Age)

10) _____ has short time extension.
(Fossil, Index fossil, Mineral, Rock)

2. Answer **any five** of the following : **10**

1) Describe Octahedron.
2) Describe Pyramid.
3) Describe any one combination form.
4) Define stratigraphy.
5) Describe uniformitarianism.
6) Describe the significance of an unconformity.

3. A) Answer **any two** of the following : **6**

1) Describe the basal pinacoid and first order tetragonal prism.
2) Describe the scope of stratigraphy.
3) Describe 'order of superposition'.

B) Describe hemipyramid. **4**

4. Answer **any two** of the following : **10**

1) Describe clinopinacoid and quarter pinacoids.
2) Describe palaeontological criteria for correlation.
3) What is an unconformity ? Explain Eparchaean Unconformity.

5. Explain **any two** of the following : **10**

1) Geological Time Scale.
2) Lithological continuity in correlation.
3) Pyramids of crystals of hexagonal system.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
MICROBIOLOGY
Microbial Genetics (Special Paper – XIII)

Day and Date : Friday, 30-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentences by choosing correct answers from given alternatives : **10**

i) If premature termination of peptide chain occurs during translation, the mutation is called as
   a) silent mutation b) nonsense mutation
   c) sense mutation d) neutral mutation

ii) The folded fibre model for E.coli chromosome was proposed by
   a) Worcel b) John Cairns c) Chase d) Pettijohn & Hetcht

iii) A probe is used in _____ stage of genetic engineering.
   a) cleaving DNA b) recombining DNA
   c) cloning d) screening

iv) _____ plasmid induced crown gall tumor in plants.
   a) pBR_{322} b) PUC c) Ti d) PEG

v) Mutation that do not bring any phenotypic changes are called _____ mutation.
   a) silent b) lethal c) nonsense d) transition

vi) Nucleic acid in gel is usually visualized by staining with _____ intercalating dye.
   a) Ethidium bromide b) Coomasine blue
   c) Methylene blue d) Venus green

vii) _____ are the enzymes that recognize specific base sequences in DNA and cleave Double stranded DNA within or adjacent to these sequences.
   a) Exonuclease b) DNA polymerase
   c) Replicase d) Restriction endonuclease

P.T.O.

viii) Lactose Operon has _____ structural genes.

a) z, y and a b) x, y and z c) z, x and y d) z, y and B

ix) When two mutation in a region of DNA cause negative Cis-Trans test that region is known as

a) Muton b) Cistron c) Intron d) Exon

x) The plasmid pTi from _____ is used as closing vector in r-DNA technology.

a) Azotobacter chrococcum b) Acetobacter xylinum

c) Agrobacterium tumefaciens d) Xanthomonas citri

2. Answer **any five** of the following : **10**

1) What is cosmid ?
2) What is Replacement Vector ?
3) What are Okazaki fragments ?
4) What is DNA finger printing ?
5) What do you mean by Phenotypic Lag ?
6) Give the role of Operator.
7) What are Macrolesions ?

3. A) Answer **any two** of the following : **6**

a) Draw a neat labelled diagram of Lac Operon.
b) Write briefly on Frame shift mutations.
c) Briefly write on Electrophoresis of DNA.

B) Describe briefly the structure of RNA polymerase holoenzyme. **4**

4. Answer **any two** of the following : **10**

a) Give an account of DNA replication.
b) Describe in brief tools of Genetic Engineering.
c) Describe Maxam and Gilbert's method.

5. Answer **any two** of the following : **10**

a) Discuss the concept and applications of Protein Engineering.
b) Describe in detail the Folded Fibre Model of E-coli chromosome.
c) Discuss the Cis-Trans test.

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SLR-Z – 272

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
COMPUTER SCIENCE
Special Paper – XIII : Web Technology

Day and Date : Friday, 30-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **All** questions carry **equal** marks.*

1. Choose the correct answer : **10**

1) _____ directive is used to specify default programming language for a web page.
   a) page b) language c) import d) implements

2) _____ control is always used in groups.
   a) Check box b) Radio button c) Text box d) Labels

3) Import directives are _____ number of attributes.
   a) 1 b) 2 c) 3 d) more than 3

4) _____ property of validation control is used to determine the validation is successfully validated or not.
   a) Validation group b) Control to validate
   c) Causes validation d) Is valid

5) _____ namespace contains classes that are used to setup ASP.Net configuration.
   a) system.web.service b) system.web.configuration
   c) system.web.UI d) system.web.security

6) We can add more than one form tag in aspx page.
   a) True b) False

7) _____ extension belong to user control.
   a) asmx b) ascs c) ascx d) aspx

P.T.O.

8) _____ is default authentication mode for IIS.
   a) windows b) anonymous c) form d) passport

9) View state stores _____ kinds of value.
   a) controls property b) data type of value
   c) controls value d) none of above

10) Master page must contains _____ control.
   a) <asp : content> b) <asp : text box>
   c) <asp : button> d) <asp : content place holder>

2. Answer the following (**any 5**) : **10**
   a) Assembly
   b) IIS
   c) Login Name Control
   d) Literal Control
   e) Is Post Back and Auto Post Back Property
   f) Validation Group.

3. a) Answer the following (**any 2**) : **6**
      i) Validation summery control.
      ii) Explain how to apply theme to website.
      iii) Explain view state in detail.
   b) Explain image map control with example. **4**

4. Answer the following (**any 2**) : **10**
   a) Explain list class with example.
   b) Explain server side state management technique in detail.
   c) Explain role management in detail.

5. Answer the following (**any 2**) : **10**
   a) Explain different application folders used in ASP.Net.
   b) Explain custom validator control with example.
   c) Explain events used in master and content page.

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SLR-Z – 273

Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
PHYSICS (Special Paper – XIV)
Material Science

Day and Date : Saturday, 31-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *i)* ***All*** *questions are* ***compulsory.***
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Use*** *of log table or calculator is* ***allowed.***
iv) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*

1. Select the correct alternative: **10**

i) The stress is expressed in _____
a) Poise b) Pascal c) Gauss d) Weber

ii) Brass is a combination of copper and _____
a) zinc b) tin c) nickel d) aluminium

iii) Conductivity is measured in _____
a) $\mho$/m b) $\mho$m c) Ω/m d) Ωm

iv) The metals in decreasing order of ductility ore _____
a) silver, gold, platinum b) silver, platinum, gold
c) gold, platinum, silver d) gold, silver, platinum

v) Toughness _____ with rise in temperature
a) does not change b) rises
c) falls d) may rise or fall

vi) Hot working processes are carried out _____ recrystallization temperature.
a) at b) above
c) both a) and b) d) below

vii) Thermosetting polymers are prepared by _____ mechanism.
a) addition b) condensation
c) both addition and condensation d) none of these

P.T.O.

viii) Particle size of 1 nm is equal to _____

a) 10^{-12}m b) 10^{-6}m c) 10^{-3}m d) 10^{-9}m

ix) Ceramic materials are _____ in nature

a) brittle b) ductile c) elastic d) plastic

x) The degree of freedom when ice, water, and water vapour co-exist in equilibrium is _____

a) 1 b) 2 c) 3 d) 0

2. Answer **any five** of the following: **10**

i) Explain the term : i) strength ii) creep

ii) Explain in brief the optical properties of materials.

iii) Explain slip mode of plastic deformation.

iv) Copper has a conductivity $5.9\times10^{7}\mho$ /m, what is its resistivity ?

v) What is polymer ? Define polydispersivity index.

vi) Define recrystallization temperature and state the factors affecting recrystallization temperature.

3. A) Answer **any two** of the following: **6**

i) State and explain Gibb's phase rule.

ii) Explain pervoskite structure of ceramics.

iii) Explain any three applications of nanophase materials.

B) If the average modulus of elasticity of steel used is 205.000 MPa by how much will a wire 2.5 mm in diameter and 3 m long be extended when it supports a load of 1000 kg ($g = 9.8$ m/s^2). **4**

4. Answer **any two** of the following: **10**

i) Obtain the expression for critical resolved shear stress in case of plastic deformation within single crystal.

ii) Describe processing of ceramic materials.

iii) What are polymers ? Discuss the classification of polymers.

5. Answer **any one** of the following: **10**

i) Describe any one synthesizing method and any one characterization technique of nanomaterials.

ii) What is phase diagram ? Draw Pb-Sn phase diagram and explain the different areas in it.

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Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
CHEMISTRY (Special Paper – XIV)
Inorganic Chemistry

Day and Date : Saturday, 31-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagram and give equations* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for the following and rewrite the sentences : **10**

1) The electronic configuration of Bk^{+2} ion is _____

a) [Rn] $5f^9\ 6d^0\ 7s^0$ b) [Rn] $5f^9\ 6d^0\ 7s^2$

c) [Rn] $5f^8\ 6d^0\ 7s^1$ d) [Rn] $5f^7\ 6d^0\ 7s^2$

2) The free electron theory of metals was first time proposed by _____

a) Lorentz b) Drude c) Bloch d) J. Van Vleck

3) In diborane, the B – B distance is _____ pm.

a) 119 b) 133 c) 177 d) 266

4) Solid-gas heterogenous system leads to _____ corrosion.

a) Atmospheric b) Immersed

c) Mechanical d) Underground

5) In solid $Be(CH_3)_2$, there are _____ 3c – 2e bonds.

a) six b) one c) zero d) two

6) In the periodic table, 4f series elements lies between _____ and _____

a) Ba, Hf b) Ra, Rf c) Sr, Zr d) Ca, Ti

7) For the preparation of bulk superconductors _____ method is used.

a) Chemical deposition b) Electro deposition

c) Sputtering d) Sintering

P.T.O.

8) Galvanized iron is obtained by _____ method.
   a) Cementation b) Hot dipping
   c) Metallizing d) Electroplating

9) The molecular formula of ethylene sodium is _____
   a) NaCH = CHNa b) $CH_3 - CH_2Na$
   c) $CH_2 = CHNa$ d) $NaCH_2 - CH_2Na$

10) Production of PbO_2 layer on lead surface in dil.H_2SO_4 is the process of _____ passivity.
   a) Mechanical b) Chemical
   c) Electrochemical d) Thermal

2. Answer **any five** of the following : **10**
   1) What is the observed electronic configuration of Gd and Ce ?
   2) Draw the structure of Y Ba_2 Cu_3 O_{7-x}.
   3) Give the structure of solid SO_3 molecule.
   4) Which are the various methods for prevention of corrosion ?
   5) What is 18-electron rule ? Give suitable example.
   6) Give the applications of actinides.

3. A) Answer **any two** of the following : **6**
   i) Draw the band diagrams for conductors, insulators and semiconductors.
   ii) Why borazine is called as inorganic benzene ?
   iii) Write a note on differential oxygenation in corrosion of metals.

   B) How will you synthesize organoaluminium compounds ? **4**

4. Answer **any two** of the following : **10**
   i) Distinguish between lanthanides and actinides.
   ii) Discuss the properties of metallic solids.
   iii) How will you prepare P_4O_{10} molecule ? Discuss its structure.

5. Answer **any two** of the following : **10**
   i) Explain the structure and bonding in XeF_6 molecule.
   ii) Give the comparison between n-type and p-type semiconductors.
   iii) Give names, atomic symbols and electronic configuration of Lanthanides.

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SLR-Z – 275

Seat No.	

B.Sc. (Semester – VI) Examination, 2015
BOTANY
Systematics of Angiosperms (Special Paper – XIV)

Day and Date : Saturday, 31-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: i)* ***All*** *questions are* ***compulsory****.*
ii) ***All*** *questions carry* ***equal*** *marks.*
iii) Draw ***neat*** *labelled diagram* ***wherever*** *necessary.*
iv) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternative : **(1×10=10)**

1) According to Bennettitalean theory of origin of Angiosperms flowers of Magnolia resemblance with strobili of _____
   a) Cycadeoidea b) Lyginopteris
   c) Enigmocorpon d) Calamite

2) Engler and prantl's system of classification of Angiosperms is _____ system.
   a) Artificial b) Natural
   c) Phylogenetic d) None of these

3) Study of pollen and spores is called _____
   a) Embryology b) Palynology c) Ecology d) Cytotaxonomy

4) The phenomenon of cytology for the explanation of taxonomic problems is referred as _____
   a) Chemotaxonomy b) Anatomy
   c) Ecology d) Cytotaxonomy

5) Pollinia are found in members of family _____
   a) Rutaceae b) Fabaceae
   c) Asclepiadaceae d) Polygonaceae

6) _____ is the most common type of ovule found in Angiosperms.
   a) Orthotropous b) Anatropous
   c) Amphitropous d) Campylotropus

P.T.O.

7) Polygonum type of development of embryo sac is _____
   a) monosporic b) bisporic c) trisporic d) tetrasporic

8) Monstrous development is seen in _____
   a) Rose b) Nymphaea c) Paeonia d) Mussaenda

9) _____ inflorescence is characteristic of family labiatae.
   a) Raceme b) Catkin c) Umbel d) Verticillaster

10) Diadelphous stamens are found in _____ family.
   a) poaceae b) fabaceae c) liliaceae d) bignoniaceae

2. Answer **any five** of the following : **10**

   i) Write any four advanced characters of the flower.

   ii) What is chalazogamy ?

   iii) Define Autogamy.

   iv) Give the botanical names of any two plants of the family Rutaceae.

   v) Define chemotaxonomy.

   vi) Write on Papilionaceous corolla.

3. A) Answer **any two** of the following : **6**

   i) Explain the stem nature of thalamus.

   ii) Give economic importance of family poaceae.

   iii) Give the distinguishing characters of family Myrtaceae.

   B) Explain double fertilization is a triple fusion. **4**

4. Answer **any two** of the following : **10**

   i) Describe the development of tetrasporic embryo sac.

   ii) Describe Anatropous ovule.

   iii) Give economic importance of family Amaranthaceae.

5. Answer **any two** of the following : **10**

   i) Give insect pollination with examples.

   ii) What is endosperm ? Write on cellular endosperm.

   iii) What is embryogenesis ? Describe development of typical dicot embryo with example.

_____

SLR-Z – 276

Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
ZOOLOGY
Endocrinology, Environmental Biology and Toxicology
(Special Paper – XIV)

Day and Date : Saturday, 31-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Select the appropriate answer from each of the following and rewrite the sentence : **10**

1) _____ is osteoporosis.
   a) A disorder in which bones become fragile.
   b) A disorder characterised by apparent lack of aging
   c) A disorder characterised impaired growth.
   d) A technique use to cheak hormone balance in blood.

2) Gluco corticoids are produced from
   a) pancreas b) testes c) ovary d) adrenal cortex

3) An auto immune disease in which an antibody mimics the action of TSH is
   a) Myxedema b) Cretinism c) Acromegaly d) Grave's disease

4) _____ is a male sex hormone ?
   a) insulin b) aldosterone c) androgens d) pheramones

5) In the body, both the blood sodium and potassium levels are regulated by
   a) pheramones b) aldosterone c) cortisol d) androgen

6) Endemic species are
   a) rare species
   b) species localised in the specific region
   c) cosmopolitan in-distribution
   d) critically endangered

P.T.O.

7) _____ are the species that can be used to monitor health of an environment or ecosystem.
   a) ecodegreder b) biological indicators
   c) ecodestructor d) biodenatures

8) _____ is a heavy metal toxicant.
   a) DDT b) Malathion c) Endosulfan d) Cadmium

9) In Mytilus the adaptation for attachment to substratum is
   a) muscular foot b) cement gland
   c) byssus thread d) pedal disc

10) Lentic is the term used for
   a) standing water b) running water
   c) streams d) springs

2. Answer **any five** of the following : **10**
   I) Biological indicators.
   II) Deciduous forest.
   III) Hormone receptors.
   IV) Thyroxine.
   V) Heavy metal toxicants.
   VI) Gn RH.

3. A) Answer **any two** of the following : **6**
   I) Role of parathyroid hormones.
   II) Determination of LD_{50} values.
   III) Role of hormones secreted by islets of langerhans.
   B) Rain water harvesting. **4**

4. Answer **any two** of the following : **10**
   I) Prostaglandin.
   II) Bioaccumulation.
   III) Waste water management.

5. Answer **any one** of the following : **10**
   I) Write on histological structure and role of hormones of adrenal gland.
   II) Describe characteristics and faunal adoptation of animals in desert habitat.

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SLR-Z – 278

Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
MATHEMATICS (Special Paper – XIV)
Linear Algebra

Day and Date : Saturday, 31-10-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose the correct alternative of the following. **10**

1) If w_1 and w_2 are finite dimensional subspace of vector space V then dim $(w_1 + w_2)$ =
   a) dim w_1 + dim w_2
   b) dim w_1 + dim w_2 + dim $(w_1 \cup w_2)$
   c) dim w_1 + dim w_2 – dim $(w_1 \cap w_2)$
   d) none of these

2) An orthogonal set of non zero vectors is
   a) Linearly dependent b) Linearly independent
   c) Constant d) None of these

3) Every _____ dimensional inner product space has an orthonormal basis.
   a) nonzero finite b) infinite
   c) finite d) none of these

4) In an inner product space the norm is defined by
   a) $\| V \| = (V, V)$ b) $\| V \| = \sqrt{(V, V)}$
   c) $\| V \| = (V, V)^2$ d) $\| V \| = | V |$

5) The dimension of C as a complex vector space is
   a) 0 b) 1 c) 2 d) none of these

P.T.O.

6) Let V be an inner product space over F then for all $x \in V$ & $C \in F$ $\|CX\| =$

a) $|C|\|X\|$ b) $\|C\|\|X\|$ c) $C\|X\|$ d) none of these

7) A non empty subset w of a vector space V(F) is a subspace of V(F) if for $\alpha, \beta \in F, X, y \in W$

a) $\alpha x + \beta y \in w$ b) $\alpha x + \beta y \notin w$

c) $\alpha x - \beta y \in w$ d) none of these

8) The sum of two subspace is a

a) field b) ring c) subspace d) none of these

9) $T : R^2 \to R^3$ be a linear transformation defined by $T(a_1, a_2) = (a_1 + 3a_2, 0, 2a_1 - 4a_2)$ β and γ are standard ordered basis for R^2 and R^3 then $[T]_\beta^\gamma =$ __

a) $\begin{bmatrix} 1 & 3 \\ 0 & 0 \\ 2 & -4 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 2 \\ 3 & 0 & -4 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 2 & -4 \end{bmatrix}$ d) none of these

10) Let $T : R^2 \to R^3$ be linear transformation given by $T(X_1\ X_2\ X_3) = (X_1 + X_2 + X_3, X_1 - 2X_2, 2X_2 - X_3)$. Then T(1, 1, 2) =

a) (4, –1, 1) b) (4, –1, 0) c) (4, 0, 0) d) none of these

2. Solve **any five**. **10**

1) In any vector space prove that

a) 0.u = 0 b) (–1) u = – u, $u \in V$.

2) Determine whether first vector can be expressed as a linear combination of other two

(– 2, 0, 3) (1, 3, 0) (2, 4, –1).

3) Let V and W be vector space over a field F and Let T, U : V $\to$ W be linear then for all $a \in F$, aT + U is linear.

4) Define $T : R^2 \to R^2$ by $T(a_1, a_2) = (2a_1 + a_2, a_1)$ to show that T is linear.

5) Let A and B be m× n matrix and C be a scalar then prove that $(A+CB)^* = A^* + CB^*$.

6) Let V be an inner product space then, $x, y \in V$ and $C \in F$ then show that $\langle X, Cy \rangle = \bar{C} \langle X, y \rangle$.

3. A) Solve **any two**. **6**

1) Let V be vector space. Let T, U_1, $U_2 \in$ (V) then prove that $T(U_1 + U_2) = TU_1 + TU_2$.

2) Show that $\| X + y \| \leq \| X \| + \| y \|$ for all $x, y \in V$, V being inner product space over F.

3) $T : R_2 \rightarrow R_3$ is linear transformation T(1, 1) = (1, 0, 2) T(2, 3) = (1, –1, 4) what is T(8, 1).

B) Let V be the vector space over field F prove that polar identity for all $x, y \in V$

$$\langle x, y \rangle = \frac{1}{4} \| X + y \|^2 - \frac{1}{4} \| X - y \|^2 .$$ **4**

4. Solve **any two**. **10**

1) Let V be an inner product space and S = {V_1 V_2 ... V_K} be an orthogonal subset of V consisting of nonzero vectors if $y \in$ span(S), then

$$y = \sum_{i=1}^{K} \frac{\langle y, v_i \rangle}{\| v_i \|^2} v_i .$$

2) Prove that $\{x^3 + 2x^2, -x^2 + 3x + 1, x^3 - x^2 + 2x - 1\}$ in $P_3(R)$ is linearly independent.

3) If $T : V_3 \rightarrow V_3$ is linear transformation defined by T(x, y, z) = (3x, x – y, 2x + y + z). Find T^{-1}.

5. Solve **any one**. **10**

1) Let V = P(R) with the inner product $\langle f(x), g(x) \rangle = \int_{-1}^{1} f(t)\, g(t)\, dt$ and consider the subspace $P_2(R)$ with standard ordered basis β use the Gram-Schmidt process to replace β by an ordered basis {V_1 V_2 V_3} for $P_2(R)$. Also obtain orthonormal set.

2) State and prove rank-nullity theorem.

SLR-Z – 280

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
GEOLOGY (Special Paper – XIV)
Precambrian Stratigraphy of India

Day and Date : Saturday, 31-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) Draw ***neat*** *diagram* ***wherever*** *necessary.*

1. Fill in the blanks with correct answer from the given options. **10**

1) Oldest sediments of Dharwars are metamorphosed to form _____
   a) Gneiss and Schist b) Gneiss
   c) Schist d) Granites

2) Rocks below Eparchaean unconformity are _____
   a) Gondwana b) Dharwars c) Siwaliks d) Bagh Beds

3) Charnockites are _____ bearing granites.
   a) Hypersthene b) Augite c) Silver d) Gold

4) Diamond bearing horizons occur in _____ Vindhyan rocks of M.P.
   a) basement b) middle c) upper d) lower

5) The Upper Vindhyans contains predominantly of _____
   a) Limestone b) Shales c) Sandstone d) Coal

6) The regional trend of Dharwarian rocks is _____
   a) E – W b) NE – SW c) N d) NNW – SSE

7) Zawar is famous for _____ deposits.
   a) Gold b) Cu – Au c) Pb – Zn d) Fe – Mn

8) The oldest group of Vindhyan group is _____
   a) Semri b) Kaimur c) Bhandar d) Rewa

P.T.O.

9) Oldest sedimentary strata of Indian Peninsula are produced from _____ rocks.
   a) Primitive gneiss b) Dharwar c) Basalt d) Granite

10) Mansar formation belongs to _____ group.
   a) Sakoli b) Sausar c) Amgaon d) Amba

2. Answer **any five** of the following : **10**

1) Stratigraphic horizon of Iron ores of India.
2) Ajabgarh group.
3) Kaladgi group.
4) Mansar formation.
5) Aravallis economic deposit.
6) Schist complex of Sargur.

3. A) Answer **any two** of following : **6**

i) Upper, Vindhyan.
ii) Primite basement rocks.
iii) Bhima group.

B) Explain the economic importance of Cuddapah. **4**

4. Answer **any two** of the following : **10**

i) Dharwar supergroup; its structure and economic importance.
ii) Iron-ore groups of Singhbum-Orissa province and associated metamorphic assemblages.
iii) Badami group and associated palaeontological characters.

5. Answer **any two** of the following : **10**

1) Cuddapah super group.
2) Aravallis of Rajasthan.
3) Upper Vindhyan supergroup : lithology and economic importance.

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SLR-Z – 281

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
MICROBIOLOGY
Microbial Biochemistry (Special Paper – XIV)

Day and Date : Saturday, 31-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by selecting correct alternatives given : **10**

1) A ferrous atom that is bound to enzyme acts as a

a) Coenzyme b) Prosthetic group

c) Cofactor d) Holoenzyme

2) The velocity attained at steady state by the system is denoted as

a) V_0 b) V_{max} c) $V_{max/2}$ d) $V_{0.5}$

3) The allosteric enzymes for which K_M changes with modulator concentration are called _____ enzymes.

a) M b) V c) L d) K

4) _____ is an example of nonionic detergent that is used for cell disruption.

a) Triton b) SDS

c) Acetyl bromide d) Acetyl trimethyl ammonium bromide

5) The major functions of PP pathway is to supply ribose 5P and

a) ATP b) Pyruvate c) NADPH d) NADH

6) The key metabolite for most of the metabolic pathways is

a) Pyruvate b) Citrate c) Glycerate d) Malate

7) The enzyme reaction becomes of _____ nature at steady state.

a) Linear b) Zero order c) Hyperbolic d) First order

8) The enzyme hexokinase is an example of _____ type of specificity.

a) Optical b) Group c) Bond d) Absolute

P.T.O.

9) The functioning of arabinose operon is regulated by _____ gene.

a) ara B b) ara A c) ara D d) ara C

10) GOGAT is active when concentration of _____ is low.

a) N b) NH_3 c) NO_2 d) NO_3

2. Answer **any five** of the following : **10**

i) What is an active site ?

ii) Give structure of enzyme.

iii) Write the final equation of enzyme action (Michaelis-Menten equation)

iv) Give properties of isozymes.

v) Name atleast four chemicals used for immobilization by cross linking.

vi) Write glyoxylate bypass.

3. A) Answer **any two** of the following : **6**

i) Describe models of enzyme action.

ii) Describe methods of purification of enzyme based on solubility.

iii) Write on 'ED' pathway.

B) Write on allosteric enzymes. **4**

4. Answer **any two** of the following : **10**

i) Write on Arabinose operon.

ii) Write on peptidoglycan synthesis.

iii) Write on assay of enzymes.

5. Answer **any two** of the following : **10**

i) Describe factors affecting catalytic efficiency.

ii) Give an account of assimilation of N.

iii) Give an account of protein synthesis.

_____

SLR-Z – 283

Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
COMPUTER SCIENCE
Advanced Java (Special Paper – XIV)

Day and Date :Saturday, 31-10-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose correct alternative. **10**

I) The _____ package contains the various interfaces and classes that the JDBCAPI requires.
a) Java.sql.*; b) Java.jdbc.*;
c) Java.oracle.*; d) Java.util.*;

II) To run an applet _____ command is used.
a) run b) java c) appletviewer d) applet

III) The jsp explicit object 'out' is actually
a) response.getoutputstream() b) response.getwrite()
c) request.getoutputstream() d) request.getwriter()

IV) Serlet is an instance of
a) the object class b) the applet class
c) the http servlet class d) all of these

V) Which of these interfaces define a method action performed()
a) ComponentListener b) ContainerListener
c) ItemListener d) ActionListener

VI) _____ method ensures that a new web-page is generated.
a) GET b) POST
c) DELETE d) HEAD

VII) By default how long does a cookies lost
a) 24 hours b) 30 days
c) 365 days d) by default, a new created cookies persist until the browser exists

P.T.O.

VIII) The root element of deployment descriptor (web.x ml) is the
a) <web-app> b) <servlet>
c) <servlet-mapping> d) all of these

IX) The jsp scriptlet must be terminated with; (semicolon).
a) True b) False

X) In URL query string, parameters pairs are separated using the _____ symbol.
a) ? b) = c) & d) +

2. Answer **any five** of the following : **10**
I) What is DSN ?
II) What is general structure of web-application ?
III) What is URL ?
IV) How to create jar file ?
V) Write general syntax of expression language.
VI) Write syntax of creation of combo box.

3. A) Answer **any two** of the following : **6**
I) Explain hidden form field.
II) Explain prepared statement.
III) Explain action tags in jsp.

B) Write a servlet to display “Hello” message. **4**

4. Answer **any two** of the following : **10**
I) Write a program to copy items from one list box to another list box.
II) Write a program to implement and httpsession object.
III) Write a program to demonstrate callable statement.

5. Answer **any two** of the following : **10**
I) Explain servlet config with suitable example.
II) Explain event delegation model.
III) Write note on type – 4 driver.

SLR-Z – 284

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
PHYSICS (Special Paper – XV)
Quantum Mechanics and Astrophysics

Day and Date : Monday, 2-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N. B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) Use of log table or scientific calculator is ***allowed****.*
iv) Draw neat diagrams ***wherever*** *necessary.*

1. Select correct alternative : **10**

i) If $e^{\alpha y}$ is eigen function and $\frac{d^2}{dy^2}$ is operator then eigen value of operator is _____

a) α b) α^2 c) α^3 d) αy

ii) Schrödinger's time dependent wave equation is based on conservation of _____

a) Mass b) Energy
c) Momentum d) Probability

iii) The separation between two successive energy levels in harmonic oscillator is _____

a) $\hbar\omega$ b) $\frac{1}{2}\hbar\omega$ c) $\frac{3}{2}\hbar\omega$ d) $2\hbar\omega$

iv) The zero point energy of linear harmonic oscillator is given by _____

a) $E_0 = 0$ b) $E_0 = \hbar\omega$

c) $E_0 = mc^2$ d) $E_0 = \frac{1}{2}\hbar\omega$

P.T.O.

v) The linear momentum operator is given by

a) $\hat{p}_x = -i\hbar \frac{\partial}{\partial x}$ b) $\hat{p}_x = -i\hbar \frac{\partial}{\partial t}$

c) $\hat{p}_x = -\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2}$ d) $\hat{p}_x = -\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} + V(x)$

vi) The approximate limit of observable universe is _____

a) 100 light years b) 17.6×10^9 light years

c) 17.6×10^9km d) 100 billion light years

vii) If V is velocity of recession of a galaxy at a distance x, then Hubble constant H is given by _____

a) H = Vx b) H = V/x

c) H = x/V d) H = V – x

viii) From edge-on view of Milky way galaxy it can be said that Milky-way galaxy is _____

a) Disc shaped b) Spiral

c) Spherical d) Elliptical

ix) The sun and planets were formed before _____

a) 20 billion years b) 9 billion years

c) 4.6 billion years d) 15 billion years

x) Majority of sun spots occur _____

a) Near equator b) In polar region

c) Far from equator d) Both a) and b)

2. Answer **any five** of the following : **10**

i) Explain normalization condition for wave function.

ii) Explain zero point energy.

iii) What is an operator ?

iv) What is cosmology ?

v) Explain supernova explosion.

vi) Why sunspot regions are dark ?

3. A) Attempt **any two** of the following : **6**

   i) Explain the concept of matter waves.

   ii) Write a note on quantum numbers.

   iii) Write a note on interstellar medium.

   B) Derive Schrödinger's time dependent wave equation for matter waves in one and three dimension. **4**

4. Answer **any two** of the following : **10**

   i) Obtain expression for

   a) Momentum operator

   b) Total energy operator

   c) Kinetic energy operator

   d) Hamiltonian operator.

   ii) Write a note on oscillating theory of universe.

   iii) What is milky way galaxy ? Discuss in detail.

5. Answer **any one** of the following : **10**

   i) Apply Schrödinger's wave equation to a particle in one dimensional rigid box, give the energy levels.

   ii) Discuss the origin of solar system with reference to condensation theory. What are supporting evidences to the condensation theory ?

SLR-Z – 286

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
BOTANY (Special Paper – XV)
Microbial Genetics, Plant Breeding and Biostatistics

Day and Date : Monday, 2-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *I)* ***All*** *questions are* ***compulsory****.*
II) ***All*** *questions carry* ***equal*** *marks.*
III) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
IV) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences choosing correct alternatives : **10**
   1) Desired improved verifies of economically useful crops are raised by
      a) Natural selection b) Hybridization
      c) Clonal selection d) Mutation
   2) _____ are always pure because they passes only one set of chromosome.
      a) Diploids b) Haploids c) Triploids d) Polyploids
   3) Name the bacteria which were used by Griffith for his experiment
      a) Diplococcus pneumonia b) E. coli
      c) Salmonella typhi d) Lactobacillus
   4) In hybridization the removal of anthers from flower bud before anthesis is called as
      a) Tagging b) Emasculation c) Bagging d) Selfing
   5) _____ is non-ionizing mutagenic agent used in mutation breeding.
      a) X-rays b) Beta rays c) Gamma rays d) UV-rays
   6) Data represented in circle form is called as
      a) Pie diagram b) Bar diagram c) Line diagram d) Point diagram
   7) The process of mass selection is generally used in
      a) Cross pollinated crops b) Self pollinated crops
      c) Clonally propagated crops d) Both a) and c)

P.T.O.

8) The term pure line was coined by
   a) W.L. Johannsen b) A.D. Hershey
   c) N.D. Zender d) S.E. Luria

9) Across between a hybrid and one of its parent is called as _____ method.
   a) Back cross b) Bulk c) Pedigree d) Multiple cross

10) Test of significance used specially for small size samples are
   a) T-test b) F-test
   c) Chi square test d) Both a) and b)

2. Answer **any five** of the following : **10**
   i) Give application of Bulk method.
   ii) Write merits of mass selection.
   iii) What is transformation ?
   iv) What is pure line selection ?
   v) Enlist application of multiple cross.
   vi) Give any four objectives of plant breeding.

3. A) Answer **any two** of the following : **6**
   i) Give methods of Emasculation.
   ii) Write note on conjugation.
   iii) Give merits and demerits of clonal selection.

   B) Write note on scope of plant breeding. **4**

4. Answer **any two** of the following : **10**
   i) Write an essay on breeding in cotton.
   ii) Describe measures of central tendency.
   iii) Describe method of mutation breeding.

5. Answer **any two** of the following : **10**
   i) Describe DNA viruses.
   ii) Explain application of computer in biological education.
   iii) Explain various steps in hybridization.

SLR-Z – 287

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
ZOOLOGY (Special Paper – XV)
Molecular Biology and Biotechnology

Day and Date : Monday, 2-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw neat and labelled diagram ***wherever*** *necessary.*

1. Select the appropriate answer from **each** of the following and rewrite the sentence : **(1×10=10)**

i) _____ is the termination codon.
   a) UAA b) AVG
   c) GUG d) None of the above

ii) DNA replication is _____ type.
   a) conservative b) semi conservative
   c) disposal d) quarterly conservative

iii) Okazaki fragments are formed during
   a) Translation b) Transcription
   c) DNA replication d) DNA damage

iv) _____ mechanism is responsible for removal of introns from eukaryotic m-RNA.
   a) Splicing b) Methylation
   c) Capping d) Polyadenylation

v) Those codons do not take part in protein synthesis are called as _____ codons.
   a) Degenerate b) Nonsense c) Ambiguous d) Double

vi) Monoclonal antibodies are formed during
   a) DNA fingerprinting b) Hybridoma
   c) TLC d) Southern blotting

P.T.O.

vii) The site of protein synthesis is

a) Ribosomes b) Lysosomes c) Nucleus d) Nucleolus

viii) _____ is ambiguous codon.

a) AVG b) GVG c) AAA d) VAG

ix) Double helicle structure of DNA is proposed by

a) Devaries b) Mendel

c) Morgan d) Watson and Crick

x) Wobble hypothesis is proposed by

a) Watson b) Crick c) Morgan d) Mendel

2. Answer **any five** of the following : **10**

1) Codon – Anticodon pairing
2) Degenerate Codon
3) DNA Ligase
4) DNA polymerase
5) Rho (ρ) factor
6) m-RNA.

3. A) Answer **any two** of the following : **6**

1) Southern blotting
2) Properties of genetic code
3) Transduction.

B) Describe ELISA Technique. **4**

4. Answer **any two** of the following : **10**

1) Lac-Operon
2) Applications of PCR
3) Transformation.

5. Answer **any one** of the following : **10**

1) Describe the process of Hybridoma technology and add a note on monoclonal antibody.
2) Describe in detail the DNA finger printing and its applications

_____

SLR-Z – 288

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
MATHEMATICS
Special Paper – XV : Partial Differential Equations

Day and Date : Monday, 2-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure to the ***right*** *indicates* ***full*** *marks.*

1. Select correct alternative for **each** of the following : **10**

1) In the partial differential equation the number of independent variables are _____

a) less than one b) more than one
c) exactly one d) none of these

2) The degree of the partial differential equation is the degree of highest derivative which occur in it so far as derivatives concerned after derivatives are free from _____

a) radical only
b) fractions only
c) radicals and fractions
d) none of these

3) The product of the first order partial derivatives allowed in the _____ first order partial differential equation.

a) non-linear b) linear
c) semi-linear d) quasi-linear

4) If number of arbitrary constants are greater than number of independent variables then by eliminating arbitrary constants we get _____

a) more than one partial differential equation of order one
b) unique partial differential equation of order one
c) partial differential equation of order greater than one
d) none of these

5) $x^2zp + y^2zq = xy$ is _____ partial differential equation.

a) linear b) non-linear

c) semi-linear d) quasi-linear

6) If $u(x, y, z) = c_1$ and $v(x, y, z) = c_2$ are two independent solutions of $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ where c_1 and c_2 are arbitrary constants then general solution of $Pp + Qq = R$ is _____ where ϕ is arbitrary function.

a) $\phi(u, v) = c$ b) $u = \phi(v)$

c) $\phi(u + v) = 0$ d) $\phi(u) = \psi(v)$

7) The meaning of DD'^2 in $f(D, D')\, z = 0$ is _____

a) $\frac{\partial}{\partial x}\frac{\partial^2}{\partial y^2}$ b) $\frac{\partial^2}{\partial x^2}\frac{\partial}{\partial y}$

c) $\frac{\partial^3}{\partial x^2\, \partial y}$ d) $\frac{\partial^3}{\partial x\, \partial y^2}$

8) For homogeneous linear partial differential equation with constant coefficients, $F(a, b) = 0$ if and only if _____ is a factor of $F(D, D')$.

a) $(aD - bD')$ b) $(aD + bD')$

c) $(bD - aD')$ d) $(bD + aD')$

9) In standard form I of non-linear partial differential equation, its solution is _____ with $f(a, b) = 0$.

a) $z = ax + by + c$ b) $z = ax + by$

c) $z = ax - by + c$ d) $z = by - ax + c$

10) Cauchy-Euler partial differential equation reduced to a linear partial differential equation with constant coefficients by the substitution _____

a) $x = e^{-u}$, $y = e^{-v}$

b) $x = e^{u}$, $y = e^{-v}$

c) $x = e^{-u}$, $y = e^{v}$

d) $u = \log x$, $v = \log y$

2. Attempt **any five** of the following : **10**

   1) Form the partial differential equation by eliminating ϕ from $z = (x - y)\ \phi(x^2 + y^2)$.

   2) Solve ptanx + qtany + tanz = 0.

   3) State Clairaut' form and Charpit's auxiliary equation for non-linear partial differential equation of order one.

   4) If $F(D, D') = D^2 + 3DD' + 2D'^2$ and f(x, y) = x + 2y then find particular integral.

   5) Find C.F. for $(D - 2D'^2 - 1)z = 0$.

   6) Find the partial differential equation by eliminating a, b, c from ax + by + cz = 4.

3. A) Attempt **any two** of the following : **6**

   1) Solve (1 + y) p + (1 + x) q = z.

   2) Find the complete integral of $(1 - x^2)\, yp^2 + x^2q = 0$.

   3) Solve $(2D^2 - 5DD' + 2D'^2)\, z = 5 \sin(2x + y)$.

   B) Solve $(D^2 - D'^2 - 3D + 3D')z = xy$. **4**

4. Attempt **any two** of the following : **10**

   1) Solve $(D - 3D' - 2)^2 z = 2e^{2x} \tan(y + 3x)$.

   2) Solve $(D^2 - 3DD' + 2D'^2)z = e^{2x - y} + \cos(x + 2y)$.

   3) Find a complete integral of $p^2 + q^2 = z^2 (x + y)$.

5. Attempt **any one** of the following : **10**

   1) Show that the general solution of Lagrange's equation Pp + Qq = R is $\phi(u, v) = 0$ where ϕ is an arbitrary function and $u(x, y, z) = c_1$ and $v(x, y, z) = c_2$ are two independent solutions of $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ and c_1, c_2 are arbitrary constants and at least one of u, v must contain z, and hence solve the linear partial differential equation of order one $xyp + y^2q = xyz - 2x^2$.

   2) Explain the Charpit's method for solving the non-linear partial differential equations of order one, and hence solve by Charpit's method $z^2 (p^2z^2 + q^2) = 1$.

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Seat No.	

B.Sc. III (Semester – VI) Examination, 2015
STATISTICS (Special Paper – XV)
Limit Theorems, Reliability and Queuing Theory

Day and Date : Monday, 2-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) ***Use*** *of Statistical tables and calculators is* ***allowed****.*

1. Choose the most correct alternative : **10**

1) Let $X_1, X_2 ..., X_n$ is a random sample from χ^2 distribution with 1 d.f. let $\overline{X}_n = \frac{1}{n}\sum x_i$ .Then as $n \to \infty$, $\overline{X}_n$ follows _____ distribution.

a) $\chi^2_{(n)}$ b) $\chi^2_{(1)}$ c) normal d) lognormal

2) Which of the following statements is incorrect ?

a) $X_n \xrightarrow{P} X \Rightarrow X_n \xrightarrow{D} X$ b) $X_n \xrightarrow{D} K \Rightarrow X_n \xrightarrow{P} K$

c) $X_n \xrightarrow{P} K \Rightarrow X_n \xrightarrow{D} K$ d) $X_n \xrightarrow{D} X \Rightarrow X_n \xrightarrow{P} X$

3) A series system of 3 components A, B, C fails if _____ fails.

a) A b) B

c) C d) any one of A, B, C

4) Which one of the following is an order statistic ?

a) sample range b) sample median

c) sample mean d) sample mode

5) In FIFO behaviour, the customers are served

a) randomly b) in the order of arrival

c) in the reverse order of arrival d) prioritily

6) If $X \sim \exp(\theta)$ then failure rate is

a) increasing b) decreasing c) constant d) none of these

7) If X ~ B (10, 0.2) then $P\left[\left|\frac{x}{10} - \frac{2}{10}\right| > 2\right]$ will be

a) atmost 0.01 b) at least 0.01

c) exactly 0.0123 d) none of these

8) If T is a life time of a component with cdf F (.), then reliability is given by

a) F (T) b) $F'(T)$

c) $\frac{f(T)}{\bar{F}(T)}$ d) none of these

9) For a coherent system

a) $\phi(0) = 0$ b) $\phi(0) = 1$

c) $\phi(1) = 0$ d) none of these

10) In usual notations traffic intensity is given by

a) λ b) μ c) $\frac{\mu}{\lambda}$ d) $\frac{\lambda}{\mu}$

2. Attempt **any five** from the following : **10**

A) Define parallel system and series system.

B) Find reliability of two out of three system.

C) WLLN does not hold good for Cauchy distribution. Give the justification in two statements.

D) State Weak Law of Large Numbers (WLLN).

E) Define order statistic.

F) Define queue discipline.

3. A) Attempt **any two** from the following : **6**

   i) Define IFR and DFR distributions.

   ii) State the assumptions mode, while obtaining the distribution of departures in queuing system.

   iii) Let $X_n \xrightarrow{P} X$, show that $KX_n \xrightarrow{P} KX$ as $n \to \infty$.

   B) Does there exists a r.v. X for which $P\left[\mu - 2\sigma < X < \mu + 2\sigma\right] = 0.6$? where $\mu = E(X), \sigma^2 = V(X)$ (finite). Justify. **4**

4. Attempt **any two** from the following : **10**

   A) Let $X_1, X_2, ..., X_n$ be a r.s. of size n from exp (1) distribution.

   Let $Y_1 = \min \{X_1,..., X_n\}$. Test whether $Y_1 \xrightarrow{P} 0$ as $n \to \infty$.

   B) If number of arrivals (n) in time t follow poisson distribution and if T = inter arrival time. Then show that T ~ exp (λ).

   C) Define survival function $\bar{F}(t)$ and hazard function $\lambda(t)$ and show that $\bar{F}(t) = \bar{e}\int_0^t \lambda(x)dx$.

5. Attempt **any two** from the following : **10**

   A) If arrivals are completely random and λ is the average arrival rate then show that probability distribution of number of arrivals in a fixed time interval is Poisson with parameter $n\lambda$.

   B) Decide whether CLT holds if $\{X_n\}$ is a random sample from Poisson distribution with parameter 1.

   C) Define K^{th} order statistic and find the distribution of it if $X_1, X_2,... X_n$ is a random sample from certain distribution.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
GEOLOGY (Special Paper – XV)
Phanerozoic Stratigraphy of India

Day and Date : Monday, 2-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Fill in the blanks with correct answer from given options : **10**

1) The main boundary fault separates
   a) Vindhyans and Arawallies b) Siwaliks and Tertiaries
   c) Siwaliks and Aravallis d) Siwaliks and Archaeans

2) Muschelkalk series of Spiti belongs to
   a) Permian b) Upper Jurassic
   c) Triassic d) Cretaceous

3) Pick out the formation devoid of coal.
   a) Barakar stage b) Raniganj stage
   c) Iron stone stage d) None of these

4) Deccan Traps are older than
   a) Lametas b) Bagh beds c) Laterites d) Intertrappeans

5) Gondwana sediments were deposited in
   a) Geosynclines b) Lakes c) Trough faults d) Estuaries

6) In which of the following Era of Indian Stratigraphy Jurassics of Kutch were formed ?
   a) Purana b) Aryan c) Dravidian d) Archaean

7) The last upheaval of the Himalayan mountain belt took place in
   a) Lower – Middle Cretaceous b) Miocene – Pliocene
   c) Upper Cretaceous – Eocene d) Pliocene – Pleistocene

P.T.O.

8) 'Chikkim limestone', belongs to
   a) Eocene rocks of Kashmir
   b) Cretaceous of Spiti
   c) Pre Cambrians of Sikkim
   d) Jurassics of Spiti

9) The Gondwana System was formed during
   a) Upper Carboniferous – Jurassic
   b) Upper Carboniferous – Cretaceous
   c) Permian – Jurassic
   d) Permian – Eocene

10) In Gondwana succession the first evidence of cold climate is obtained from
   a) Panchet formation
   b) Talchir formation
   c) Damuda formation
   d) Rajmahal series

2. Answer **any five** of the following : **10**
   i) Write any two characteristic features of Chari Series of Jurassic System.
   ii) Describe Raniganj Stage.
   iii) Describe "Neobolus beds".
   iv) What is Maleri Series ?
   v) Give the ages of the Saline Series / Salt Marl.
   vi) Fossils found in Inter-trappean beds.

3. A) Answer **any two** of the following : **6**
   i) What is the stratigraphical significance of inter-trappean beds ?
   ii) Explain Umaria marine beds of Gondwana System.
   iii) What is Barren measures ?

   B) Write a brief essay on the age of Deccan Traps. **4**

4. Answer **any two** of the following : **10**
   i) Describe in brief with stratigraphic sequence and lithology of Rajmahal series.
   ii) Describe in detail Marine Transgressions.
   iii) Describe in brief with lithology and fauna of Lameta beds.

5. Answer **any two** of the following : **10**
   i) Write a detailed account on Jurassic of Cutch.
   ii) Describe important characters of Deccan Traps of India.
   iii) Describe in brief with stratigraphic sequence and lithology of Siwalik System.

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SLR-Z – 291

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
MICROBIOLOGY
Environmental Microbiology (Special Paper – XV)

Day and Date : Monday, 2-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Rewrite the sentences by selecting correct answer from given alternatives : **10**

i) The shortest generation time is reported for _____ organism found in marine environment.
   a) Ps. Aeruginosa b) Ps. Netrigens
   c) Cl. Oceavicum d) Photobacterium Spp

ii) _____ industry waste water contains amenable organic compounds.
   a) Textile b) Paper and pulp
   c) Dairy d) Sugar

iii) Sulfur oxide pollutant mainly carry out irritation of _____ system.
   a) Respiratory b) Digestive c) Urinogenital d) Central Nervous

iv) In C.O.D. test _____ chemical is used as a strong oxydizing agent.
   a) $FeSO_4$ b) $K_2Cr_2O_7$
   c) Ferroin d) Ferrous ammonium sulphate

v) Axenic animals are these which are
   a) Free from germs b) With known organism
   c) Normal d) All of these

vi) _____ acts as indicators of fecal pollution.
   a) E.Coli b) Bifidobacterium
   c) St. fecalis d) All of these

vii) _____ lakes are nutrient rich lakes.
   a) Oligotrophic b) Eutrophic c) Mesotrophic d) None of these

P.T.O.

viii) _____ organisms involved in bioleaching process.

a) Thiobacillus thioxidans b) Thiobacillus ferroxidans

c) Ferrobacillus ferroxidans d) All of these

ix) _____ test is used for routine bacteriological analysis of water.

a) BOD b) SPC c) COD d) TOC

x) The coliform count of potable water must be

a) 0 b) 10 c) 15 d) 20

2. Answer **any five** of the following : **10**

i) Write causes of depletion of ozone layer.

ii) Enlist bioindicators of fecal pollution.

iii) Define BOD and COD.

iv) Discuss the microbially enhanced recovery of oil.

v) List types of wastes.

vi) Write classification of lakes on the basis of nutrient level.

vii) Write the characteristics of marine environment.

3. A) Answer the following questions in brief (**any two**) : **6**

i) Describe control of depletion of ozone layer.

ii) Write different parameters used for characterization of industrial wastes.

iii) Describe in short municipal water purification process.

B) Write on sources and control of eutrophication. **4**

4. Answer **any two** of the following : **10**

i) Describe bioleaching of copper and uranium.

ii) Write on treatment of textile industry waste water.

iii) Explain routine bacteriological analysis of water.

5. Answer **any two** of the following : **10**

i) Write in detail characters of distillary waste water.

ii) Discuss in detail germ free animals and gnotobiology.

iii) Write on biological safety.

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SLR-Z – 294

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
PHYSICS (Special Paper – XVI)
Electronics and Computer Programming

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
4) ***Use*** *of calculator or log table is* ***allowed****.*

1. Select the correct alternatives : **10**

i) The ideal input impedance of Op-Amp is
   a) infinite b) high
   c) negative d) low

ii) Noise triggering is avoided by using
   a) Differentiator b) Integrator
   c) Schmitt trigger d) Comparator

iii) In astable multivibrator using IC-555 timer the capacitor always charges between
   a) 0 and V_{cc} b) 0 to $\frac{2}{3}V_{cc}$
   c) $\frac{1}{3}V_{cc}$ to $\frac{2}{3}V_{cc}$ d) 0 to $\frac{1}{3}V_{cc}$

iv) Pulse width in IC-555 mono-stable multivibrator is given by
   a) 0.69 RC b) 1.1 RC
   c) RC d) None of the above

v) The firing angle of SCR depends on
   a) Source current b) Load current
   c) Gate current d) Shield current

P.T.O.

vi) SCR is
   a) negative resistance device
   b) a current control negative resistance device
   c) voltage control device
   d) none of these

vii) Data is temporary held in
   a) main memory b) secondary unit
   c) control unit d) monitor

viii) All the key words should be in
   a) digits
   b) upper case letters
   c) lower case letters
   d) single digit

ix) _____ is two way decision making statement.
   a) case b) switch
   c) if d) continue

x) In _____ loop condition is tested after first iteration.
   a) for-loop b) do-while
   c) -while loop d) none of above

2. Answer **any five** of the following : **10**
   1) Define operational amplifier.
   2) Define duty cycle of timer IC-555.
   3) Give any two methods of SCR firing.
   4) Explain important characteristics of computer.
   5) Explain increment and decrement operators in C++.
   6) What is algorithm ?

3. A) Answer **any two** of the following : **6**
   1) Explain the term DOS.
   2) Give an account of variables and constants ; in C++.
   3) Explain working of Diac.

   B) Give an account of IC-555 as astable multivibrator. **4**

4. Answer **any two** of the following : **10**

   1) Explain control structures in C++.

   2) Write note on RAM and ROM memory of computer.

   3) Explain the use of IC-555 for linear ramp monostable.

5. Answer **any one** of the following : **10**

   1) With neat block diagram explain construction and working of op-amp. Explain any four op-amp parameters.

   2) Explain the construction and working of SCR and give its one application.

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SLR-Z – 295

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
CHEMISTRY (Special Paper – XVI)
Analytical and Industrial Organic Chemistry

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50
Time :10.30 a.m. to 12.30 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams and give equations **wherever** necessary.*

1. Select the most correct alternative from among those given below and rewrite the sentence. **10**

i) The _____ detergents are known as invert soaps.
a) anionic b) cationic c) ampholytic d) non-ionic

ii) The monomers that are commonly used in addition polymerisation are
a) amides b) esters c) cycloalkanes d) alkenes

iii) In Ziegler-Natta polymerisation _____ is used as a catalyst.
a) NaCl b) NH_4Cl c) $TiCl_3$ d) KCl

iv) Power alcohol used as a substitute for petrol is
a) 20% alcohol mixture + 80% petrol b) 80% alcohol mixture + 20% petrol
c) 60% alcohol mixture + 40% petrol d) 50% alcohol mixture + 50% petrol

v) The semisolid mass containing crystalline sugar and molasses is called
a) bagasse b) black syrup c) massecuite d) sugar juice

vi) The sizing mixture used for water repellant fibres contains _____ agents.
a) wetting b) drying c) bleaching d) dyeing

vii) Natural rubber is a polymer of
a) propene b) isoprene c) formaldehyde d) phenol

P.T.O.

viii) Green chemistry is defined as designing and development of the chemical processes which

a) increase the pollution

b) produce the products with many by-products

c) use more energy

d) reduce the pollution

ix) Fuel gases are analysed by _____ chromatography.

a) gas b) column c) paper d) thin layer

x) The dispersal of micelles of grease in soapy water forms

a) wax b) solution c) alloy d) emulsion

2. Answer **any five** of the following : **10**

i) Explain synthesis and uses of PVC.

ii) How are the solvent systems prepared for development of TLC ?

iii) Draw a neat labelled sketch of mill house used for extraction of juice from sugar-cane

iv) Write merits of detergents over soaps.

v) What are microwave assisted reactions ? Give example.

vi) Explain scouring of fabric.

3. A) Answer **any two** of the following : **6**

i) What are the raw materials used for the manufacture of soap ?

ii) Explain biocatalytic reactions with their characteristic features.

iii) Discuss the process of dyeing of fabric using vat dyes.

B) Explain in brief the process of manufacture of ethyl alcohol by the fermentation of molasses. **4**

4. Answer **any two** of the following : **10**

   i) What are elastomers ? Discuss the synthesis of uses of Buna-S rubber.

   ii) Explain the process of concentration of sugar juice by using triple effect evaporator.

   iii) Discuss the principle and experimental methodology of column chromatography.

5. Answer **any two** of the following : **10**

   i) How are phenol-formaldehyde resins prepared ? Give their uses.

   ii) Compare TLC over paper chromatography.

   iii) Explain the principle and process of bleaching of fibres by sodium hypochlorite.

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SLR-Z – 296

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
BOTANY (Special Paper – XVI)
Molecular Biology and Biotechnology

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*

1. Write the correct answer. **10**

1) Molecular scissors are nothing but
   a) DNA ligase b) DNA polymerase
   c) Restriction endonucleases d) Helicase

2) Gene amplification can be achieved by
   a) PCR technique b) rDNA technology
   c) Southern blotting technique d) Both a) and b)

3) Lac Operon is a set of _____ Genes.
   a) three b) six
   c) five d) four

4) In MS medium, agar is used as a _____ agent.
   a) fusogenic b) sterilization
   c) solidifying d) stimulating

5) _____ enzyme prepares cDNA from mRNA.
   a) restriction endonuclease b) reverse transcriptase
   c) DNA ligase d) exonuclease

6) For production of secondary metabolites _____ culture technique is used.
   a) anther b) protoplast
   c) cell suspension d) all of these

7) _____ is the popular name of a transgenic rice having improved protein quality.
   a) Golden rice b) Basmati rice
   c) Texmati rice d) HMT

8) _____ gene expresses for enzyme luciferase which produces luminescence in dark.
   a) lux b) gus
   c) cat d) npt II

9) Each strand of DNA has a backbone of
   a) sugar and phosphate base b) sugar and nitrogen bases
   c) phosphate and nitrogen bases d) none of these

10) Haploid plants can be obtained by _____ culture technique.
   a) shoot tip b) cell suspension
   c) anther/pollen d) embryo

2. Attempt **any five** from the following : **10**
   1) Enlist the vectors used in recombinant DNA technology.
   2) What are the special features of Z-DNA ?
   3) Which enzyme is used in PCR and why ?
   4) Mention physical methods of gene delivery.
   5) Give the applications of anther culture.
   6) Mention different methods of mechanisms of gene regulation in eukaryotes.

3. A) Attempt **any two** of the following : **6**
   1) What do you mean by marker and reporter genes ? Give one example of each.
   2) Describe the organization of eukaryotic gene with suitable example.
   3) Draw a diagram of B-DNA.

   B) Describe somatic hybridization in brief. **4**

4. Attempt **any two** of the following : **10**
   1) Write a note on hybrid DNA model.
   2) Describe the procedure of southern blotting technique and give its significance.
   3) Write the composition of any tissue culture medium.

5. Attempt **any two** of the following : **10**
   1) Explain the mechanism of gene expression and regulation with the help of Lac Operon.
   2) Describe the method of micropropagation.
   3) Give an account of Agrobacterium mediated gene transfer.

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SLR-Z – 298

Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2015
MATHEMATICS (Special Paper – XVI)
Graph Theory

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for **each** of the following : **10**

1) If G = (V, E) be an undirected graph with e edges. Then $\sum_{v \in V} deg_G(v)$ =
   a) 2e b) e c) 0 d) e + 2
2) A graph which contains only isolated node is called _____ graph.
   a) Complete b) Null c) Regular d) Planar
3) A vertex with zero in degree is called
   a) Sink b) Total degree c) Source d) None of these
4) If a connected planar graph G has n vertices, e edges and r region, then n – e + r =
   a) 1 b) 2 c) 3 d) 4
5) A Tree with one vertex is called _____ tree.
   a) Trivial b) Non-trivial
   c) Both a) and b) d) None of these
6) There are at most _____ leaves in an m-ary tree of height h.
   a) m + h b) mh c) m – h d) m^h
7) Repeated vertices are not allowed in
   a) Path b) Trail c) Walk d) None of these
8) A binary number is 100.11 =
   a) $4.75_{(10)}$ b) $4.76_{(10)}$ c) $4.74_{(10)}$ d) $4.73_{(10)}$
9) The octal number conversion of hexadecimal number 0.BF85 is
   a) $.477024_{(8)}$ b) $.577024_{(8)}$ c) $.677_{(8)}$ d) $.777_{(8)}$
10) Every tree is _____ graph.
   a) Simple b) Multi c) Pseudo d) None of these

P.T.O.

2. Attempt **any five** of the following : **10**

   1) Define complete graph.

   2) Draw n-cube Q_n for n = 2 and n = 3.

   3) Show that a graph G is self complementary if it has 4n or 4n+1 vertices.

   4) Draw the diagraph G corresponding to adjacency matrix

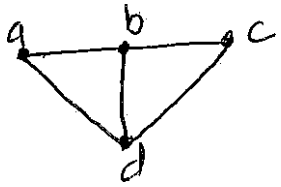
$$A = \begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$$

   5) In a complete n-ary tree with i internal vertices, then show that the number of leaf vertex P is given by P = (n – 1) (x – 1)/n.

   6) Convert $(0.10100110)_2$ to its equivalent octal number.

3. A) Attempt **any two** of the following : **6**

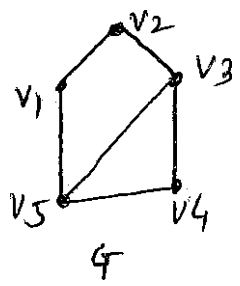
   1) Find all spanning trees of the following graph

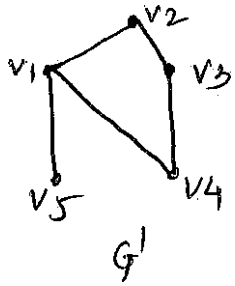


   2) Convert hexadecimal number 8E47.AB to decimal number.

   3) For what values of n is the graph of k_n Eulerian ?

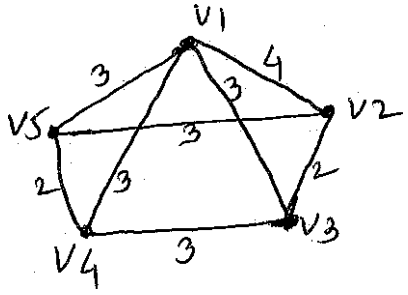
   B) Show that graphs are not isomorphic. **4**





4. Attempt **any two** of the following : **10**

1) Find the minimal spanning tree of the graph using the Prim's algorithm.

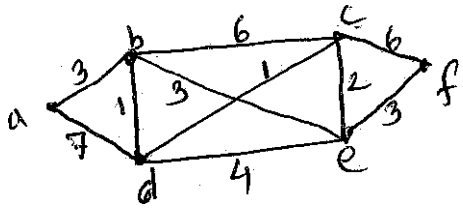


2) Convert $(3287.5100098)_{10}$ into octal.

3) Prove that the number of edges in a bipartite graph with n vertices is at most $\frac{n^2}{4}$.

5. Attempt **any one** of the following : **10**

1) Use Dijkstra's algorithm to find the shortest path between the indicated vertices in the given weighted graph.



between a and f

2) A) If G = (V, E) be directed graph with e edges, then prove that

$$\sum_{v \in V} \deg_G^+(v) = \sum \deg_G^-(v) = e .$$

B) Prove that a graph is a tree if and only if it is minimally connected.

SLR-Z – 300

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2015
GEOLOGY (Special Paper – XVI)
Economic Geology

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** diagram **wherever** necessary.*
*3) Figures to the **right** indicates **full** marks.*

1. Fill in the blanks with correct answer from the given options : **10**

   1) A vertical dyke showing transverse veins is known as _____
   (vuge, stock work, saddle reef, ladder vein)

   2) The chemical composition of chromite is _____
   ($2FeOCr_2O_3$, Cr_2O_3, Cr_2O_4, $FeCr_2O_4$)

   3) The Bailadila formations are associated with _____
   (Banded Hematite Quartzite, Hematite Schist, Gneiss, Jaspar)

   4) Tenor value of precious metal is _____
   (low, high, very high, moderate)

   5) The magmatic deposits formed in initial stage of magmatic crystallization are called as _____ magmatic deposits.
   (veins, moderate, early, late)

   6) The residual concentration rich in Fe content is _____
   (Bauxite, Magnetite, Hematite, Laterite)

   7) The placer deposits along the coastal tract of Maharashtra is _____
   (Zircon, Ilmenite, Rutile, Gold)

   8) Hydrothermal _____ deposits are mainly produced in carbonate rocks.
   (replacement, vein, cavity, placer)

P.T.O.

9) Diamonds occur as _____ magmatic deposits.
(disseminated, segregation, injection, placer)

10) Sulphide ores are the most common products of _____ process.
(residual, magmatic, fluvial, supergene enrichment)

2. Answer **any five** of the following : **10**

1) Stock work
2) Gossan
3) Fissure vein deposits
4) Contact metasomatism
5) Crustification
6) Pitches, flats.

3. A) Answer **any two** of the following : **6**

1) Epigenetic ore deposits.
2) Syngenetic ore deposits.
3) Immisible liquid segregation.

B) Any three essential conditions for the formation of hydrothermal deposits. Give Indian example. **4**

4. Answer **any two** of the following : **10**

1) Define mechanical concentration process. Describe in detail alluvial placer deposits.
2) Define hydrothermal deposits. Write full account on replacement deposits.
3) What are magmatic deposits ? Describe late magmatic deposits.

5. Explain **any two** of the following : **10**

1) Placer deposits. Add note on the Indian examples.
2) Residual deposits. Give their Indian examples.
3) National mineral policy 1990 of India. Add note on the mineral conservation.

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SLR-Z – 301

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
MICROBIOLOGY (Special Paper – XVI)
Medical Microbiology

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50

Time : 10.30 a.m. to 12.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative and rewrite the sentence again : **10**

i) Nucleic acid of Hepatitis B virus is _____ and virus size is _____ nm.
a) DNA, 42 b) DNA, 27 c) RNA, 42 d) RNA, 27

ii) Antibiotic action of streptomycin antibiotic is by inhibiting _____ synthesis.
a) cell membrane b) nucleic acid
c) protein d) cell wall

iii) Latency in trigerminal ganglia is a property of _____ virus.
a) Herpes simplex b) Hepatitis B
c) AIDS d) None of these

iv) Hydrophobia is a symptom of
a) rabies b) filariasis c) gas gangrene d) hepatitis

v) Pyocyanin pigment is produced by
a) Escherichia Coli b) Proteus vulgaris
c) Strepto. pneumoniae d) Pseudo.aeruginosa

vi) The primary lesion of syphilis is known as
a) chancre b) gas gangrene
c) anaerobic myositis d) thrush

vii) Trimethoprim and sulphonamides are inhibitor of _____ synthesis.
a) folic acid b) vitamin B_{12}
c) protein d) peptidoglycan

P.T.O.

viii) Plasmodium reproduces sexually in the
a) Mosquito b) Human c) Stagnant water d) Soil

ix) Clostridium perfringes is
a) Gram positive, aerobic, spore bearing rods
b) Gram positive, anaerobic, spore bearing rods
c) Gram negative, aerobic, non spore bearing rods
d) Gram negative, anaerobic, non spore bearing rods

x) _____ is a veneral disease.
a) Gonorrhoea b) Leprosy c) Gas gangrene d) Filariasis

2. Answer in brief/define **any five** of the following : **10**
a) Lepromin test
b) Negri bodies
c) HIV/AIDS
d) Beta lactam antibiotics
e) Prevention of Rabies
f) Gas gangrene
g) Plasmodium Vivax

3. A) Answer **any two** of the following : **6**
a) Biochemical mechanism of antibiotic resistance.
b) Symptoms of Helicobacter pylori infection.
c) Virus pathogenicity.

B) Explain role of Beta lactamase, Extended Spectrum Beta Lactamase (ESBL) and Carbapenase enzyme in antibiotic resistance. **4**

4. Answer **any two** of the following : **10**
a) Minimum Inhibitory Concentration (MIC) determination.
b) Candida albicans infection.
c) Spread of cholera.

5. Answer **any two** of the following : **10**
a) Mechanism of action of penicillin and vancomycin.
b) Living agents used for biological warfare.
c) Spread of Hepatitis B.

SLR-Z – 303

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2015
COMPUTER SCIENCE (Special Paper – XVI)
Data Communications and Networking – II

Day and Date : Tuesday, 3-11-2015 Max. Marks : 50
Time : 10.30 a.m. to 12.30 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *question carries* ***equal*** *marks.*

1. Choose the correct alternatives : **10**

1) _____ cipher permutes symbols in a block of symbols.
   a) Substitution b) Transposition cipher
   c) Caesar d) None of the above

2) _____ is a FTP server.
   a) INN b) TVX c) vsftpd d) Samba

3) _____ profile is used to specify particular settings for individuals or an entire group of users.
   a) Temporary b) Mandatory c) Local d) None of the above

4) A _____ can understand multiple networking protocols.
   a) repeater b) bridge c) router d) gateway

5) _____ protocol is used to retrieve emails from a remote server.
   a) POP3 b) IP c) TCP d) SMTP

6) _____ protects an organizations network from outside attack.
   a) Cryptography b) Bridges c) Firewall d) Spyware

7) _____ is the primary print server for most Linux distributions.
   a) Tux b) CUPS c) Apache d) Samba

8) _____ server provides greater reliability and performance to various applications.
   a) Terminal b) Application c) Web d) Database

P.T.O.

9) _____ addresses were designed for midsize organizations.
   a) Class A b) Class D c) Class C d) Class B

10) _____ is created by the system administration and is stored on a server.
   a) Hardware profile b) Local user profile
   c) Roaming user profile d) Temporary user profile

2. Answer **any five** of the following : **10**
   1) What is predictive encoding ?
   2) Which are the various partitions in Linux ?
   3) Mention the server roles of Windows Server 2003.
   4) What is meant by Packet-filter firewall ?
   5) What is meant by VPN ?
   6) Which are the various control flags of TCP ?

3. A) Answer **any two** of the following : **6**
   1) What is stream delivery service of TCP ?
   2) What is message confidentiality ?
   3) Explain tux server.

   B) Explain in detail bridges and types of bridges. **4**

4. Answer **any two** of the following : **10**
   1) Explain in detail logon script.
   2) Explain www in detail.
   3) Explain squid server in detail.

5. Answer **any two** of the following : **10**
   1) Explain the various security services in short.
   2) Explain remote sensing in detail.
   3) Explain SNMP protocol in detail.

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