SLR-N – 228

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
CHEMISTRY
Physical Chemistry (Special Paper – XIII)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *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 _____, $\Delta G_r = \Delta A$.
   a) volume b) temperature
   c) pressure d) temperature and pressure

2) The term fugacity has the dimensions of
   a) volume b) temperature
   c) pressure d) none of these

3) At equilibrium free energy is
   a) positive b) negative
   c) zero d) one

4) The rate constant K and temperature are related by _____ equation.
   a) Van't Hoff b) Arrhenius
   c) Both a) and b) d) None of these

5) $2FeCl_{3(aq)} + SnCl_{2(aq)} \rightarrow 2FeCl_2 + SnCl_4$ is an example of _____ order reaction.
   a) zero b) first c) second d) third

6) Reactions which proceed in a series of successive stages initiated by suitable primary processes are called _____ reactions.
   a) chain b) side c) parallel d) opposing

P.T.O.

7) For rotational transitions selection rule is

a) $\Delta V = \pm 1$ b) $\Delta J = \pm 1$

c) $\Delta E = \pm 1$ d) $\Delta J = \pm 2$

8) Which of the following diatomic molecule will not give a rotational spectra ?

a) NO b) HF c) CO d) N_2

9) A liquid mixture which distilled with a change in composition is called

a) zeotropic mixtures b) boiling mixtures

c) azeotropes d) azeotropic mixtures

10) The distillation carried out in a current of steam is known as _____ distillation.

a) fractional b) steam

c) flame d) none of these

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

1) State and explain Raoult's law.

2) What are the applications of rotational spectra ?

3) Explain the term "temperature coefficient" of the reaction.

4) The order of the reaction

$2 NO + 2 H_2 = N_2 + 2 H_2O$

appears to be 4. Experimentally determined order is 3. Explain.

5) Show that, $\Delta G = \Delta A + P \Delta V$.

6) Mention various applications of Clausius – Clapeyron equation.

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

1) Derive Gibb's – Helmholtz equation in its standard form.

2) Show that for third order reaction time required to complete half of the reaction is inversely proportional to square of initial concentration.

3) Distinguish between ideal and non-ideal solutions.

B) Calculate the reduced mass and moment of inertia of $Br^{79} – Cl^{35}$ molecule. The bond length of Br – Cl is 0.214 nm.
Given : $N = 6.023 \times 10^{23}$. **4**

4. Answer **any two** of the following : **10**

   1) Discuss, vibrational spectra of diatomic molecules.

   2) Derive thermodynamically Van't Hoff reaction isotherm.

   3) Define the term " Energy of activation". Discuss in brief activated complex theory to explain the energy of activation.

5. Attempt **any two** of the following : **10**

   1) What are azeotropic mixtures ? Discuss the distillation of solutions with the system having boiling point maximum.

   2) If the rate of reaction gets doubled from 298 K to 308 K. Calculate the energy of activation.

      Given R = 8.314 J K^{-1} $mole^{-1}$.

   3) The normal boiling point of water is 373 K. Under what pressure will water boils at 375 K.

      Given : The heat of vaporisation of water is 2259 J gm^{-1}

      R = 8.314 J K^{-1} $mole^{-1}$.

SLR-N – 100

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
METEOROLOGY (New)
Climatology (Paper No. – I)

Day and Date : Wednesday, 3-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

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

   1) The envelop of colourless, test less, odourless gases which surround the earth is called as

      (environment, atmosphere, ozone, ionosphere)

   2) Isobars are the lines which join the places of equal

      (temperature, rainfall, salinity, pressure)

   3) A _____ is defined as a stream of air in a fairly well definite direction.

      (wind, gala, breeze, cyclone)

   4) Blizzards are the winds which bring _____ in temperate region.

      (snow, hails, fog, rain)

   5) An airmass has _____ characters of the atmosphere over the given area.

      (uniform, uneven, layered, patches)

   6) An extensive transitional zone between two _____ airmasses is called as a frontal zone.

      (diverging, converging, uplifting, sliding)

   7) A belt of low pressure, known as equatorial through is also known as

      (wedge, westerlies, easterlies, doldrums)

P.T.O.

8) In 'Indian monsoon', there is a complete _____ reversal of wind directions.

(diurnal, monthly, seasonal, yearly)

9) When two contrasting airmasses are converging and parallel to each other, there is a _____ front.

(warm, cold, occluded, stationary)

10) Monsoon regions receive most of their rainfall through _____and orographic type of rainfall.

(Cyclonic, Anticyclonic, Periodic, Conventional)

2. Write in short (**any 5**) : **10**

1) What is 'climate' ?
2) What are the tropical easterlies ?
3) Give wind direction in 'anticyclone'.
4) Define the term 'monsoon'.
5) Define an airmass.
6) State the characters of meritime airmass.

3. A) Write short answers (**any two**) : **6**

1) State the secondary circulations of air in Southern hemisphere.
2) Describe the term 'Break of Monsoon'.
3) State the pattern of upper air circulations.

B) Draw a neat diagram of 'Planetary winds'. **4**

4. Write answers of **any two** : **10**

1) Describe the nature of climatology.
2) Classify the airmasses.
3) Describe the tropical cyclones.

5. Write short answers (**any two**) : **10**

1) Describe the branches of climatology.
2) Describe the rainfall in winter monsoon over India.
3) State the characters of continental airmass.

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SLR-N – 102

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
ZOOLOGY (Paper – V) (New)
Animal Diversity – III

Day and Date : Wednesday, 3-12-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw ***neat*** *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) Fore gut of cockroach is also called as_____
   a) Proctodaeum b) Mesenteron
   c) Stom odaeum d) Me sodaeum

ii) Aquatic respiration in Pila is by_____
   a) Pulmonary Sac b) Ctenidium
   c) Mantle d) Osphradium

iii) Cockroach belongs to class _____
   a) Insecta b) Myriapoda
   c) Arachnida d) Crustacea

iv) Function of Malpighian tubules in cockroach is _____
   a) Respiration b) Reproduction
   c) Excretion d) Digestion

v) Heart of Pila consist of _____chambers.
   a) 4 b) 2 c) 6 d) 3

P.T.O.

vi) Balanoglossus belongs to phylum_____

a) Echinodermata b) Mollusca

c) Arthropoda d) Hemichordata

vii) Statocyst of Pila is an organ of_____

a) Equilibrium b) Vision

c) Respiration d) Defense

viii) Sponging type of month parts are found in _____

a) Honeybee b) Housefly

c) Butterfly d) Mosquito

ix) Byssus threads are present in _____

a) Sepia b) Pila

c) Mytilus d) UNO

x) In cockroach ovaries consists of _____numbers of ovarioles.

a) 4 b) 16 c) 12 d) 10

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

a) Foot in a mytilus.

b) 1st maxilla of cockroach.

c) Osphradium of Pila.

d) Mosquito as disease vector.

e) General characters of Echinodermata.

f) Spiracles in cockroach.

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

   1) Mouth parts of Honeybee.

   2) Sexual dimorphism in Cockroach.

   3) Radula of Pila.

   B) Describe salivary glands of Cockroach. **4**

4. Write answers **any two** of the following : **10**

   A) Describe the shell of Pila.

   B) Describe leg of cockroach.

   C) Describe foot in Cephalopoda.

5. Write answer to **any one** of the following : **10**

   i) Explain nervous system of pila.

   ii) Describe male reproductive system of cockroach.

SLR-N – 122

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
COMPUTER SCIENCE (Old) (Paper – V)
Object Oriented Programming Using C++

Day and Date : Friday, 28-11-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) _____ used for automatically initialisation of object of its class.
   a) destructor b) constructor
   c) terminator d) overloading

2) The preprocessor directive always starts with
   a) % b) " "
   c) ? d) #

3) To request the dynamic memory which operator is used ?
   a) new b) destructor
   c) delete d) free

4) In C++, execution begins from function
   a) main() b) fun()
   c) long d) any function

5) Assignment operator can not be overloaded
   a) True b) False

6) The _____ contains sequence of zero or more characters enclosed in double quotes.
   a) character b) array
   c) string d) 'in'

7) Every C++ statements ends with a
   a) colon b) semicolon
   c) ? d) correct

P.T.O.

8) Identify invalid character constant
   a) 'C' b) '!'
   c) 'A' d) 'a'

9) In a friend function, overloading a binary operator we can pass _____ argument.
   a) 1 b) 2
   c) 3 d) 4

10) Which is a operator that does not overloaded ?
   a) ++ b) <<
   c) [ ] d) *

2. Answer the following : **10**
   1) What are the advantages of inline member function ?
   2) Define virtual base class.
   3) What are rules of operator overloading ?
   4) Define data encapsulation.
   5) Define abstract base class.

3. A) Answer **any two** of the following : **6**
   1) Explain operators in C++.
   2) Describe nested member function.
   3) Difference between runtime polymorphism and compile time polymorphism.

   B) Write a program in C++ to test the given number is prime or not by using parameterised constructor. **4**

4. Answer **any two** of the following : **10**
   1) Define destructor. Why it is used ? Explain with example.
   2) Explain any two types of inheritance.
   3) Write a program in C++ to implement any one binary operator overloading.

5. Answer **any two** of the following : **10**
   1) Explain the term 'function overloading'.
   2) Explain any two string function with example.
   3) Define nested class. Explain with example.

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SLR-N – 124

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
COMPUTER SCIENCE (Paper – VI) (Old)
Relational Database Management System

Day and Date : Saturday, 29-11-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

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

1) The column of a table is referred to as the
   a) Tuple b) Attribute c) Entity d) Degree

2) DBMS does not support client/server architecture
   a) True b) False

3) In SQL, which command is used to remove a stored function from the database ?
   a) Remove function b) Delete function
   c) Drop function d) None of these

4) A trigger is
   a) a statement that enables to start any DBMS
   b) a statement that is executed by the user when debugging an application
   c) a condition the system tests for the validity of the database user
   d) a statement that is executed automatically by the system as a side effect of a modification to the database.

5) Which of the following is not a cursor attribute ?
   a) ROWCOUNT b) FOUND
   c) NOTFOUND d) None of these

6) The goto statement changes the flow control within a PL/SQL block
   a) True b) False

7) _____ is another name/alias to a table or view.
   a) Sequence b) Synonym
   c) Cluster d) Index

P.T.O.

8) The Foreign key does not allow duplicate values.
   a) True b) False

9) Which of the following joins also called as an 'Inner join' ?
   a) Non-Equijoin b) Self join
   c) Equijoin d) None of these

10) The exists operator is usually used with correlated subqueries.
   a) True b) False

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

   i) Define DBMS.

   ii) What is disadvantages of SQL ?

   iii) What is Inner join ?

   iv) What is rules for creating tables ?

   v) What is a cursor ?

   vi) What is function ?

3. A) Answer **any two** of the following : **6**
   i) Differentiate between DBMS and RDBMS.
   ii) Write a PL/SQL block to find factorial of given No.
   iii) Write a PL/SQL block to check whether given no. is armstrong or not.

   B) Explain group by and having clause with example. **4**

4. Answer **any two** of the following : **10**

   i) What is Trigger ? Explain different types of trigger.

   ii) Explain steps of explicit cursor in detail.

   iii) Write note on Indexes.

5. Answer **any two** of the following : **10**

   i) Explain different types of constraints.

   ii) What are the advantages of procedure ?

   iii) Explain different types of joins with example.

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SLR-N – 128

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
PHYSICS (Paper – VI) (Old)
Optics

Day and Date : Tuesday, 2-12-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 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 from the following : **10**

i) 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

ii) In F.P. interferometer, interference is obtained by division of
   a) wave front b) amplitude
   c) both (a) and (b) d) none of above

iii) In case of diffraction of light at straight edge
   a) The band width increases away from the edge of the shadow
   b) The band width remain constant
   c) The band width decreases away from the edge of the shadow
   d) None of above

iv) Spectral resolving power for a prism varies with the length (t) of the base as
   a) R.P α t^2 b) R.P α t
   c) R.P α $\sqrt{t}$ d) R.P α t^3

v) For negative crystals
   a) $V_E > V_e > V_o$ b) $V_E < V_e < V_o$
   c) $V_E < V_o < V_e$ d) $V_E > V_o > V_e$

P.T.O.

vi) Ruby laser is _____

a) gas laser
b) crystalline solid state laser
c) semiconductor laser
d) liquid dye laser

vii) For a system of lenses in air, the lateral magnification of image is 2. The longitudinal magnification must be _____

a) 2
b) $1/2$
c) 4
d) $1/4$

viii) In Fresnel's diffraction, the area of each half period zone is _____

a) $\pi b\lambda$
b) $\frac{\pi b\lambda}{2}$
c) $2\pi b\lambda$
d) $3\pi b\lambda$

ix) The resolving power of prism is

a) $t \cdot \frac{d\mu}{d\lambda}$
b) $\sqrt{t}\,\frac{d\mu}{d\lambda}$
c) $\frac{t}{d\mu/d\lambda}$
d) $t^2 \cdot \frac{d\mu}{d\lambda}$

x) Holography is _____ dimensional lensless method of photography.

a) One
b) Two
c) Three
d) Four

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

i) Explain absorption and stimulated emission of radiation process of interaction between light and matter.

ii) Find the radius of first zone of zone plate having focal length is 200 cm for a light of wavelength 5000 A°.

iii) Distinguish between magnification and resolution.

iv) State the laws of rotation of plane of polarization.

v) State any two points of superiority of Fabry Perot interferometer over Michelson's interferometer.

vi) Define Quarter and half wave plate.

3. A) Answer **any two** of the following : **6**
   i) A point source of wavelength 5500 A° is placed at a distance of 40 cm from a circular aperture of radius 0.5mm along the axis. Calculate the farthest point along the axis where the intensity is minimum.
   ii) Distinguish between geometrical and spectral resolution.
   iii) Define principal point and principal plane for a lens system. State the properties of the principal planes.

   B) Show that a zone plane acts as a convex lens by considering the source at a finite distance. **4**

4. Answer **any two** of the following : **10**
   i) Explain construction and working of He-Ne laser.
   ii) Explain Rayleigh's criterion for resolution.
   iii) Obtain the relation between lateral, axial and angular magnification.

5. Answer **any one** of the following : **10**
   i) Describe the construction and working of Nicol prism. Explain how a Nicol prism can be used as a polariser and as an analyser.
   ii) Describe the construction and working of a Michelson's interferometer. How it can be used for measurement of difference in wavelengths between two closer lines ?

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SLR-N – 129

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
BIOCHEMISTRY (Paper – II) (Old)
Biochemical Techniques

Day and Date : Tuesday, 2-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw labelled diagrams **wherever** necessary.*

1. Write following sentences selectic most correct answer from given options. **(10×1=10)**

i) In adsorption chromatography stationary phase is always a
a) Solid b) Liquid c) Gas d) Mixture of gases

ii) Net charge on a zwitterion form of an amino acid is
a) Negative b) Positive c) Zero d) Not fix

iii) During electrophoresis the effect of electroosmosis can be minimised by
a) Applying low voltage
b) Applying high voltage
c) Passing less current
d) Increasing buffer concentration of conducting electrolyte

iv) In spectrophotometer photocell is used to
a) Provide radiations b) Split radiations
c) Reflect radiations d) Convert light signal into electrical signal

v) The technique of polymerase chain reaction was invented by
a) G. Kohler and C. Milestein b) Kerry Mullis
c) Southern d) Alwin, Kemp and Stark

vi) ELISA technique is used to detect small quantity of
a) Proteins b) DNA c) RNA d) Vitamins

vii) In SDS-PAGE staking gel has usually _____ concentration as compared to resolving gel.
a) More b) Equal c) Less d) Variable

P.T.O.

viii) In gel permeation chromatography, the minimum molecular mass excluded from the gel is called _____ of the gel.
a) Void volume b) Inner volume c) Elution volume d) Exclusion limit

ix) The logarithm of ratio of intensity of incident light to the intensity of transmitted light is called
a) Absorbance b) Transmittance
c) Molar extinction coefficient d) λ max

x) Whole cells are immobilised by _____ method.
a) Ionic binding b) Physical adsoprtion
c) Gel entrapment d) Covalent binding

2. Answer **any five** : **(5×2=10)**
1) How is the elution volume found out in gel permeation chromatography ?
2) What is the effect of electric cloud on electrophoretic mobility ?
3) Define molar extinction coefficient (ϵ_M) and transmittance.
4) What are the drawbacks of CNBr method used for immobilization of enzyme ?
5) What is trade mark ? Give two examples.
6) What is a DNA probe ? What are its uses ?

3. A) Answer **any two** : **(2×3=6)**
1) What is stacking gel ? Why is it used in SDS-PAGE ?
2) Why is glutaraldehyde used for immobilization of enzymes ? Which other reagents are used for immobilization by intermolecular cross-linking ?
3) What is DNA finger printing ? What is its use ?

B) Draw a labelled flow sheet diagram of HPLC process. **4**

4. Attempt **any two** : **(2×5=10)**
1) Explain hybridoma technology.
2) State Beer-Lambert's law. Write on spectrophotometer.
3) How the various separated components detected after separation by Southern blotting technique ?

5. Answer **any two** : **(2×5=10)**
1) Explain any four applications of enzyme immobilization.
2) Discuss about patents and their registration.
3) Describe the process of starch gel electrophoresis.

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SLR-N – 131

Seat No.	

B.Sc. II (Semester – III) Examination, 2014
Paper – V : STATISTICS (Old)
Continuous Probability Distribution – I

Day and Date : Wednesday, 3-12-2014 Max. Marks : 50

Time : 11.00 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 : **10**

1) The height of persons in a country is a random variable of the type

a) Continuous r.v

b) Discrete r.v.

c) Neither discrete nor continuous r.v.

d) None of these

2) If X and Y are two random variables with means $\overline{X}$ and $\overline{Y}$ respectively, then the expression $E\left[(X-\overline{X}).(Y-\overline{Y})\right]$ is called

a) Variance of X b) Variance of Y

c) Cov (X, Y) d) None of these

3) If $F_x(x)$ is the cumulative distribution function (c.d.f) of a continuous r.v.X then $F_x(+\infty)$ will be equal to

a) 0 b) 1 c) 0.5 d) None of these

4) A continuous r.v.X. has p.d.f. $f(x) = 3x^2$; $0 < x < 1$, then mean of X is

a) 4/3 b) 3/4 c) $\frac{1}{2}$ d) None of these

5) If $M_x(t)$ is m.g.f. of a continuous random variable X, then $M_x(0)$ =

a) 0 b) 1 c) t d) None of these

P.T.O.

6) If X and Y are random variables, then E(X/Y=y) is

a) a function of Y alone b) a function of X alone

c) function of (X,Y) d) none of these

7) If X~U(0, 1), then $-\frac{1}{\theta}\log_e X$ has _____ distribution.

a) Normal b) Exponential

c) Uniform d) None of these

8) If X is a continuous uniform distribution over (a, b), then its mean

a) $\frac{a+b}{2}$ b) $\frac{(b-a)^2}{12}$ c) $\frac{a-b}{2}$ d) None of these

9) For exponential distribution with parameter $\theta\,(>0)$

a) mean = variance b) mean < variance

c) mean > variance d) none of these

10) MGF of exponential distribution with parameter θ is

a) $\left(1-\frac{t}{\theta}\right)^{-1}$ b) $\left(1-\frac{t}{\theta}\right)^{-2}$ c) $\left(1-\frac{t}{\theta}\right)$ d) None of these

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

For a continuous random variable X, define

i) mean

ii) median

iii) mode

iv) geometric mean

v) harmonic mean

vi) variance

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

i) If f(x) = 2x ; 0 < x < 1

= 0 ; ow

is the pdf of r.v.X. Then obtain harmonic mean of it.

ii) P.d.f. of random variable X is given by $f(x) = k ; 1 < X < 4$

$= 0$; ow

find k and pdf of $Y = 2X + 1$.

iii) Show that, for independent continuous r.v's X and Y, $E(XY) = E(X).E(Y)$

B) Show that m.g.f. of sum of two independent r.v's is the product of their m.g.f.'s. **4**

4. Attempt **any two** of the following : **10**

i) If $f(x) = 6x(1 - x) ; 0 \leq x \leq 1$

$= 0$; otherwise

check whether f(x) is a pdf or not if it is pdf, then find its cdf.

ii) The joint pdf of (X, Y) is

$$f(x, y) = \frac{3}{2}y^2 ; 0 \leq x \leq 2$$

$$0 \leq y \leq 1$$

$= 0$; ow

obtain marginal p.d.f.'s of X and Y.

iii) Define uniform distribution over (a, b). Obtain its distribution and mean.

5. Attempt **any two** of the following : **10**

i) The p.d.f of a continuous r.v.X is $f(x) = kx(2 - x) ; 0 \leq 4 \leq 2$

$= 0$; ow

find k and variance of X.

ii) Let X and Y be continuous r.v's having joint p.d.f

$f(X, Y) = xe^{-x(y + 1)} ; x \geq 0, y \geq 0$

$= 0$; ow

are X and Y are independent ?

iii) Let X be a exponential r.v. with parameter θ. Find the distribution function of X, hence find median of X.

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SLR-N – 137

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
GEOCHEMISTRY (Paper – II) (Old)
Introduction to Solar System and Geo-Spheres

Day and Date : Thursday, 4-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *the 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) The bulk composition of earth is determined by the composition of
   a) Mantle and Core b) Crust and Mantle
   c) Sial and Sima d) Crust and Core

2) Chondrites consists primarily of _____
   a) Olivine b) Pyroxene
   c) Amphibole d) Olivine and pyroxene

3) The two abundant elements in the sun are _____
   a) H and Si b) He and Si c) H and He d) Si and O

4) The convection is prominant in _____ part of the atmosphere.
   a) Troposphere b) Stratosphere
   c) Vesosphere d) Hemosphere

5) The Mohorovicic discontinuity under continents is about _____ km below sea levels.
   a) 25 b) 30 c) 35 d) 45

6) _____ meteorites consists essentially Ni-Fe metallic phases about 98%.
   a) Siderites b) Siderolites c) Aerolites d) Tectites

7) Pre-Cambrian _____ formation reflect the early photosynthesis.
   a) Clay b) SiO_2 c) $CaCO_3$ d) Fe

P.T.O.

8) The major dissolved elements in the sea water are _____
   a) K and Cl b) K and Na c) Mg and Cl d) Na and Cl

9) The composition of cohenite is _____
   a) Fe_3C b) FeO c) Fe_2O_3 d) FeS

10) The most variable constituent of atmosphere is _____
   a) CO b) SO_2 c) H_2O d) None of these

2. Answer **any five** of the following : **10**
   i) Atmophile elements.
   ii) Losses of elements in the oceanic water.
   iii) Salinity.
   iv) Chalcophile elements.
   v) Core.
   vi) Stratosphere.

3. A) Answer **any two** of the following : **6**
      i) Mantle.
      ii) Evolution of atmosphere.
      iii) Aerolites.
   B) Explain composition of sea water. **4**

4. Answer **any two** of the following : **10**
   i) Composition of sun.
   ii) Crust, its composition and subzones.
   iii) Cosmic abundance of the elements.

5. Answer **any two** of the following : **10**
   i) Siderolites and their types.
   ii) Structure of atmosphere.
   iii) Primary differentiation of elements.

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SLR-N – 138

Seat No.	

B.Sc. II (Semester – III) Examination, 2014
ZOOLOGY (Paper – VI) (Old)
Cell Science, Genetics, Biological Chemistry and Economic Zoology

Day and Date : Thursday, 4-12-2014 Max. Marks : 50

Time : 3.00 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 diagrams ***wherever*** *necessary.*

1. Complete the sentence selecting appropriate answer : **10**

1) Exchange of chromosomal segments between maternal and paternal chromatids at Pachytene stage is

a) Linkage b) Crossing over

c) Disjunction d) Segregation

2) Meiosis occurs in

a) liver b) kidney

c) gonads d) brain

3) The ratio 9 : 3 : 4 is due to

a) Fully lethal genes

b) Supplementary genes

c) Complementary genes

d) Subvital lethal genes

4) Nucleotide is the combination of

a) Base + sugar + phosphate

b) Base + sugar

c) Only nitrogen bases

d) Nitrogen base + phosphate

P.T.O.

5) _____ is a disaccharide.
   a) starch b) glycogen
   c) ribose d) maltose

6) Scientific name mulberry silk worm is
   a) Morus alba b) Bombyx mori
   c) Apis dorsata d) Laccifer lacca

7) Deshi hen is also called as _____ breed.
   a) Asciatic b) English
   c) American d) Indigenous

8) When the milk is heated a thick layer of protein and fat coagulates on the top is called as
   a) butter b) chees
   c) malai d) ghee

9) Double helical structure of DNA is discovered by
   a) Robertson b) Carl Zeiss
   c) Watson and Crick d) Morgan

10) Complete linkage in male Drosophila was observed by
   a) Boveri b) Sutton
   c) T.H. Morgan d) Batesson and Punnet

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

i) Honey comb

ii) m-RNA

iii) Cocoon

iv) Coupling

v) Lactose

vi) Fatty acids.

3. A) Answer **any two** of the following : **6**
   i) Glass aquarium
   ii) Poultry diseases
   iii) Anaphase.

   B) Goat farming. **4**

4. Answer **any two** of the following : **10**
   i) Describe complimentary factors with suitable example.
   ii) Meiosis – I.
   iii) Describe the classification of proteins.

5. Answer **any one** of the following : **10**
   i) Describe rearing of silkworm and add note on economic importance of silk.
   ii) Describe various milk products.

SLR-N – 14

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
ENGLISH COMPULSORY (Old)
On Track – English Skills for Success

Day and Date : Saturday, 1-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Rewrite the following sentences by choosing the correct alternative : **10**

1) _____ deserted the streets of Newyork.
   a) Cyclone b) Curfew
   c) Wind and Rain d) Riots

2) Jimmy and Bob were brought up like brothers in
   a) Newyork b) Chicago
   c) West d) Joe Bardy

3) Connoisseur is an expert in judging the beauty of
   a) nature b) art
   c) books d) concepts

4) Ms. Krishna craved for
   a) honest people b) writers
   c) lovers of art d) beautiful things

5) Binet developed the
   a) Intelligence quotient test b) Emotional quotient test
   c) Energy quotient test d) None of these

6) Sarojini Naidu has used different images of bangles to present the _____ inequality.
   a) gender b) caste
   c) creed d) religious

P.T.O.

7) The Irish Airman is speaking to
   a) himself b) his beloved
   c) his friend d) his country men

8) Sachin is a cricketer who has played highest number of matches. The underlined word is _____ pronoun.
   a) relative b) distributive
   c) reciprocal d) interrogative

9) Shruti found a bag. She handed over _____ bag to the police.
   a) a b) an
   c) the d) no article

10) Vasant is fond _____ reading.
   a) of b) off c) in d) on

2. Answer **any five** of the following questions in **2-3** sentences **each** : **10**

1) How did the man in the doorway appear ?

2) Why did the narrator find Miss Krishna annoying ?

3) How can you define intelligence ?

4) What are the areas in which the computer is faster than human brain ?

5) What sort of relationship did Bob and Jimmy share ?

6) What are Krishna's complaints against her mother ?

3. A) Write a paragraph in about **50** words **each** (**any two**) : **6**
   1) Solar energy
   2) Importance of sports
   3) Cricket crazy Indians.

   B) Answer briefly **any two** of the following questions : **4**
   1) The central idea of the poem Bangle sellers.
   2) Irish airman's attitude towards the war.
   3) Describe the different types of bangles carried by the sellers.

4. Write an essay on **any one** of the following topics : **10**

1) The impact of internet on the youth today.

2) An eventful sport event you watched.

5. Read the following passage and make notes with points and suggest a suitable title. **10**

Civilized man is by now well aware of the more obvious symptoms of water pollution : scum covered rivers, stinking bays and shorelines littered with bloated fish. The cause of much of it is equally clear : The indiscriminate dumping of raw sewage and industrial sludge into the nearest body of water has exceeded the absorptive capacity of the environment. Because the symptoms of this overflow are so compelling, it seems likely that we shall finally attempt to do something about it. But continued population growth makes it impossible that we shall find the funds to do more than skim off the chunks.

Unfortunately, the most serious water-pollution threats are those which cannot be seen smelt, or picked up by the handful. The organic content in many domestic water supplies which have been treated to some degree is apparently still high enough to protect viruses from the effects of chlorine. Hence tap water is a suspected transmission route for the alarming rise of infectious hepatitis in the United States today. Moreover, the vast array of chemicals which industry spews into the environment in many cases defies filtration. These chemicals now pervade not only rivers, lakes and even oceans, but also vast reservoirs of ground water.

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SLR-N – 140

Seat No.	

B.Sc. II (Semester – III) Examination, 2014
BOTANY (Paper – V) (Old)
Development of Plants

Day and Date : Friday, 5-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternative : **10**

1) Hydathodes are found in _____ angiospermic plants.
a) Herbaceous b) Thorny c) Woody d) All

2) Cruciferous stomata is also known as _____ stomata.
a) Anomocytic b) Anisocytic c) Paracytic d) Diacytic

3) On the basis of plane of cell division the meristems are classified into _____ groups.
a) One b) Two c) Three d) Four

4) The intercalary meristem is responsible for increase in
a) Height of internode b) Width of internode
c) Both d) None of these

5) The tunica corpus theory was proposed by
a) Hofmeister b) Nageli c) Hanstein d) Schmidt

6) The scattered vascular bundles are found in the stem of
a) Nerium b) Sunflower c) Maize d) Hibiscus

7) Tracheids are found in
a) Meristem b) Phloem c) Xylem d) Parenchyma

8) The phelloderm is also known as
a) Cork cells b) Secondary Cortex
c) Non-vascular cambium d) None of these

P.T.O.

9) The annual rings corresponds to _____ of the plant.
   a) Age b) Height c) Width d) None of these

10) _____ is the example of monocot showing abnormal secondary growth.
   a) Dracaena b) Bignonia c) Nerium d) Maize

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

   i) Give the functions of collenchyma.

   ii) Describe the apical cell theory.

   iii) Give the functions of trichomes.

   iv) Give the functions of xylem.

   v) Describe the phelloderm.

   vi) Define the anomalous growth.

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

   i) Describe the differences between tracheids and vessels of xylem.

   ii) Write short note on periderm.

   iii) What are the anomalies found in Dracaena stem ?

   B) Describe the different elements of phloem. **4**

4. Answer **any two** of the following : **10**

   i) Describe the different types of stomata.

   ii) Describe the Histogen theory.

   iii) Describe the internal primary structure with reference to tissues and functions in monocotyledonous stem.

5. Answer **any two** of the following : **10**

   i) Describe in brief the secretory tissue system.

   ii) Describe the anomalous secondary growth in Bignonia stem.

   iii) Describe the different types of wood.

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SLR-N – 146

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
GEOLOGY (Paper – V) (Old)
Optics and Mineralogy

Day and Date : Monday, 8-12-2014 Total Marks : 50

Time : 3.00 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. Fill in the blanks with correct answer from the given options : **10**

1) Pleochroism is exhibited by _____ minerals.
   a) colourless b) coloured
   c) both coloured and colourless d) opaque

2) A well developed crystal in a rock is called as _____
   a) Euhedral b) Anhedral
   c) Subhedral d) Rounded

3) The relief of a mineral is directly related to the _____
   a) Ordinary light b) IR light c) Refractive Index d) All of these

4) Anisotropic minerals become extinction _____ times during a complete rotation of the stage.
   a) five b) two c) three d) four

5) Mineral Augite is a member of _____
   a) pyroxene group b) amphibole group
   c) felds pathoid group d) feldspar group

6) Olivine is usually found in the _____ igneous rocks.
   a) mafic and ultramafic b) felsic and mafic
   c) felsic and ultramafic d) felsic

7) Phyllosilicates are also called as _____
   a) Tektosilicates b) Inosilicates
   c) Sheet silicates d) Cyclosilicates

P.T.O.

8) Pyrope belongs to _____ group.
   a) Amphibole b) Pyroxene c) Mica d) Garnet

9) The composition of muscovite is
   a) Al_2O_3 b) $Mg_6 (Si_8 O_{20}) (OH)_4$
   c) $K_2Al_4 [Si_6 Al_2 O_{20}] (OH, F)_4$ d) $Al_4 [Si_8 O_{20}] (OH)_4$

10) _____ is a common mineral in greenschist metamorphic rock.
   a) Chlorite b) Hornblende c) Quartz d) Olivine

2. Answer **any five** of the following : **10**
   i) Isotropism
   ii) Extinction angle
   iii) Properties of clay minerals
   iv) Mineral inclusion
   v) Twinning
   vi) Acicular form.

3. A) Answer **any two** of the following : **6**
      i) Optical properties of microcline.
      ii) Mode of occurrence of amphibole minerals.
      iii) Cyclosilicates.

   B) Difference between pyroxene and amphibole group of minerals. **4**

4. Answer **any two** of the following : **10**
   i) Define and describe polymorphism.
   ii) Physical properties of Quartz and their occurrence.
   iii) Mode of occurrence of pyroxene minerals.

5. Answer **any two** of the following : **10**
   i) Describe the minerals in mica group.
   ii) Physical properties and occurrence of orthoclase mineral.
   iii) Physical and optical properties of Hornblende mineral.

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SLR-N – 147

Seat No.	

B.Sc. II (Semester – III) Examination, 2014
MICROBIOLOGY (Paper – V) (Old)
Bacterial Cytology, Virology and Metabolism

Day and Date : Monday, 8-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions carry* ***equal*** *marks.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentences by selecting correct alternatives : **10**

i) Plasmolysis takes place when cells are suspended in
   a) Hypotonic solution b) Isotonic solution
   c) Hypertonic solution d) Water

ii) An ultimate electron acceptor in anaerobic respiration is
   a) Molecular oxygen b) Hydrogen
   c) NO_3 d) CO_2

iii) In _____ growth cells are growing in the same growth phase.
   a) Continuous b) Synchronous
   c) Induced d) Diauxie

iv) Ligases catalyze _____ type of reaction.
   a) Oxidation b) Hydrolysis
   c) Joining d) Aldalation

v) _____ is absent in cell wall of gram positive bacteria.
   a) Peptidoglycan b) Techoic acid
   c) Lipopolysaccharide d) Pentapeptide chains

vi) Small solute molecules like water, CO_2 or O_2 enter in the cell by the way of
   a) diffusion b) facilitated diffusion
   c) active transport d) group translocation

vii) _____ are responsible for maintaining buoyancy of bacteria.
   a) Carboxysomes b) Chlorobium vesicle
   c) Gas vacuoles d) Magnetosomes

P.T.O.

viii) Organisms having high salt concentrations are known as

a) barophiles b) acidophiles

c) halophiles d) thermophiles

ix) Cell wall of gram negative bacteria contain _____ layers.

a) 1 b) 2

c) 5 d) 3

x) NAGA and NAMA of peptidoglycan is joined by _____ linkage.

a) $\beta(1-4)$ b) $\alpha(1-4)$

c) $\beta(1-6)$ d) $\alpha(1-6)$

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

i) Chlorobium vesicle.

ii) Simple diffusion.

iii) Explain sex pili.

iv) Acidophile and alkaliphiles.

v) Functions of cell membrane.

vi) Techoic acid.

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

i) Explain aerobic respiration in bacteria.

ii) Explain structure of TMV with figure.

iii) PHB granules.

B) Describe heterolactic fermentation. **4**

4. Answer **any two** of the following : **10**

i) Give an account of structure of endospore.

ii) Describe tactic behaviour of bacteria.

iii) Describe two methods of measurement of cell growth.

5. Answer **any two** of the following : **10**

i) Synchronous growth.

ii) Effect of activators on enzyme activity.

iii) Cell wall of gram positive bacteria.

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SLR-N – 151

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
GEOLOGY (Paper – VI) (Old)
Structural Geology

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 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 correct answer from given options : **10**

1) _____ substances undergo a large plastic deformation before rupture.
a) Ductile b) Soil c) Brittle d) Rock

2) In _____ fold axial plane is nearly horizontal.
a) Symmetrical b) Recumbent
c) Asymmetrical d) Overturned

3) The term _____ is used if beds are dipping in one direction.
a) Homocline b) Anticline
c) Monocline d) Structural terrace

4) The angle between two sets of shear fractures formed by compressive force is _____ degree.
a) 90 b) 30 c) 45 d) 60

5) The cohesive microbreccia showing foliation is known as _____
a) cataclasite b) gauge c) mylonite d) drag

6) The line of maximum curvature in a fold is known as _____
a) Rake b) Hinge line c) Plunge d) Dip

7) Boudinage is a type of _____
a) Lineation b) Fault
c) Foliation d) Joint

P.T.O.

8) In non-conformity old group of rocks are _____ origin.
   a) Plutonic b) Hypabyssal c) Volcanic d) Cataclastic

9) Dip of the inclined beds measured parallel to the strike is _____ degree.
   a) 30 b) zero c) 15 d) 45

10) In _____ fold the hinge line is inclined.
   a) Horizontal b) Non-plunging c) Plunging d) All

2. Answer **any five** of the following : **10**
   i) Bedding plane
   ii) Axial plane
   iii) Fracture cleavage
   iv) Slaty cleavage
   v) Mineral lineation
   vi) Strike of the bed.

3. A) Answer **any two** of the following : **6**
   i) Limb and inverted limb
   ii) Normal fault
   iii) Types of fault based on value of dip of fault

   B) Describe angular unconformity and disconformity. **4**

4. Answer **any two** of the following : **10**
   i) Explain parts of fault.
   ii) Anticline and syncline folds.
   iii) Recognition of folds in the field by plotting attidue of beds.

5. Describe **any two** of the following : **10**
   i) Outcrop, outlier and inlier.
   ii) Recognition of fault in the field with the help of physiographic criteria.
   iii) Symmetrical and asymmetrical folds.

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SLR-N – 152

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
MICROBIOLOGY (Paper – VI) (Old)
Microbial Genetics and Biostatistics

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw diagrams ***wherever*** *necessary.*

1. Rewrite the following sentences by selecting correct alternative : **10**

1) A bacterial cell contains _____ number of chromosomes.
a) 1 b) 2 c) 3 d) 4

2) In DNA molecule _____ link binds deoxyribose sugar to nitrogen base.
a) phosphodiester b) hydrogen c) glycosidic d) ester

3) Hydroxylamine converts mainly _____ to hydroxylaminouracil.
a) adenine b) cytosine c) thymine d) guanine

4) The development of competence is essential for _____ to occur.
a) conjugation b) transfection
c) transformation d) transduction

5) The fluctuation test confirms _____ nature of mutation.
a) induced b) spontaneous
c) reverse d) back

6) A codon is a basic unit of _____ molecule.
a) DNA b) rRNA c) tRNA d) mRNA

7) _____ enzyme is responsible for DNA repair by photoreactivation.
a) polymerase I b) polymerase III
c) exonuclease d) photolyase

8) The genetic code is read in the direction as
a) $5' \rightarrow 3'$ b) $5' \rightarrow 5'$ c) $3' \rightarrow 5'$ d) $3' \rightarrow 3'$

P.T.O.

9) _____ value represents midvalue of data after arranging it in either ascending or descending order.
   a) variance b) median c) mode d) mean

10) The donor in the process of transfection is
   a) plasmid b) ds DNA c) phage d) exon

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

   i) Describe right handed helix of DNA.

   ii) What is an interrupted gene ?

   iii) Write in brief mutations caused by nitrous acid.

   iv) What are cryptic plasmid ?

   v) Describe 'Mean'.

   vi) What is Biostatistics ?

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

   i) Write applications of biostatistics.

   ii) Describe fate of exogenote.

   iii) Give an account of mutations caused by acridine dyes.

   B) Describe structure and properties of B form DNA. **4**

4. Answer **any two** of the following : **10**

   i) Describe effect of U.V. light on DNA. Describe dark repair mechanism.

   ii) Write on Generalised Transduction.

   iii) Give an account of properties of plasmid and applications of plasmid.

5. Answer **any two** of the following : **10**

   i) Write on mutations caused by base analogs.

   ii) Give an account of 'genetic code'.

   iii) Describe process of bacterial conjugation.

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SLR-N – 153

Seat No.	

B.Sc. II (Semester – IV) Examination, 2014
CHEMISTRY (Paper – VII)
Physical Chemistry

Day and Date: Monday, 17-11-2014 Max. Marks : 50

Time: 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw a ***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, O = 16, N = 14 Na = 23, Cl = 35.5.]

1. Choose the most correct alternative and rewrite the sentence : **10**

1) In aqueous solution, electrolyte ionises to give
   a) both +ve and –ve ions b) only +ve ions
   c) only –ve ions d) none of these

2) Which of the following can be considered a strong electrolyte ?
   a) HCOOH b) NH_4OH c) KCl d) $C_6H_5NH_2$

3) If the transport number of Ag^+ ion is 0.47, then that of NO_3^- ion is
   a) 0.53 b) 0.35 c) 5.3 d) 3.5

4) Conductance of an electrolytic solution is proportional to
   a) dilution b) number of ions
   c) current density d) volume of solution

5) Entropy is expressed in
   a) 0K b) JK^{-1} c) 0C d) All of these

6) The process carried out at constant pressure is called
   a) isobaric b) isochoric c) isothermal d) isotonic

7) Body centered cubic lattice contains
   a) eight structural units b) nine structural units
   c) seven structural units d) none of these

P.T.O.

8) CO_2 and SO_2 have zero dipole moments, hence their structure should be
   a) linear b) non linear
   c) angular d) none of these

9) Abbe's refractometer measures
   a) dipole moment b) surface tension
   c) refractive index d) parachor

10) Which of the following molecule is polar ?
   a) CO_2 b) H_2O c) PCl_5 d) CS_2

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

i) Write down Henderson's equations for acidic and basic buffers.

ii) What is migration of ions ?

iii) Define entropy. Give its units.

iv) State the law of constancy of interfacial angle and the law of rational indices.

v) Define :
   a) Plane of symmetry.
   b) Axis of symmetry.

vi) What is critical angle principle ?

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

i) Define the term pH. The hydrogen ion concentration of a fruit juice is 3.3×10^{-2} M. What is the pH of juice ? Is it acid or base ?

ii) Draw neat diagrams of simple cubic, body centered cubic and face centered cubic lattice.

iii) Give Snell's law and write down equations for specific and molar refractions.

B) Calculate the entropy change when 2 moles of an ideal gas are allowed to expand isothermally at 293 K from a pressure of 10 atmosphere to a pressure of 2 atmosphere. ($R = 8.314\ JK^{-1}\ mole^{-1}$) **4**

4. Answer **any two** of the following : **10**

   i) Describe moving boundary method adopted for determination of transport number.

   ii) Show that $\Delta S = 0$ in an isothermal reversible process.

   iii) Define equivalent conductance. The specific conductance of $\frac{N}{500}$ KCl is 2.768×10^{-3} ohm^{-1} cm^{-1} at 298 K. Calculate the equivalent conductance.

5. Answer **any two** of the following : **10**

   i) Discuss the effect of various factors on the transport number.

   ii) Write Bragg's equation. The X-ray pattern of KCl shows the first order maximum reflection at an angle 14.38° using X-ray wavelength of 1.54×10^{-8} cm. What is spacing between the planes ?

   iii) Explain the terms :

   a) Distortion polarisation

   b) Orientation polarisation.

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SLR-N – 155

Seat No.	

B.Sc. II (Semester – IV) Examination, 2014
CHEMISTRY
Paper – VIII : Analytical and Industrial Inorganic Chemistry

Day and Date : Tuesday, 18-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Select the most correct alternative and rewrite the following sentences : **10**

1) A point in titration at which reaction is just complete is called _____

a) equivalence point b) end point

c) titration break d) none of above

2) Strength of solution is expressed in _____

a) normality or molarity b) g/L

c) % of chemical substance d) all of the above

3) The nature of Ferric hydroxide precipitate is _____

a) crystalline b) amorphous

c) gelatinous d) curdy

4) For the gravimetric estimation of nickel _____ is used as specific reagent.

a) DMG b) Rubanic acid

c) EDTA d) Hot dil.H_2SO_4

5) In conversion of glucose to ethanol _____ enzyme is used.

a) maltase b) zymase

c) urease d) none of these

P.T.O.

6) Sedimentation is a _____ process.

a) chemical b) biological

c) settling d) coagulation

7) The _____ process removes all types of ions from water.

a) zeolite b) ion exchange

c) lime soda d) boiling

8) In the manufacture of sulphuric acid by contact process _____ is used as a catalyst.

a) V_2O_5 b) Pd

c) Iron d) Nickel

9) The _____ is the process in which steel is heated to redness and cooled suddenly in oil or water.

a) tempering b) hardning

c) nitriding d) annealing

10) In L.D. process _____ is used for oxidation.

a) pure and dry oxygen

b) air

c) nitrogen gas

d) oxygen diluted with steam or carbon dioxide

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

i) What are the requirements of an acid - base indicator ?

ii) Disodium salt of EDTA is used for preparation of solution instead of EDTA. Why ?

iii) What is catalytic poisoning ?

iv) What is hard water ? Give its classification.

v) Draw neat labelled diagram of catalytic converter for contact process.

vi) What is steel ? Give the composition of stainless steel.

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

   i) Write note on Ostwald's theory of acid-base indicator.

   ii) Distinguish between crystalline precipitate and gelatinous precipitate.

   iii) Give the type of catalytic reactions. Explain any one with example.

   B) Discuss any two physico chemical principles involved in Haber's process for manufacture of ammonia. **4**

4. Write short note on **any two** of the following : **10**

   i) Intermediate compound formation theory of catalysis.

   ii) Activated sludge process.

   iii) Bessemer process for manufacture of steel.

5. Answer **any two** of the following : **10**

   i) What are the different types of EDTA titrations ? Explain in detail direct titration.

   ii) Discuss the conditions required for effective precipitation.

   iii) Draw a schematic diagram for manufacture of sulphuric acid by contact process.

SLR-N – 161

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
BIOCHEMISTRY (Paper – IV)
Molecular Biochemistry and Diseases

Day and Date : Thursday, 20-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Write following sentences by selecting most **correct** answer from given options. **(10×1=10)**

i) Double helical model of DNA was proposed by _____
   a) Okazaki b) Meselson and Stahl
   c) Chargaff d) Watson and Crick

ii) _____ has clover leaf like structure.
   a) DNA b) mRNA
   c) tRNA d) rRNA

iii) In genetic code word the _____ base is less specific and tend to wobble.
   a) First b) Second
   c) Third d) Fourth

iv) Usually _____is the first amino acid coded by AUG codon.
   a) Methionine b) Tyrosine
   c) Valine d) Glycine

v) _____is a restriction endonuclease enzyme.
   a) Taq DNA polymerase b) S1 nuclease
   c) RNA polymerase d) Reverse transcriptase

P.T.O.

vi) Immunity induced by vaccines is_____type of immunity.

a) Natural active
b) Artificial active
c) Natural passive
d) Artificial passive

vii) IgG molecule is formed from_____polypeptide chains joined by disulphide bonds.

a) 2
b) 3
c) 4
d) 6

viii) HIV surface antigen gp120 is related to _____disease.

a) AIDS
b) Diabetes
c) Cancer
d) Phenyl Ketonuria

ix) Ampicillin and tetracycline resistant genes are present in _____ vector.

a) λ -phage
b) Plasmid pBR 322
c) M13 Virus
d) Modified λ -phage

x) Carcino Embryonic Antigen (CEA) is used in detection of_____

a) AIDS
b) Diabetes
c) Cancer
d) Thyroid disease

2. Answer **any five** from below. **(5×2=10)**

1) How does Azidothymidine (AZT) acts on HIV ?

2) Differentiate between insulin dependent diabetes and non insulin dependent diabetes.

3) What is secondary immune response ?

4) What is function of enzyme reverse transcriptase ?

5) What are the products formed on hydrolysis of DNA ?

6) Define immunity and explain it in brief.

3. A) Answer **any two** from below. **(2×3=6)**

   1) Explain Watson and Crick model of DNA.

   2) Illustrate-DNA replication is semiconservative.

   3) What are the reasons of the degeneracy of genetic code ?

   B) Draw a labelled diagram of HIV. **4**

4. Attempt **any two** : **(2×5=10)**

   1) Explain-plasmid pBR 322 as a cloning Vector.

   2) Write an account of active immunity.

   3) How pre proinsulin is converted to active insulin ?

5. Answer **any two** from below. **(2×5=10)**

   1) Describe the structure of immunoglobulin G. (IgG).

   2) How diabetes can be managed ?

   3) Discuss the concept of lac operon.

SLR-N – 162

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
PLANT PROTECTION (Paper – IV)
Insect Pests

Day and Date : Thursday, 20-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences by choosing **correct** alternatives : **10**

1) Heliothis armigera is the scientific name of _____
   a) Mango mealy bug b) Groundnut white grub
   c) Rose aphid d) Gram pod borer

2) The life cycle of an insect is divided into_____ stages.
   a) Five b) Four
   c) Three d) Two

3) Grass hopper is the common pest of _____
   a) Paddy b) Jowar
   c) Brinjal d) Pomegranate

4) _____is the pest of stored grains.
   a) Mealy bug b) Rice weevil
   c) Stem borer d) Fruit borer

5) Virachola isocrates is the scientific name of _____
   a) Sugarcane leaf hopper b) Grass hopper
   c) Anar butterfly d) White grub of groundnut

P.T.O.

6) The life cycle of Mealy bug shows only _____generations in a year.

a) One b) Two

c) Three d) Four

7) A chemical which has property of sterilizing insect without killing it is called_____

a) Repellent b) Attractant

c) Chemosterilant d) Antifeedent

8) _____is plant origin insecticide.

a) Pongram b) DDT

c) Carbofuran d) Diazinon

9) _____ is used as contact poison obtained from tobacco.

a) Pyrethrin b) Nicotine

c) Nimbin d) Nimbidine

10) A chemical or physical source which induces insects to move towards is called_____

a) Antifeedent b) Attractant

c) Repellent d) Chemosterilant

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

i) Give the marks of identification of Grasshopper.

ii) Give the nature of damage caused by jowar stem borer.

iii) How to control white grub ?

iv) What are the pheromones ?

v) How to manage the damage caused by fruit borer of brinjal ?

vi) What you know about antifeedents ?

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

   i) Give the scientific name and marks of identification of sugarcane leaf hopper.

   ii) Give the nature of damage caused by aphids.

   iii) Give the quantitative losses caused by insect pests.

   B) Give the life cycle of Grasshopper. **4**

4. Answer **any two** of the following : **10**

   i) Describe duster or sprayer.

   ii) Give an account of marks of identification and life cycle of Rice Weevil.

   iii) Give the morphology and life cycle of gram pod borer.

5. Answer **any two** of the following : **10**

   i) Give the properties of DDT.

   ii) Describe various principles of insect pest control.

   iii) Give the general characters of typical insect.

SLR-N – 17

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
CHEMISTRY
Inorganic Chemistry (Paper – II) (Old)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Draw ***neat*** *and labelled diagrams* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct alternative for the following and rewrite the sentences : **10**

i) Bond angle HNH (LHNH) in ammonia molecule is

a) $109°28'$ b) $107°28'$ c) $90°$ d) $180°$

ii) All the five d-orbitals have equal energy therefore they are called

a) Quantized orbitals b) Symmetrical orbitals
c) Degenerate orbitals d) Coplanar orbitals

iii) Hybridisation in SF_6 molecule is

a) SP^3 b) SP^3d c) SP^2 d) SP^3d^2

iv) The limiting radius ratio for octahedral geometry is

a) 0.414 b) 0.732 c) 0.225 d) 0.175

v) _____ is most electronegative element in the periodic table.

a) Iodine b) Bromine c) Fluorine d) Chlorine

vi) Formation of ionic solid is favoured if

a) Ionisation potential of electropositive atom is low
b) Electron affinity of electronegative atom is high
c) Lattice energy of resulting ionic compound is high
d) All of these

vii) Oxygen (O_2) molecule is paramagnetic due to

a) Presence of one unpaired electron
b) Presence of two unpaired electrons
c) Presence of three unpaired electrons
d) None of these

P.T.O.

viii) Ionic compounds have _____ melting and boiling points.
a) Low b) High c) Moderately low d) Very low

ix) S-orbital has _____ shape.
a) Dumb-bell b) Spherical c) Square d) None of these

x) Bonding molecular orbital is at
a) Higher energy level b) The same energy level
c) Lower energy level d) None of these

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

i) Write names of halogen group elements.

ii) Explain P_x-P_x overlap.

iii) Draw the unit cell structure of CsCl.

iv) Explain antibonding molecular orbitals.

v) Ionisation energy trend in periodic table. Explain.

vi) Give schematic representation of Born-Haber cycle.

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

i) Draw the structure of IF_7 molecule.

ii) Explain the bond order in H_2 molecule with the help of MOT.

iii) State and explain any two properties of ionic solids.

B) State and explain Hund's rule. **4**

4. Answer **any two** of the following : **10**

i) Write the names and electronic configuration of II A group elements.

ii) Define hybridisation. Explain geometry of $SiCl_4$ molecule.

iii) Explain bond order, stability and magnetic character of N_2 molecule on the basis of MOT.

5. Write short notes on **any two** : **10**

i) Formation of ionic bond with suitable example.

ii) Geometry of H_2O molecule.

iii) Atomic orbitals and molecular orbitals.

_____

SLR-N – 172

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
BOTANY (Paper – VII)
Plant Physiology

Day and Date : Monday, 24-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 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 **correct** answer from given alternatives : **10**

1) _____ are known as proton pumps.
   a) NADP b) FAD
   c) AMP d) ATPase complex

2) _____ is the site of photochemical reaction.
   a) Chromosome b) Ribosome
   c) Quantasome d) Polysome

3) 'Red-drop' effect was shown by _____ in chlorella.
   a) Calvin b) Emerson
   c) Kreb d) Embden

4) _____is the C_3 plant.
   a) Sunflower b) Maize
   c) Jowar d) Sugarcane

5) The transfer of organic substance from mesophyll into sieve element is called _____
   a) Phloem loading b) Phloem unloading
   c) Xylem loading d) Xylem unloading

P.T.O.

6) The total number of ATP molecules formed after complete oxidation of the one glucose molecule in aerobic respiration _____

a) 22 b) 24

c) 30 d) 38

7) The electron transport system in mitochondria consist of _____ large macro molecular complex.

a) Two b) Six

c) Four d) Eight

8) Reduction of N_2 into NH_3 is takes place in the presence enzyme _____

a) Nitrate reductase b) Nitrogenase

c) Nitrite reductase d) Protease

9) Zea mays is example of_____

a) Short day plant b) Day neutral plant

c) Long day plant d) Short night plant

10) _____is a growth retardant.

a) IAA b) ABA

c) GA d) Kinetin

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

i) Define passive-uptake.

ii) Define photo phosphorylation.

iii) Define phloem-unloading.

iv) What are the three stages of aerobic respiration ?

v) Enlist the nitrogen fixing Blue Green Algae.

vi) What is photoperiodism ?

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

   i) Describe the role of phosphorus.

   ii) Give the functions of mitochondria.

   iii) Describe the Day Neutral Plants (DNP).

   B) Write in brief outline of CAM-pathway. **4**

4. Answer **any two** of the following : **10**

   i) Explain source-sink relationship.

   ii) Explain outline of non-cyclic photophosphorylation.

   iii) Describe in brief salient features of long day plant.

5. Answer **any two** of the following : **10**

   i) Write a note on grand period of growth.

   ii) Describe the role of cell membrane in active uptake.

   iii) Describe in brief outline of Calvin cycle.

SLR-N – 178

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
GEOLOGY
Igneous Petrology (Paper – VII)

Day and Date : Wednesday, 26-11-2014 Max. Marks : 50

Time : 3.00 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. Fill in the blanks with a suitable answer from the given options : **10**

1) Flow structure is developed in _____ rock.
a) Rhyolite b) Basalt c) Pitchstone d) Obsidian

2) Ophitic texture is developed in
a) Dunite b) Peridotite c) Gabbro d) Rhyolite

3) Which of the following is not a volcanic rock ?
a) Dunite b) Rhyolite c) Obsidian d) Pumice

4) Sub-ophitic texture is observed in
a) Dolerite b) Gabbro c) Granite d) All the above

5) Aerolites are _____ meteorites.
a) Stony b) Iron c) Basic silicate d) All the above

6) The crystallisation of _____ feldspar from binary magma composed of isomorphous albite and anorthite.
a) Plagioclase b) Microcline
c) Orthoclase d) Labradorite

7) Zonal structure is observed in
a) Plagioclase b) Labradorite c) Microcline d) In all the above

P.T.O.

8) In the Bowen's reaction series the crystallization of minerals from the magma follows the _____ order of increasing.
   a) Basicity b) Acidity c) Solubility d) Insolubility

9) _____ is a monomineralic rock.
   a) Peridotite b) Anorthite c) Syenite d) Gabbro

10) Pitchstone is a _____ type of rock.
   a) Plutonic b) Hypabyssal c) Volcanic d) None of the above

2. Explain **any five** of the following : **10**
   i) Vesicular structure
   ii) Graphic texture
   iii) Ophitic and sub-ophitic texture
   iv) Zoning
   v) Labile and metastable zone
   vi) Expansion cracks.

3. A) Answer **any two** of the following : **6**
   i) Discontinuous reaction series.
   ii) Niggli's classification.
   iii) Process of differentiation of magma.

   B) Crystallisation of unicomponent magma. **4**

4. Answer **any two** of the following : **10**
   i) Describe various structures developed in igneous rocks.
   ii) Give the various textures of igneous rocks.
   iii) Describe the process of assimilation of magma.

5. Answer **any two** of the following : **10**
   i) Give an account of crystallisation of binary magma.
   ii) Classify igneous rocks on the basis of silica percentage, mode of occurrence and feldspar content.
   iii) Give the Sand's and CIPW classification of igneous rocks.

_____

SLR-N – 182

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
Paper – VIII : ELECTRONICS
Fundamentals of Microcontroller

Day and Date : Thursday, 27-11-2014 Max.Marks : 50

Time : 11.00 a.m. to 1.00 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 calculator is* ***allowed****.*

1. Select correct alternative from the following : **10**

i) Which of these buses are required for interfacing ?

a) Address and data bus b) Data and control bus

c) Address and control bus d) Data, address and control bus

ii) Microprocessor 8085 has _____ bit accumulator.

a) 16 b) 8 c) 12 d) 4

iii) μC 8031 of MCS-51 family has _____ internal ROM.

a) 4 K Bytes b) 8 K Bytes c) 0 K Bytes d) 64 K Bytes

iv) _____ port of μC 8051 requires external pull-up resistors.

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

v) Which one of these is an indirect addressing mode instruction ?

a) mov A, R5 b) mov R2, #55H

c) mov 55H, 66H d) mov A, @R0

vi) If data 05H is subtracted from 10H, the result will be

a) 06H b) 0BH c) 15 H d) 13 H

vii) The SFR used to select resister banks is

a) accumulator b) TMOD c) SP d) PSW

P.T.O.

viii) If data 23 H is divided by 05H using DIV AB instruction, the result would be

a) A = 07H, B = 00H b) A = 04H, B = 03H

c) A = 00H, B = 05H d) A = 03H, B = 07H

ix) _____ data is latched into port to configure the port as an input port.

a) OOH b) FFH c) 55H d) AAH

x) The diagram that shows the flow of program execution is called

a) Block diagram b) Circuit diagram

c) Functional diagram d) Flowchart

2. Attempt **any five** : **10**

i) Give the requirements of interfacing.

ii) How the internal memory of μC 8051 is organized ?

iii) Draw the clock circuit diagram for μC 8051.

iv) Explain with suitable example, the instruction MUL AB.

v) List any four Boolean instructions.

vi) Explain the need of subroutine programs.

3. A) Attempt **any two** : **6**

i) Show the interfacing of RAM to μP. Explain in short.

ii) Show the port structure of PORT - 0.

iii) Write the instructions to add data bytes 50H and 65H. Store the result at internal memory address 70H.

B) Discuss logical instruction set of μC 8051. **4**

4. Attempt **any two** : **10**

i) Discuss the instruction set classification of μC 8051.

ii) Write a note on timer/counter function in μC 8051.

iii) Write a program to turn-on and turn-off LEDs connected to PORT-1.

5. Attempt **any two** : **10**

i) Show the pin distribution of μC 8051 and expain in brief.

ii) Give the structure of ALP. Write ALP for logical operation.

iii) Write a note on relative addressing mode.

_____

SLR-N – 187

Seat No.	

B.Sc. III (Semester – V) Examination, 2014
CHEMISTRY
Physical Chemistry (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 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) In case of one component system, when all the three phases are in equilibrium at only one point the system is

a) Non-variant b) Univariant c) Bivariant d) Trivariant

2) In Nernst equation, the constant 0.0591 at 298 K represents the value of

a) $\frac{RT}{nF}$ b) $\frac{RT}{F}$ c) $\frac{2.303RT}{nF}$ d) $\frac{2.303RT}{F}$

3) For a photochemical reaction that obeys Einstein law

a) $\phi = 1$ b) $\phi > 1$ c) $\phi < 1$ d) $\phi = \alpha$

4) The minimum number of phases in any system is

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

5) If a salt bridge is removed from two half cells, the emf of cell

a) Drops to zero b) Does not change

c) Decrease gradually d) Increases gradually

6) For dissociation of hydrogen molecule _____ is used as a sensitizer.

a) Na-vapour b) Hg-vapour c) Water-vapour d) Vapour

P.T.O.

7) In salt bridge, KCl is used because
   a) KCl is present in the Calomel electrode
   b) K^+ and Cl^- ions have the same transference number
   c) K^+ and Cl^- ions are isoelectronic
   d) KCl is an electrolyte

8) For a system containing a solution of cane sugar in a beaker at room temperature, the number of phases are
   a) One b) Two c) Three d) Zero

9) The standard cell potential of Daniell cell is
   a) 1.10 Volts b) 2.20 Volts c) 0.00 Volts d) 0.20 Volts

10) An electrode in contact with its electrolyte solution constitutes
   a) Electrochemical cell b) Half cell
   c) Galvanic cell d) None of these

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

1) What do you meant by electrochemical series ?
2) What is cryohydric point ?
3) Explain oxidation-reduction electrode.
4) What is luminescence ?
5) How emf of the cell is used to calculate Gibbs free energy change ?
6) What is polymorphism ?

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

1) Discuss the application of emf measurement in determination of pH of solution.
2) Write a note on Pattinson's process of desilverisation of lead.
3) Explain reversible cell.

B) Calculate the energy associated with i) one quantum and ii) one Einstein. Given that the wavelength of radiation is 7500A°. **4**

($N = 6.024 \times 10^{23}$, $h = 6.62 \times 10^{-27}$ erg. sec, $C = 3 \times 10^{10}$ cm/sec
1 cal = 4.184×10^7 ergs)

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

   1) Discuss the mechanism of photochemical reaction between H_2 and Cl_2. Give the reasons of high quantum yield.

   2) How is single electrode potential determined ? Explain.

   3) What is meant by photosensitized reactions ? Explain with dissociation of hydrogen and photosynthesis.

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

   1) Derive an expression for emf of an electrolyte concentration cell with transference which is reversible to anion.

   2) Discuss ferric chloride-water system with the help of phase diagram.

   3) Calculate emf of the cell.

   $\bar{Z}n_{(Hg)}\,0.006M \,|\, Z_nSO_{4(aq)} \,|\, Zn_{(Hg)}(0.0003M)^+$, at 323 K. The amalgums are sufficiently dilute to be considered ideal.

   ($R = 8.3\ JK^{-1}M^{-1}$, $F = 96500$ coulombs)

SLR-N – 2

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
CHEMISTRY (Paper – I) (CGPA Pattern)
Physical and Inorganic Chemistry

Day and Date : Monday, 3-11-2014 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

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

ii) Draw ***neat****, labelled diagrams* ***wherever*** *necessary.*

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

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

v) Solve ***each*** *Section in* ***separate*** *answer book.*

SECTION – I

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

i) The point of intersection of X and Y axes in graph is known as

a) slope b) origin c) intercept d) quadrant

ii) The unit of 'b' in Vander Waal's equation is

a) dm^3mole^{-1} b) $moledm^{-3}$ c) $mole^{-1}$ d) dm^{-3}

iii) The rate constant in a first order reaction is 0.0154 min^{-1}. The half life period of the reaction is

a) 60 min. b) 45 min. c) 120 min. d) 20 min.

iv) Hot reservoir represents

a) Source b) Sink c) Isolated system d) Open system

v) The number of molecules taking part in chemical reaction is known as

a) order of reaction b) molecularity of reaction

c) specific reaction rate d) rate of reaction

P.T.O.

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

i) What is Joule-Thomson effect ?

ii) Give any four rules of integration.

iii) How concentration affects the rate of reaction ?

iv) What is heat engine ? Give examples.

v) What is continuity of state ?

vi) Give any two statements of second law of thermodynamics.

vii) Define the term order of a chemical reaction.

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

i) Derive Vander Waal's equation for one mole of gas.

ii) Distinguish between spontaneous and nonspontaneous processes.

iii) Write a note on decomposition of N_2O_5.

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

i) Give in detail the characteristics of second order reaction.

ii) Explain the efficiency of heat engine on the basis of Carnot cycle. Calculate the % efficiency of steam engine operating between 383 K and 298 K.

SECTION – II

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

1) As the atomic size increases, ionization potential

a) Increases b) Decreases

c) First increases then decrease d) Remains same

2) _____ is the most electropositive element in the periodic table.

a) Oxygen b) Carbon c) Magnesium d) Caesium

3) In $BeCl_2$, the bond angle is

a) 120° b) 90° c) 72° d) 180°

4) Bond order of Li_2 molecule is

a) 2 b) 1 c) 0 d) 1.5

5) Limiting radius ratio for octahedral 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) Draw the shapes of p-orbitals.

   ii) Inert gas elements have zero electron affinity, why ?

   iii) Draw P.E. curve for formation of H_2 molecule.

   iv) Give the limitations of VBT.

   v) Why Be_2 molecule does not exist ?

   vi) Define bonding and antibonding molecular orbitals.

   vii) Mention the characteristics of ionic compounds.

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

   i) What is ionic radius ? Discuss its trends in a period and in a group in the periodic table.

   ii) Discuss NH_3 molecule w.r.t. VSEPR theory.

   iii) Discuss the formation of $SiCl_4$ molecule on the basis of VBT.

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

   i) Distinguish between atomic and molecular orbitals. Draw MO diagram for CO molecule, and comment on bond order and stability.

   ii) What is radius ratio ? Describe the structure of NaCl w.r.t. unit cell, co-ordination number and stoichiometry.

SLR-N – 21

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
PHYSICS (Paper – II) (Old)
Optics and Laser

Day and Date : Saturday, 8-11-2014 Total Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) ***Use*** *of calculator or log table is* ***allowed****.*
iv) ***Neat*** *diagrams must be drawn* ***whenever*** *necessary.*

1. Select the **correct** alternative from the following : **10**

1) According to the Fermat's modified principle a ray of light chooses that path between two points along which the time of travel is _____
   a) Zero b) Minimum
   c) Maximum d) Extremum

2) Spherical aberration of convex lens is reduced to minimum if the ratio of radii of curvature of the lens $\frac{R_1}{R_2}$ = _____
   a) $-\frac{1}{6}$ b) $\frac{2}{3}$
   c) $\frac{3}{2}$ d) $\frac{1}{4}$

3) Ramsden's Eyepiece is _____
   a) Negative b) Positive
   c) Single lens d) None of the above

4) In Huygen's Eyepiece, focal length of the field lens is _____
   a) two times that of the eye-lens
   b) equal to that of the eye-lens
   c) three times that of the eye-lens
   d) four times that of the eye-lens

P.T.O.

5) The fringes in wedge shaped film are fringes of _____
   a) equal thickness
   b) equal inclination
   c) different thickness
   d) none of the above

6) When a ray of light gets reflected from the surface of denser medium, then additional path difference introduced is _____
   a) λ
   b) $\lambda/2$
   c) $\lambda/4$
   d) $\lambda/8$

7) There are 15,000 lines per inch of a given grating ; then its grating element is _____
   a) $\frac{2.54}{15000}$ cm
   b) $\frac{1}{15000}$ cm
   c) 2.54 cm
   d) 15,000 cm

8) In Fraunhofer diffraction the source and screen are effectively at _____ distance from the aperture.
   a) Infinite
   b) Finite
   c) Zero
   d) Finite and moderate

9) In stimulated emission, the photon emitted and incident photons are _____
   a) coherent
   b) non-coherent
   c) different
   d) none of the above

10) He-Ne laser is _____
   a) Crystalline solid laser
   b) Semiconductor laser
   c) Gas laser
   d) Liquid dye

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

i) Two thin lenses in contact form an achromatic combination of focal length 10 cm and 20 cm. Calculate equivalent focal length of combination.

ii) Draw a ray diagram for axial chromatic aberration in a convex lens.

iii) Which are the common types of eyepiece ?

iv) Why does a thin parallel faced film appear dark or bright ?

v) Define diffraction of light. State the types of diffraction.

vi) Write properties of LASER.

3. A) Answer **any two** of the following : **6**
   i) What is spherical aberration ? State the different methods used to minimize spherical aberration.
   ii) What is long form of LASER ? State any four uses of LASER.
   iii) How many orders will be visible in a diffraction grating width 2000 lines per cm if the wavelength of light used is 6000 A.U. ?

   B) With a neat diagram explain construction and working of spectrometer. **4**

4. Answer **any two** of the following : **10**
   i) Prove Snell's law of refraction using Fermat's principle.
   ii) The focal length of field lens in Ramsden's eyepiece is 1.5cm. Calculate distance between field lens and eye lens and also calculate equivalent focal length of eyepiece.
   iii) Explain the construction and working of Ruby laser.

5. Answer **any one** of the following : **10**
   i) Obtain an expression for diameter of n^{th} dark ring in Newton's rings produced by reflected monochromatic light. In Newton's ring experiment, a plano convex lens of radius of curvature 120 cm is used. If the wavelength of light used is 6000 A.U. Calculate the diameters of second dark ring.
   ii) Explain the construction of plane diffraction grating. Give the elementary theory of plane diffraction grating.

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SLR-N – 220

Seat No.	

B.Sc. III (Semester – V) Examination, 2014
MATHEMATICS (Special Paper – XII)
Programming in C

Day and Date: Saturday, 8-11-2014 Max. Marks : 50

Time: 3.00 p.m. to 5.00 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) C is _____ kind of language.
a) Machine b) Assembly c) Procedural d) Strictly-typed

2) Every program statement in C ends with
a) colon b) semi colon c) period d) comma

3) In the C language, a constant can be
a) number b) character
c) string d) all of the above

4) _____ operator in C is used to combine multiple expression in to single expression.
a) Arithmetic b) Comma c) Ternary d) Conditional

5) In C, –14% – 3 =
a) 2 b) – 2 c) 4 d) 4.6

6) The specification _____ is used for reading strings that contains blank spaces.
a) % [ ] b) % d c) % s d) % c

7) The switch expression must be an
a) Integral type b) Character type
c) Floating type d) None of these

P.T.O.

8) The range of index for an array of size n is

a) 0 to n b) 0 to n + 1 c) 1 to n d) 0 to n – 1

9) _____ is a jump statement.

a) switch b) goto c) while d) for

10) The range of unsigned in data type varies from

a) –128 to 127 b) 0 to 255 c) 0 to 65535 d) none of these

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

a) What does int main( ) mean ?

b) Write a note on executing a 'C' program.

c) Define variables used in C with example.

d) Explain the size of operator.

e) List the commonly used printf format codes with meanings.

f) What is the general form of the else if ladder ?

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

a) Explain the while statement.

b) Write a note on arithmetic expressions in C.

c) Explain the switch statement.

B) Explain relational operators in C. **4**

4. Attempt **any two** of the following : **10**

a) Discuss the two dimensional arrays.

b) Discuss a multifunction program in C.

c) Write a program to compute the sum of 'n' numbers by using the for loop.

5. Attempt **any one** of the following : **10**

a) An electric power distribution company charges its domestic consumers as follows :

Consumption units	**Rate of charge**
0 – 200	Rs. 0.50 per unit
201 – 400	Rs. 100 + Rs. 0.65 per unit
401 – 600	Rs. 230 + Rs. 0.80 per unit

Write the program to read the customer number and power consumed and prints the amount to be paid by the customer.

b) Discuss in detail the arithmetic operators used in C.

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SLR-N – 23

Seat No.	

B.Sc. – I Sem. – I (Old) Examination, 2014
STATISTICS (Paper – I)
Descriptive Statistics – I

Day and Date : Monday, 10-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory** and **each** carry **equal** marks.*
*2) Figures to the **right** indicate **full** marks.*

1. Choose an appropriate alternate to the following : **10**

1) If a moderately skewed distribution has mean 35 and median 27 then the mode is

a) 11 b) 15 c) 25 d) 30

2) Median is equivalent to

a) D_5 b) Q_2 c) P_{50} d) All of the above

3) If $\mu_2 = 3$ and $\mu_4 = 27$ then β_2 is

a) 3 b) 9 c) 27 d) None of these

4) The variance of values 8, 8, 8 and 8 is

a) 8 b) 0 c) 4096 d) None of these

5) The number of observations belonging to a class is called

a) Class-frequency b) Relative-frequency

c) Class-width d) Class-mark

6) The most stable measure of central tendency is

a) Mean b) Median

c) Mode d) None of these

7) Bowley's coefficient of skewness lies between

a) 0 and 1 b) –1 and +1 c) $-\infty$ and ∞ d) 0 and ∞

P.T.O.

8) The value of the variable which occurs at highest point of frequency distribution curve is

a) Median b) Mean c) Mode d) None of these

9) If $\beta_2 > 3$ then the curve is

a) Lepto kurtic b) Platty kurtic c) Meso kurtic d) None of these

10) Primary data means

a) Raw data b) Result of a survey

c) Result of an enquiry d) All of the above

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

i) What is an ogive ?

ii) Explain how to locate mode graphically.

iii) What is range and its coefficient ?

iv) Define raw and central moments.

v) Given the variance of a meso kurtic distribution is 3. Find μ_4.

vi) State the combined variance formula.

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

i) The mean wages of 100 male employees is Rs. 200 per day and that of 200 female employees is Rs. 150 per day. Find combined mean of wages.

ii) Distinguish between inclusive and exclusive methods of classification.

iii) Define skewness and its coefficients.

B) For two positive observations a and b, show that A.M. $\geq$ G.M. $\geq$ H.M. **4**

4. Attempt **any two** of the following : **10**

i) Express first four central moments in terms of raw moments.

ii) Explain the construction of an Ogive curve.

iii) The A.M. and S.D. of 12 items are 22 and 3 respectively. It was discovered that the item 32 was wrongly taken as 23. Compute correct mean and S.D.

5. Attempt **any one** of the following : **10**

i) Derive the formula for finding mode for a grouped frequency distribution.

ii) The first three moments of a distribution about 2 are 1, 22 and 10. Find its mean, S.D. and the third central moment.

SLR-N – 237

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XIV)
Material Science

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

***Instructions** : 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 are **allowed**.*

1. Select the correct alternative from the following. **10**

1) Reciprocal of resistance is

a) Conductance b) Inductance

c) Admittance d) Reluctance

2) _____ is not ceramic material.

a) glass b) bakelite c) cement d) zinc oxide

3) Elastic deformation is

a) permanent b) irreversible

c) reversible d) none of (a), (b) and (c)

4) The twins which are formed during the recrystallization is called

a) plastic twins b) elastic twins

c) deformation twins d) anneling twins

5) In general ceramics are

a) hard b) strong c) dense d) all (a), (b) and (c)

P.T.O.

6) Plywood has _____ strength in all direction.

a) weak b) uniform

c) unequal d) none of (a), (b) and (c)

7) _____ is associated with polymerization.

a) Thermoplastic b) Copper c) Zinc d) Both (a) and (b)

8) In nano-meter range the hardness of material _____ with decrease in grain size.

a) decreases b) increases c) independent d) remain constant

9) _____ nano particles are used in refrigeration and water purification.

a) Cadmium b) Silver c) Gold d) Carbon

10) Gibb's phase rule is given by the equation

a) $F = C + P + 2$ b) $F = C + P - 2$

c) $F = C - P - 2$ d) $F = C - P + 2$

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

i) What is elastomers ?

ii) Define recovery.

iii) Explain raw material processing of ceramics.

iv) Define elasticity and plasticity.

v) What is liquidus and solidus in phase diagram ?

vi) Give long form of XRD and SEM.

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

   i) Discuss the electrical properties of materials.

   ii) Explain linear polymers.

   iii) Describe NaCl structure of ceramic compounds.

   B) Distinguish between plastic and elastic deformation. **4**

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

   i) What is slip ? What is its significance ?

   ii) Discuss the method of preparation of polythene and explain its uses.

   iii) Discuss mechanical and electrical properties of ceramic material.

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

   i) What do you understand by nano composite materials ? Explain the methods of preparation of nano composites.

   ii) What is CRSS ? Describe it in detail.

SLR-N – 25

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
STATISTICS (Paper – II) (Old)
Probability and Probability Distributions – I

Day and Date : Tuesday, 11-11-2014 Total Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

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

i) A, B are two events which have no common point then A, B are

a) Complementary events b) Independent events

c) Mutually exclusive events d) None of these

ii) A bag contains 5 white and 6 black balls. Two balls are drawn at random then probability that all balls drawn will be white is

a) $\frac{1}{11}$ b) $\frac{9}{11}$

c) $\frac{10}{11}$ d) $\frac{2}{11}$

iii) If s is the sample space of a random experiment containing n sample points then in the power set there are _____ elements.

a) 2n b) n^2

c) ${}^nC_2$ d) 2^n

iv) A and B are two events on the sample space of a random experiment. Then occurrence of exactly one of them is given by

a) $A \cap B$ b) $A \cup B$

c) $(A \cap \overline{B}) \cup (\overline{A} \cap B)$ d) $(A \cap \overline{B}) \cap (\overline{A} \cap B)$

v) A and $\overline{A}$ are

a) mutually exclusive events b) independent events

c) exhaustive events d) both (a) and (c)

P.T.O.

vi) If A and B are independent events with P(A) = 0.4, P(B) = 0.3 then P(A $\cup$ B) is

a) 0.7 b) 0.1

c) 0.58 d) 0.6

vii) Distribution function of r.v. X is

X :	10	20	22	30	32
F(x) :	0.1	0.2	0.32	0.78	1.0

Median of X is

a) 22 b) 26

c) 30 d) 20

viii) Which of the following is not a probability function

a) $P(x) = \frac{1}{5}$ x = 1, 2, 3, 4, 5 b) P(x) = 1 x = 0

c) $P(x) = \frac{x}{2}$ x = – 1, 0, 1 d) $P(x) = \frac{1}{2}$ x = 0, 1

ix) If A_1, A_2, A_3 are mutually independent then they are

a) Mutually exclusive b) Pairwise independent

c) Partition of the sample space d) None of these

x) If X takes values –1, 0, 1 with probabilities 0.3, 0.4, 0.3 respectively then X^2 takes values 0, 1 with probabilities

a) (0.5, 0.5) b) (0.6, 0.4)

c) (0.4, 0.6) d) None of these

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

i) Define axiomatic definition of probability.

ii) A card is drawn from a pack of cards. Obtain probability of getting (a) a king (b) a red card.

iii) If A is subset of B, find $P(\overline{A}/B)$

iv) Prove that $0 \leq P(A) \leq 1$

v) Verify whether the following function can be regarded as the pmf for the given values of X . $P(x) = \frac{x^2 + 1}{8}$ x = 0, 1, 2, 3.

vi) Explain partition of a sample space with an illustration.

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

i) Define :

a) Pairwise independence

b) Mutual independence

ii) Two unbiased dice are thrown simultaneously. What is the probability that

a) The sum is greater than 8

b) The product of numbers is less than 4.

iii) If A and B are independent events prove that $\overline{A}$ and $\overline{B}$ are independent.

B) Define conditional probability and prove that it satisfies axioms of probability. **4**

4. Answer **any two** of the following : **10**

i) The chances of X, Y, Z becoming the manager of a certain company are $\frac{4}{9}, \frac{2}{9}, \frac{3}{9}$ respectively. The probabilities of a bonus scheme being introduced if X, Y, Z becomes manage are 0.3, 0.5 and 0.6 respectively. If bonus scheme is introduced what is the probability that X is appointed as Manager.

ii) If $P(A) = \frac{1}{4}$, $P(A/B) = \frac{1}{3}$ and $P(B/A) = \frac{1}{2}$ then find

a) $P(A \cap B)$ b) $P(B)$

iii) State and prove addition theorem on expectation and state its extension for the three events A, B, C.

5. Answer **any one** of the following : **10**

i) Prove that $0 \leq P(A \cap B) \leq P(A) \leq P(A \cup B) \leq P(A) + P(B)$.

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

X :	1	2	3	4	5	6	7
P(x) :	K	2K	3K	K^2	$K^2 + K$	$2K^2$	$4K^2$

Find :

a) K

b) $P(X \leq 3)$

c) Distribution function of X

d) Median of X

e) Probability distribution of 3X.

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SLR-N – 27

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
MATHEMATICS (Paper – I) (Old)
Algebra

Day and Date : Wednesday, 12-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) Obtain characteristic polynomial for the matrix $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$.

a) $x^2 - 2x + 1$ b) $x^2 - 2x - 1$ c) $x^2 - 2x$ d) $x^2 - 1$

2) tanh(ix) =

a) itanx b) tan(ix) c) – itanhx d) tanx

3) $\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ 9 & 7 \end{bmatrix} x - \begin{bmatrix} 1 & -1 \\ 0 & 3 \end{bmatrix} x^2$ is a metric polynomial of degree

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

4) If A and B are symmetric then A – A' is

a) Symmetric matrix b) Skew-symmetric
c) Diagonal of A d) None of these

5) Sinhz =

a) $1 + \frac{z^2}{2!} + \frac{z^4}{4!} + ...$ b) $z + \frac{z^3}{3!} + \frac{z^5}{5!} + ...$

c) $1 + z + \frac{z^2}{2!} + \frac{z^3}{3!} + ...$ d) $1 - \frac{z^2}{2!} + \frac{z^4}{4!} - \frac{z^6}{6!} + ...$

6) Inverse exists if $|A| \neq 0$ then A is only

a) Row matrix b) Column matrix
c) Square matrix d) None of these

P.T.O.

7) If $\rho(A) = r <$ number of unknowns then the system of equations AX = 0 have
   a) No solution b) Unique solution
   c) Many solutions d) None of these

8) coshz – sinhz =
   a) 1 b) –1 c) e^{z} d) e^{-z}

9) The complex conjugate of z is $\bar{z}$. Then $z - \bar{z}$ =
   a) z Rez b) z Imz c) zi Imz d) zi Rez

10) Find the skew-symmetric matrix from the following matrices
   a) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 1 \\ 1 & -1 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

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

1) Solve : x + y = 0, x – y – z = 0, 3x + y – z = 0.

2) If A is a square matrix, show that A + A' is symmetric matrix.

3) Find the values of
   i) cosh (π i) ii) sinh (2π i).

4) Define Euler's formula, show that sin $(-\theta) = -\sin\theta$.

5) Write the complex number $\frac{1}{2} + i\frac{\sqrt{3}}{2}$ in polar form.

6) Obtain the characteristic equation of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

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

1) Find the values of λ for which the system has a non-trivial solution.
   $3x + y - \lambda z = 0$
   $4x - 2y - 3z = 0$
   $2\lambda x + 4y + \lambda z = 0$.

2) Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 5 \\ -1 & -2 & 6 & -7 \end{bmatrix}$.

3) If $\cos(\alpha + i\beta) = x + iy$ prove that $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$.

B) Find the eigen values and corresponding eigen vectors of the matrix $\begin{bmatrix} 1 & 2 \\ 5 & 4 \end{bmatrix}$. **4**

4. Attempt **any two** of the following : **10**

1) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ express $A^6 - 4A^5 + 8A^4 - 12A^3 + 14A^2$ as a linear polynomial in A.

2) Find the values of λ and μ such that the following system of equation has
   i) no solution
   ii) unique solution
   iii) many solutions

   $x + y + z = 3$, $x + 2y + 2z = 6$, $x + \lambda y + 3z = \mu$.

3) Use DeMoivre's theorem to solve $x^7 - x^4 + x^3 - 1 = 0$.

5. Attempt **any one** of the following : **10**

1) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$. Hence find A^{-1}.

2) State and prove DeMoivre's theorem and simplify $\frac{(\cos 4\theta + i\sin 4\theta)^5}{(\cos 2\theta + i\sin 2\theta)^3}$.

SLR-N – 29

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
MATHEMATICS (Old)
Calculus (Paper – II)

Day and Date : Thursday, 13-11-2014 Max.Marks : 50

Time : 11.00 a.m. to 1.00 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) Find the $\lim_{x \to 0} \frac{x - \sin x}{x^3}$

a) 0 b) $\frac{0}{0}$ c) 1 d) $\frac{1}{6}$

2) If $y = \log(2x + 3)$ then $y_n =$

a) $\frac{(-1)^{n-1}(n-1)!\,2^n}{(2x+3)^n}$ b) $\frac{(-1)^{n-1}\,n!\,2^n}{(2x+3)^n}$

c) $\frac{(-1)^n\,n!\,2^n}{(2x+3)^n}$ d) $\frac{(-1)^{n-1}\,(n-1)!\,2^{n-1}}{(2x+3)^{n-1}}$

3) Find the series expansion $1+\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots$ for

a) coshx b) sinhx c) tanhx d) cos x

4) If $\vec{r}$ = xi + yj + 3k then div $\vec{r}$ = ...

a) 0 b) 1 c) 3 d) 4

5) If u = logx – logy then $x\frac{\partial u}{\partial x} - y\frac{\partial u}{\partial y}$

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

P.T.O.

6) $\int_0^{\pi/2} \cos^4 x \sin^2 x \, dx =$

a) $\frac{\pi}{30}$ b) $\frac{\pi}{32}$ c) $\frac{3}{37}$ d) $\frac{\pi}{35}$

7) If φ (x, y, z) = $2xz^4 - x^2y$ then $\nabla \varphi$ =

a) 10i – 4j – 16k b) 10i + 4j + 16k

c) 10i – 4j + 6k d) 10i + 4j – 16k

8) $\int_0^{\pi/4} \sin^4 x dx =$

a) $\frac{\pi}{16}$ b) $\frac{\pi}{15}$ c) $\frac{3\pi}{16}$ d) $\frac{2\pi}{13}$

9) If δ is any positive number then the set of points (x, y) such that $0 < |x - a| < \delta$, $0 < |x - b| < \delta$ is the δ-neighbourhood of the point

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

10) The degree of homogeneous function $u = \frac{x^2 + y^2}{x - y}$ is

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

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

1) Find the $\lim_{x \to 0} \frac{\log x}{\cot x}$.

2) Find n^{th} derivative of $\frac{x^4}{(x-1)(x-2)}$.

3) Show that $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ...$

4) Examine for continuity f(x, y) = $\frac{xy}{x^2 + y^2}$, $x^2 + y^2 \neq 0$

= 0, otherwise

5) Evaluate $\int_0^{\pi/4} \sin^7 z\theta d\theta$.

6) If $\vec{r}$ = xi + yj + 3k, find curl $\vec{r}$.

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

1) If $u = \sin^{-1}\left(\frac{x^2 + y^2}{x+y}\right)$ then prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial x} = \tan u$.

2) If $\vec{f} = (x + y + 1)\, i + j - (x + y)k$ then prove that $\vec{f}.\text{curl}\,\vec{f} = 0$.

3) Evaluate $\int_0^{\pi} (1-\cos\theta)^3\, d\theta$.

B) If $y = \sin(ax + b)$ then prove that $y_n = a^n \sin(ax + b + n.\frac{\pi}{2})$, hence find the value of y_7 when $y = \sin(2x + 5)$. **4**

4. Attempt **any two** of the following : **10**

1) If $\varphi = x^3 + y^3 + z^3 - 3xyz$, find

i) $\vec{r}.\nabla\varphi$ ii) div $\vec{F}$ iii) curl $\vec{F}$ where $\vec{F} = \nabla\varphi$

2) If $z(x + y) = x^2 + y^2$ then show that $\left(\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)^2 = 4\left(1 - \frac{\partial z}{\partial x} - \frac{\partial z}{\partial y}\right)$.

3) State Maclaurin's series and hence show that $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \ldots$

5. Attempt **any one** of the following : **10**

1) State and prove Leibnitz's theorem and if $y = e^{\tan^{-1} x}$ then prove that $(1 + x^2)y_{n+1} + (2nx - 1)y_n + n(n - 1)\, y_{n-1} = 0$.

2) If f(x, y) is homogeneous function of degree n then show that $x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = nf(x, y)$ hence verify Euler's theorem for $u = \frac{x^{1/4} + y^{1/4}}{x^{1/5} + y^{1/5}}$

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SLR-N – 31

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
ELECTRONICS (Paper – I) (Old)
Electronics Fundamentals

Day and Date : Friday, 14-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

***Instructions**: 1) Figures to the **right** indicates **full** marks.*
*2) Draw **neat** diagrams **wherever** necessary.*
*3) **Use** of log table and calculator is **allowed**.*
*4) **All** questions carry **equal** marks.*

1. Select correct alternatives for the following : **10**

1) Series resonant circuit above resonance becomes
a) Resistive b) Inductive c) Capacitive d) All

2) The unit of capacitor is
a) Ohm b) Mhos c) Farad d) None

3) A sinusoidal signal has maximum value of 20 V, its rms value is
a) 141.4 V b) 14.14 V c) 1.414 V d) 1414 V

4) In stepdown transformer primary voltage is _____ than secondary voltage.
a) Less b) Greater c) Equal to d) None

5) Frequency of dc source is _____ Hz.
a) 50 b) 230 c) 440 d) 0

6) The unit of resistance is
a) Ohm b) Mhos c) Coulomb d) Farad

7) Two resistances each of 200Ω are connected in parallel then equivalent resistance will be _____Ω .
a) 200Ω b) 0.01Ω c) 100Ω d) 400Ω

8) Two capacitors each of 200 μf are connected in parallel then equivalent capacitor will be _____μf .
a) 100 b) 200 c) 400 d) 50

P.T.O.

9) In case of pure inductor current _____ voltage.
   a) Leads b) Lags c) In phase with d) None

10) Admittance parameters are same as _____ circuit parameters.
   a) Open b) Short c) Hybrid d) None

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

i) In series resonance RLC circuit, L = 1mH, C = 0.047 μf , R = 50 Ω. Find F_0.

ii) Give classification of capacitor.

iii) Write short circuit resistance of π network.

iv) Define mesh and node.

v) Define time period and frequency.

vi) Define z-parameters.

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

i) What is resistance ? What are its types ?

ii) State and explain superposition theorem.

iii) What is transformer ? Give construction of stepdown transformer.

B) Give the comparison between series and parallel resonance. **4**

4. Answer **any two** of the following : **10**

i) What is AC source ? Explain sinusoidal and non-sinusoidal AC source.

ii) Explain black box theory for two port network.

iii) Explain π network.

5. Answer **any one** of the following : **10**

i) Explain hybrid parameters for two port network and draw its equivalent circuit.

ii) What is inductance ? Explain different types of inductors.

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SLR-N – 33

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
GEOLOGY (Paper – I) (Old)
Mineralogy and Palaeontology

Day and Date : Friday, 14-11-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) **All** the 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) Composition of quartz is _____
   a) SiO_2 b) SiO_4
   c) SiO_3 d) $SiO_2 . nH_2O$

2) Hardness of _____ mineral is four.
   a) Calcite b) Talc c) Fluorite d) Chlorite

3) Asbestos shows _____ lustre.
   a) Vitreous b) Silky c) Pearly d) Admantine

4) Olivine occur in _____
   a) Pegmatite b) Sandstone c) Granite d) Dunite

5) _____ is the best example of covalent bonding.
   a) Quartz b) Diamond c) Talc d) Graphite

6) The latin word fossil is meaning to _____
   a) Dig up b) Dig earth c) Dig soil d) Dig more

7) _____ is one of the living fossils.
   a) Ogygia b) Physa
   c) Nautilus d) Productus

8) Fossils are preserved in
   a) Sediments/Ice/Amber b) Sediments/Lava/Groundwater
   c) Amber/Ice/Lava d) Lava/Sea water/Sediments

P.T.O.

9) Fossil pecten belongs to _____ class.
   a) Gastropoda
   b) Lamellibranchiata
   c) Cephalopoda
   d) Anthozoa

10) Coal seams occur in S. America, Africa, Australia, India and Antarctica regions suggest _____ climate during the permo-carboniferous times.
   a) Cold
   b) Desert
   c) Warm and humid
   d) Cold and humid

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

1) Cleavage

2) Conchoidal fracture

3) Mineral definition with examples

4) Spire

5) Pallial line

6) Mould and cast

3. A) Answer **any two** of the following : **6**
   1) Lustre and their types.
   2) Physical properties of quartz and their varities.
   3) Difference between pyroxene and amphibole group of minerals.

   B) Draw labelled figure of typical lamellibranchiata shell. **4**

4. Answer **any two** of the following : **10**

1) Describe four forms of minerals with example.

2) Describe physical, chemical properties of mica group of minerals. Give their occurrence.

3) Any two chemical bonding types with example.

5. Explain **any two** of the following : **10**

1) Describe the morphology of a trilobita.

2) Modes of fossil preservation, petrification, carbonisation.

3) Give in brief external morphology, geological distribution, fossil names of Brachiopoda.

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SLR-N – 35

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS (Old)
Digital Fundamentals (Paper – II)

Day and Date : Saturday, 15-11-2014 Total Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw the figures ***whenever*** *necessary.*

1. Select the correct alternative for the following : **10**

1) The base of octal number system is
   a) 2 b) 8
   c) 10 d) 16

2) The 1's compliment of binary number 1010 is
   a) 0101 b) 1011
   c) 0111 d) 1010

3) The IC 7432 is a _____ gate.
   a) NOT b) AND
   c) OR d) NAND

4) _____ gate can be used as a universal building block.
   a) OR b) AND
   c) NAND d) XOR

5) The 8421 code for decimal number 25 is
   a) 0010 0101 b) 0011 0110
   c) 0010 0100 d) 0010 1011

6) T ASCII code is a _____ bit code.
   a) 5 b) 6
   c) 7 d) 8

7) $A + \bar{A} =$
   a) A b) $\bar{A}$
   c) 1 d) 0

P.T.O.

8) Half adder adds _____ bits at a time.
   a) 2 b) 3
   c) 4 d) 5

9) Gray code for a binary number 1010 is
   a) 1111 b) 1011
   c) 1110 d) 1100

10) In NOR gate
   a) AND gate follows NOT gate b) OR gate follows NOT gate
   c) AND gate follows OR gate d) OR gate follows AND gate

2. Answer **any five** of the following : **10**
   i) Convert a binary number $(10101)_2$ into decimal number.
   ii) Define positive and negative logic systems.
   iii) Draw pinout diagram of IC 7402.
   iv) Simplify using laws and rules of Boolean algebra $A(\overline{A} + B) = AB$.
   v) What is parity code ?
   vi) Convert hexadecimal number $(2\,BC)_{16}$ into binary number.

3. A) Answer **any two** of the following : **6**
   i) Perform the addition of decimal numbers $(56)_{10}$ and $(36)_{10}$ using excess 3 code.
   ii) Explain working of half subtractor with logic diagram.
   iii) Explain OR gate using NOR gate.

   B) Solve : **4**
   i) $(1101)_2 + (1011)_2$ ii) $(1010)_2 - (111)_2$

4. Answer **any two** of the following : **10**
   i) State and prove DeMorgan's theorems.
   ii) Explain how XOR gate can be used as a parity checker.
   iii) Explain 1's complement.
   Solve using 1's complement $(110101)_2 - (0110)_2$.

5. Answer **any one** of the following : **10**
   i) With the help of block diagram explain organisation of digital computer.
   ii) What is K-map ? State the rules for simplification of K-map. Simplify the following Boolean expression using K map.

$$Y = \overline{A}\ \overline{B}\ \overline{C}\ \overline{D} + \overline{A}\ B\ C\ D + \overline{A}\ B\ C\ \overline{D} + A\ B\ \overline{C}\ \overline{D} + A\ B\ \overline{C}\ D + A\ B\ C\ D + A\ B\ C\ \overline{D} + A\ \overline{B}\ \overline{C}\ \overline{D} + A\ \overline{B}\ \overline{C}\ D + A\ \overline{B}\ C\ D + A\ \overline{B}\ C\ \overline{D}.$$

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SLR-N – 37

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
GEOLOGY (Paper – II) (Old)
Igneous, Sedimentary and Metamorphic Petrology

Day and Date : Saturday, 15-11-2014 Max. Marks : 50
Time : 3.00 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. Fill in the blanks with correct answers from the given options. **10**

1) Hypabyssal rocks are formed from
   a) Lava b) Magma
   c) Pyroclastic material d) None of these

2) Rapid cooling of lava results _____ texture.
   a) Glassy b) Graphic c) Granitic d) Coarse grained

3) Sills are _____ to bedding plane.
   a) Parallel b) Across c) Perpendicular d) All of these

4) Pattern of ring dyke is
   a) Concentric b) Radial c) Linear d) Angular

5) Marble is _____ rock.
   a) Igneous b) Sedimentary
   c) Metamorphic d) None of these

6) Fossiliferous limestone is _____ deposit.
   a) Rudaceous b) Chemical c) Arenaceous d) Organic

7) Breccia rock constitutes _____ fragments of sediments.
   a) Rounded b) Sub-rounded
   c) Angular d) All of these

8) Conglomerate is _____ rock.
   a) Igneous b) Sedimentary
   c) Metamorphic d) Plutonic

9) Schistose structure is formed due to _____ metamorphism.
   a) Cataclastic b) Dynamothermal
   c) Thermal d) Plutonic

10) _____ structure is due to the predominance of equidimensional minerals.
   a) Schistose b) Gneissose c) Granulose d) Slaty

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

   i) Accessory minerals

   ii) Raindrop prints

   iii) Laterite

   iv) Marble

   v) Antistress minerals

   vi) Cone sheets.

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

   i) Amygdaloidal structure.

   ii) Source of material for secondary rocks.

   iii) Thermal metamorphism.

   B) Write note on : **4**

   The Rock Cycle.

4. Answer **any two** of the following : **10**

   i) Any two concordant intrusive igneous rocks.

   ii) Formation of residual and rudaceous rocks.

   iii) Slaty and maculose structure.

5. Answer **any two** of the following : **10**

   i) Describe with neat sketch current bedding and graded bedding.

   ii) Describe agents of metamorphism.

   iii) Describe with neat sketch pillow and columnar structure,

_____

SLR-N – 38

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
MICROBIOLOGY
Microbial Techniques (Old) (Paper – II)

Day and Date : Saturday, 15-11-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: i)* ***All*** *the questions are* ***compulsory****.*
ii) Draw a ***neat*** *labelled diagram* ***wherever*** *necessary.*
iii) Figures to the ***right-hand side*** *indicates marks allotted to the question.*

1. Rewrite the following sentence by choosing correct alternative : **10**

i) _____ staining is an example of differential staining procedure.
a) Gram's staining b) Capsule staining
c) Negative staining d) Cell wall staining

ii) Gram positive bacteria has _____ in the cell wall.
a) Mg-ribonucleate b) $MgCo_3$
c) Mg ribose d) Mg gluconate

iii) The limit of resolution of the most human eye is
a) 0.2 mm b) 2 mm c) 20 mm d) 200 mm

iv) A vitamin solution can be sterilized by
a) Chemicals b) Moist heat
c) Filteration d) Dry heat

v) _____ is not an example of phenol and phenolics used as disinfectant.
a) Cresols b) Chlorine c) Lysol d) Xylenols

vi) _____ introduced the serial dilution technique for the first time.
a) Tyndall b) Alexender Fleming
c) Joseph Lister d) Robert Koch

vii) _____ is added to adjust the osmotic pressure of medium.
a) Agar-Agar b) NaCl
c) Vitamine d) Yeast extract

P.T.O.

viii) In freeze drying process _____ is used as suspending medium.
a) 7.5% glucose serum in nutrient broth
b) Nutrient broth
c) Saline
d) Peptone water

ix) In an embryonated chicken eggs _____ is not used to grow the organisms.
a) Chorioallontoic membrane b) Allontic cavity
c) Amniotic sac d) Shell

x) The example of neutral stain is
a) Methylene blue b) Crystal violet
c) Nigrosin d) Giemsa's stain

2. Answer **any five** of the following : **10**
i) Define resolution.
ii) What is an acidic stain ?
iii) Define antiseptic.
iv) What is a living medium ?
v) Define termal death time.
vi) What is serial dilution ?

3. A) Answer **any two** of the following : **6**
i) Write short note on capsule staining by Maneval's method.
ii) In short explain pour plate technique.
iii) Give a brief account on resolving power.

B) What is sterilization ? Explain the physical agent-moist heat used to obtain sterilization. **4**

4. Answer **any two** of the following : **10**
i) Compare and contrast between light and electron microscope.
ii) Give an brief account on any 2 methods used to maintain pure cultures.
iii) Explain the use of halogens to obtain sterilization.

5. Answer **any two** of the following : **10**
i) Write principle, procedure, mechanism and application of negative staining.
ii) What is differential medium ? Explain giving suitable examples.
iii) What is anaerobic culture ? Explain any two methods to maintain anaerobic culture.

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SLR-N – 41

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE (New)
Computer Fundamentals – II (Paper III)

Day and Date : Thursday, 11-12-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Each** questions carries **equal** marks.*
*3) Figures to the **right** indicate **full** marks.*

1. Choose **correct** alternatives : **10**

1) In windows OS, deleted files will be available in _____
   a) My computer b) Start menu
   c) Recycle bin d) None of these

2) _____ key should be pressed to start a new paragraph in MS-Word.
   a) Down cursor key b) Enterkey
   c) Shitt+Enter d) Function key

3) _____ create a single row in the table.
   a) <TH> b) <TP> c) <TR> d)

4) If you want to execute more than one program at a time, the system software that you use must be capable of _____
   a) Word processing b) Virtual memory
   c) Compiling d) Multitasking

5) _____ is the concept of sharing resources, services and application.
   a) Communication b) Networking
   c) Topology d) Protocol

6) By default Ms-Word allows creations of _____ type of documents.
   a) .DOC b) .WpF c) .Txt d) .pdf

7) _____ is not a attribute of image tag.
   a) Align = “Left” b) Aligh = “Justify”
   c) Width d) Height

P.T.O.

8) WAN uses _____ type of connection.
   a) satellite b) wired c) radio d) fiberoptic

9) Quantum is used in _____
   a) multiprogramming b) multiprocessing
   c) time sharing d) multitasking

10) The quick launch bar is the component of _____
   a) menubar b) taskbar c) context menu d) background

2. Write the answer of the following questions (**any five**) : **10**

   i) Define term protocol.

   ii) Explain local area network.

   iii) What is multiprogramming ?

   iv) What is an HTML ?

   v) Define the term Anchor tag.

   vi) What is CSS ?

3. A) Write the answer of following questions (**any two**) : **6**
   i) What is windows modulus ? Explain windows explorer.
   ii) Explain evaluation of internet.
   iii) Write note on notepad.

   B) What is process management ? Explain time sharing. **4**

4. Write the answer of the following questions (**any two**) : **10**

   i) Define the word processor. Explain the features of MS-Excel.

   ii) Explain the hyperlink and image tag in details.

   iii) Explain the process of sending E-mail in details.

5. Write the answer of the following questions (**any two**) : **10**

   i) Define the Networking. Explain types of Networking.

   ii) What is windows operating system ? Explain different features of windows operating system.

   iii) Write a note on DHTML.

_____

SLR-N – 43

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE (New)
Programming Using 'C' – II (Paper – IV)

Day and Date : Friday, 12-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) _____ type of pointer holds the address of any kind of data.
a) int b) void c) float d) char

2) _____ file opening mode is used for appending.
a) app b) r c) w d) a

3) At one time, 'C' function can return only one value.
a) True b) False

4) Compiler by default assigns zero value for _____ variable.
a) Local b) Global c) Static d) Both b) and c)

5) _____ is user defined data type in 'C' language.
a) structure b) union c) both a) and b) d) none of these

6) Single structure variable can store multiple record.
a) True b) False

7) putw() is used to _____ into the file.
a) read word b) write word c) read integer d) write integer

8) Pointers are used in dynamic memory allocation.
a) True b) False

9) File is used for temporary storage of data.
a) True b) False

10) To initialize pointer variable _____ operator is used.
a) = b) = = c) * d) $\rightarrow$

P.T.O.

2. Attempt **any five** of the following : **10**
   1) Differentiate between array and structure.
   2) What is chain of pointer ?
   3) Define 'local' and 'global' variable.
   4) What is function ? List out its advantages.
   5) Write syntax to declare, call and define the function.
   6) Write syntax for malloc () function.

3. A) Attempt **any two** of the following : **6**
      1) Write a program to find factorial of entered number by using pointer.
      2) What is storage class ? Explain "static" storage class with one example.
      3) Explain fgetc ( ) and fputc ( ) file functions.

   B) Explain different parameter passing techniques in 'C' language. **4**

4. Attempt **any two** of the following : **10**
   1) Explain 'self referential structure' in details.
   2) Write a program that demonstrate the difference between structure and union.
   3) What is memory allocation ? Explain types of memory allocation in details.

5. Attempt **any two** of the following : **10**
   1) Write a program to implement 'student' structure. Accept and display student information into myinfo () user defined function.
   2) What is File ? How append mode is differ from write mode ?
   3) Write a program to check maximum number between three numbers using function returning value.

SLR-N – 45

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PHYSICAL GEOGRAPHY (Paper – III) (New)
Geomorphology

Day and Date : Saturday, 13-12-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams and maps* ***wherever*** *necessary.*
3) Use of map stencil is ***allowed****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

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

1) The chemical weathering produce more _____ minerals.
(Unstable, Solubal, Stable, Hard)

2) _____ is an important process of chemical weathering.
(Hydration, Oxidation, Carbonation, Solution)

3) The cycle of erosion is a concept advocated by W. M. Davis in
(1890, 1896, 1898, 1899)

4) The cycle of erosion commences with the _____ of landmass.
(development, degradation, upliftment, evolution)

5) Development of soil on a limestone rock is a very _____ process.
(fast, slow, sudden, medium)

6) Soil formation factors are
(three, five, six, four)

7) _____ is greater in soil.
(N_2, O_2, CO_2, H_2)

8) _____ colour of soil is associated with the oxides of iron.
(black, grey, red, yellow)

P.T.O.

9) The chemical reaction of soil is measured by its _____ value.
(PH, HP, PQ, QH)

10) Soil _____ is the ability of soil to sustain plants.
(fertility, structure, texture, type)

2. Answer in short (**any five**) : **10**
   1) Explain the term weathering.
   2) What is erosion ?
   3) Explain fertility of soil.
   4) Delta.
   5) Describe the soil component.
   6) Structure of soil.

3. A) Answer in short (**any two**) : **6**
      1) What is soil science ?
      2) Significance of weathering.
      3) Chemical properties of soil.

   B) Explain the process of chemical weathering. **4**

4. Answer the question (**any two**) : **10**
   1) Importance of weathering in geomorphology.
   2) Explain the depositional work by wind.
   3) Classify the soil into their major types.

5. Answer the question (**any two**) : **10**
   1) What are the stages of cycle of erosion ?
   2) Describe the various landforms produced by depositional work of river.
   3) Give an account of the formation of soil.

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SLR-N – 47

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
GEOGRAPHY (New) (Paper – IV)
Physical Geography – Oceanography

Day and Date : Monday, 15-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

N.B. *: 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. Choose the correct alternative of rewrite : **10**

1) _____ percent area of the earth is occupied by the oceans.
1) 51 2) 69 3) 71 4) 79

2) The area and height of the earth's surface is represented by _____ curve.
1) hypsographic 2) concave 3) convex 4) uneven

3) Long, narrow and deep valleys located on the continental shelves are known as _____
1) submarine plains 2) submarine trenches
3) submarine canyons 4) ocean deeps

4) The temperature of the sea water _____ with increasing depth.
1) decreases 2) increases
3) never changes 4) remains constant

5) _____ salinity is recorded wear the mouths of major rivers.
1) High 2) Moderate 3) Low 4) Constant

6) The position of the sun, the moon and the earth in a straight line is called as
1) Apogee 2) Syzygy
3) Perigee 4) Equilibrium

P.T.O.

7) Along the coast of South Africa _____ current is present containing cold water.
   1) Falkland 2) Brazil 3) Canary 4) Benguela

8) _____ is a term used for the tropical cyclones of Caribbean sea.
   1) Hurricane 2) Typhoon 3) Tornado 4) Depression

9) A coral polyp can grow only in _____ oceanic water.
   1) deep 2) shallow 3) estuarine 4) tidal

10) _____ current flows from the bearing strait of pacific ocean in Southerly direction.
   1) Peru 2) Benguela 3) Kurosio 4) Kurile

2. Write answers of **any five** questions : **10**
   1) What is a continental slope ?
   2) Define the term 'salinity'.
   3) What is a photic zone ?
   4) What is a 'Port' ?
   5) Give names of any two cold currents.
   6) What is a 'Spring Tide' ?

3. 1) Answer **any two** questions : **6**
      1) Describe the special character of 'Dead Sea'.
      2) State the types of ocean deposits.
      3) State the importance of harbours.
   2) Draw a neat diagram of 'Neap Tide'. **4**

4. Answer **any two** questions : **10**
   1) Describe the ocean currents of North Atlantic Ocean.
   2) Write in short the ocean deeps and trenches.
   3) Write in brief the vertical distribution of temperature of oceans.

5. Write short answers of **any two** questions : **10**
   1) Describe the importance of oceanography.
   2) Explain the 'Neap Tides'.
   3) State the Daly's theory of coral reef formation.

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SLR-N – 48

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
STATISTICS (New) (Paper – III)
Descriptive Statistics – II

Day and Date : Tuesday, 16-12-2014 Max. Marks : 50

Time : 11.00 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 correct alternative : **10**

1) Given (AB) = 75, (Aβ) = 5, (αB) = 23 and ($\alpha\beta$) = 10. Then the value of Q is
   a) zero b) positive
   c) negative d) none of these

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

3) In Paasche's price index, _____ is used as a weight.
   a) Quantity in base year
   b) Quantity in current year
   c) Price in base year
   d) Price in current year

4) The index number of base year is always taken as
   a) 100 b) 0 c) 1 d) none of these

5) The number of ultimate class frequencies for two attributes are
   a) 2 b) 4
   c) 6 d) none of these

6) If line of regression of Y on X is 8x – 10y + 66 = 0 then by x will be
   a) 0.8 b) 1.25
   c) 6.6 d) none of these

P.T.O.

7) The correlation between day temperature and sale of woolen garments is
   a) positive b) zero
   c) negative d) cannot be determined

8) Arithmetic mean of regression co-efficients is _____ the correlation co-efficient (r).
   a) $\geq$ b) $\leq$ c) = d) $\neq$

9) The value of cov (X, Y)
   a) may be negative
   b) is equal to cov (Y, X)
   c) is equal to zero when all y's are constant
   d) all of the above

10) If $\sum D^2 = 0$, where D is the difference of the ranks then the correlation between the two variables is
   a) perfect positive b) perfect negative
   c) zero d) none of these

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

i) In dichotomy with n attributes, show that the total number of classes of all order is 3^n.

ii) Show that the correlation co-efficient and the regression co-efficients have the same algebraic signs.

iii) Obtain the expression for Var (aX + bY) in terms of variances and correlations.

iv) Define Fisher's price and quantity index numbers.

v) What are the conditions of consistency for two attributes A and B ?

vi) State the expression for the acute angle between two regression lines and discuss the case when r = 0.

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

i) Prove that Fisher's price index lies between Laspeyre's and Paasche's indices.

ii) State the properties of regression co-efficients and prove any one of them.

iii) Describe scatter diagram and explain how it is used to measure correlation.

B) Define Yule's co-efficient of association and the co-efficient of colligation. Obtain the relation between them. **4**

4. Answer **any two** of the following : **10**

   i) Show that correlation co-efficient (r) is independent of change of origin and scale.

   ii) What is factor reversal test of consistency ? Verify the same for Fisher's index number.

   iii) Define the terms : (a) An attribute (b) Order of a class (c) Positive and negative class frequency and (d) Ultimate class frequency.

5. Answer **any one** of the following : **10**

   i) Derive the Spearman's rank formula for without ties. Explain how it is modified in case of ties.

   ii) Why there are two regression lines ? Derive the expression for regression line of Y on X using least square principle.

SLR-N – 53

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
Paper – III : BOTANY (New)
Gymnosperms and Angiosperms

Day and Date : Thursday, 18-12-2014 Max.Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 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) Needle like leaves are present in

a) Gnetum b) Pinus c) Cycas d) None of these

2) _____ obtained from Pinus.

a) Canada balsam b) Resin

c) Starch d) Alcohol

3) International code of botanical nomenclature consists _____ principles.

a) One b) Two c) Three d) Six

4) _____ is absent in Gymnosperms.

a) Trachieds b) Ovule c) Ovary d) Megasporophyll

5) _____ is a type of simple fruits.

a) Schizocarpic b) Etario of berries

c) Etario of follicles d) Eterio of achenes

6) _____ is a type of racemose inflorescence.

a) Spike b) Cyathium

c) Hypanthium d) None of these

7) Presence of _____ is a salient feature of angiosperms.

a) Vessels b) Nucellus c) Egg cells d) Phloem

8) In Bentham and Hooker's system the class dicotyledons is divided into _____ subclasses.

a) one b) two c) three d) four

9) _____ is an essential whort of flower.

a) Calyx b) Carolla c) Perianth d) Androecium

10) Companulate corolla is present in family

a) Annonaceae b) Amaryllidaceae

c) Caesalpinaceae d) Convolvulaceae

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

1) List the floral parts of complete flower.

2) Two demerits of Bentham and Hooker's System.

3) Two salient features of Angiosperms.

4) What is holotype ?

5) Two economic importance of Annonaceae.

6) What is floral formula ?

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

1) What is inflorescence ? Add a note on cymose type of inflorescences.

2) Give an account of economic importance of gymnosperms.

3) List the six principles of ICBN.

B) Give an account of vegetative and floral characters of Annonaceae. **4**

4. Answer **any two** of the following : **10**

1) Explain in brief the structure of cycas megasporophyll with suitable diagram.

2) Write an outline of Bentham and Hooker's system of classification.

3) What is flower ? Give an account of incomplete flower with suitable example.

5. Answer **any one** of the following : **10**

1) What is fruit ? Give an account of simple fruits and composite fruits with suitable example.

2) Write an outline of Sporne's system of classification of gymnosperms.

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SLR-N – 55

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
BOTANY (Paper – IV) (New)
Cell Biology, Genetics and Plant Biotechnology

Day and Date : Friday, 19-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw **neat** labelled diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*

1. Rewrite the following sentences by choosing the correct alternative : **10**

1) The shortest and thickest chromosomes are seen during
   a) Interphase b) Prophase
   c) Metaphase d) Telophase

2) In plants the healing of wounds is done by _____ cell division.
   a) Meiotic b) Reduction
   c) Mitotic d) Amitotic

3) The enzymes responsible for triglyceride metabolism are present in
   a) Peroxisomes b) Glyoxysomes c) Mitochondria d) Chloroplasts

4) In sclerenchyma cells, the secondary wall gets thickened with
   a) Cellulose b) Chitin
   c) Pectin d) Lignin

5) Fluid-mosaic submit model is suggested by
   a) Singer-Nicholson b) Singer-Robertson
   c) Singer-Devson d) Singer-Wilson

6) Mendel performed experiments on
   a) Pigeon-pea b) Cow-pea c) Garden-pea d) Chick-pea

7) The recombination of characters in dihybrid cross is related to
   a) Law of dominance b) Incomplete dominance
   c) Co-dominance d) Independent assortment

8) 13 : 3 is the ratio of _____ interaction.
   a) Complementary genes b) Supplementary genes
   c) Inhibitory genes d) Dominant genes

9) _____ is used as solidifying agent in plant tissue culture medium.
   a) Agar-agar b) Sucrose c) Manitol d) Sodium alginate

10) In tissue culture, the ex-plant is sterilised by
   a) Autoclave b) u-v rays
   c) $HgCl_2$ (Mercuric chloride) d) Hot air oven

2. Answer **any five** of the following : **10**
   i) Write about origin of cell wall in plants.
   ii) Define 'Mitosis'.
   iii) Enlist the functions of cell membrane.
   iv) What is 'genotype' ?
   v) What is "polyhybrid cross" ?
   vi) Define "Biofertilizer".

3. A) Answer **any two** of the following : **6**
   i) Give the functions of peroxisomes.
   ii) What is 'Law of dominance' ? Explain with suitable example.
   iii) Explain metaphase stage with neat labelled diagram.

   B) Solve the given genetic problem. **4**
   When a tall (T) pea plant bearing purple (P) flower is crossed with dwarf (t) pea plant bearing white (p) flower. Find out the phenotypic ratio in F_2 generation.

4. Answer **any two** of the following : **10**
   i) Describe the chemical composition of cell membrane.
   ii) Explain the ultra-structure of mitochondrion with neat labelled diagram.
   iii) Explain the 'law of segregation' with suitable example.

5. Answer **any one** of the following : **10**
   i) Write an essay on Biofertilizer.
   ii) Give the occurrence and explain the structure of chloroplast with neat labelled diagram.

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SLR-N – 57

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PSYCHOLOGY (Paper – III)
General Psychology – II (New)

Day and Date : Saturday, 20-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

1. Multiple choice : **10**

1) _____ was the founder of the functionalist perspective.
   a) William James b) Cannon-Bard
   c) Smit d) Fantz

2) The trait theories are typically more interested in _____ descriptions.
   a) Personality b) Social
   c) Emotional d) Mental

3) Neuroticism refers to _____ instability or stability.
   a) emotional b) psychological
   c) physical d) mental

4) Freud believed that the mind was divided into _____ parts.
   a) 3 b) 6 c) 9 d) 12

5) The approach to the study of motivation is based on the work of _____
   a) Maslow b) Cannon
   c) Bard d) James

6) The _____ changes that takes place in the brain when a memory is formed is called the engram.
   a) Physical b) Social
   c) Psychological d) Mental

7) When newer information interferes with retrieval of older information this is called _____
   a) retroactive interference b) forgetting
   c) recall d) memory

P.T.O.

8) A _____ is some physical change in the brain.
   a) Memory trace b) Forgetting
   c) Emotion d) motivation

9) _____ memory is very useful when a person wants to have meaningful conversations with others.
   a) Echoic b) Short term
   c) Chunking d) Iconic

10) _____ was one of the first researchers to study forgetting.
   a) Ebbinghaus b) Freud c) Dove d) Buck

2. Answer the following **(any five)**: **10**
   1) Define memory.
   2) Define motivation.
   3) What is intelligence ?
   4) What is serial possion effect ?
   5) Define emotion.
   6) What is creative intelligence ?

3. A) Answer the following **(any two)**: **6**
   1) Explain Binet's mental ability test.
   2) Explain memory of trace decay theory.
   3) Explain Instinct approach.

   B) Explain James-Lange theory. **4**

4. Answer the following **(any two)**: **10**
   1) Explain psychosexual stages.
   2) Explain Maslow's theory of Hierarchy.
   3) Explain the three processes of memory.

5. Answer the following **(any two)**: **10**
   1) Discuss on theories of Intelligence.
   2) What are drive-reduction approaches to motivation ?
   3) Discuss on Trait theories of personality.

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SLR-N – 59

Seat No.	

B.Sc. I (Semester – II) Examination, 2014
MICROBIOLOGY (New)
Microbial Physiology (Paper – III)

Day and Date : Saturday, 20-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicates **full** marks.*

1. Rewrite the following sentences by selecting correct answers from given alternatives : **10**

i) _____ is simple enzyme.
a) Pepsin b) Protease c) Peptidase d) Phosphatase

ii) _____ is soluble RNA.
a) mRNA b) rRNA c) 16 srRNA d) tRNA

iii) Bacteria are physiological young and biologicaly active in _____ phase of growth.
a) lag b) positive accelerated
c) logarithmic d) maximum stationary

iv) Oligosaccharide contain _____ sugar units.
a) 2 b) 3 c) 4 d) 2 to 9

v) _____ is main reducing power generated in EMP pathway.
a) $FMNH_2$ b) $FADH_2$ c) $NADH_2$ d) FMN

vi) _____ enzyme is produced by bacteria to enter the walls of RBCs.
a) Lecithinase b) Penicillinase c) Amylase d) Coagulase

vii) _____ proposed clover leaf model of tRMA.
a) Holley b) Watson c) Richard d) Nicolson

viii) In poly peptide chain amino acids are linked by _____ bond.
a) ester b) ether c) peptide d) hydrogen

P.T.O.

ix) β-pleated sheet is _____ form of protein structure.

a) primary b) secondary c) tertiary d) quaternary

x) _____ enzyme involved in conversion of pyruvate to acetyl COA.

a) pyruvate carboxylase b) pyruvate dehydrogenase

c) pyruvate oxidase d) pyruvate kinase

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

i) Define anabolic and catabolic reactions.

ii) What are lithotrophs ?

iii) What is coenzyme give example.

iv) What is commensalism ?

v) Give role of NaCl.

vi) Explain lag phase.

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

i) Quaternary structure of proteins.

ii) Intracellular and extracellular enzymes.

iii) Role of blood in blood agar.

B) Write in detail on Ruminant synbiosis. **4**

4. Answer **any two** of the following : **10**

i) Write on EMP pathway.

ii) List common components of media and their functions.

iii) Write on root modulation.

5. Answer **any two** of the following : **10**

i) Give an account of classification of bacteria on the basis of energy and carbon sources.

ii) Write in brief on TCA cycle.

iii) Write on homo and heteropolysaccharides with one example each.

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SLR-N – 61

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PSYCHOLOGY (Paper – IV)
Human Development – II (New)

Day and Date : Monday, 22-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

1. Multiple choice : **10**

1) Body fat tends to increase in
   a) middle adulthood b) middle age
   c) old age d) young age

2) Interest in _____ remains fairly high for many people in middle adulthood.
   a) sex b) emotions
   c) motivation d) mind

3) The frequency of _____ intercourse declines with age.
   a) sexual b) social
   c) psychological d) mental

4) _____ is one of the most frequent chronic disorders.
   a) Hypertension b) Phobia
   c) Schizophrenia d) Depression

5) The male climacteric is the period of _____ and psychological change in the reproductivity system.
   a) physical b) social
   c) educational d) mental

6) Drawing conclusions about age-related changes in _____ is challenging.
   a) intelligence b) motivation
   c) emotion d) stress

7) To recall information, people often use schemas organized bodies of information stored in
   a) memory b) body
   c) mind d) emotion

8) _____ characterized mid life as a period of generativity versus stagnation.
   a) Erik Erikson b) Rosen
   c) Riley d) Smit. F.

9) _____ satisfaction is related to general marital satisfaction.
   a) Sexual b) Social
   c) Mental d) Educational

10) The care of aging parents can be _____ tricky.
   a) psychologically b) sociologically
   c) mentally d) physically

2. Answer the following (**any five**) : **10**
   1) Explain the term of Ageism.
   2) Give the term of Alzheimer's disease.
   3) How to suggests continuity theory ?
   4) Give the term of Telomere theory.
   5) Give the only titles of types of memory.
   6) Give the 'Big five' personality traits only names or titles.

3. A) Answer the following (**any two**) : **6**
      1) Explain the ups and downs of marriage.
      2) Explain the common physical disorders.
      3) Discuss on the throat of cancer.
   B) Discuss on sexuality in old age : use it or lose it. **4**

4. Answer the following (**any two**) : **10**
   1) Explain continuity and change in personality during late adulthood.
   2) Explain crystallized and fluid intelligence.
   3) Explain the ongoing sexuality of middle age.

5. Answer the following (**any two**) : **10**
   1) Discuss on coronary heart disease.
   2) Discuss on Erikson's stage of generativity versus stagnation.

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SLR-N – 63

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MICROBIOLOGY (Paper – IV) (New)
Applied Microbiology – I

Day and Date : Monday, 22-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicates **full** marks.*

1. Rewrite the following sentences by selecting correct answers from given alternatives : **10**

1) Glucose phosphate broth is used for _____ test.
   a) Indole b) Methyl Red
   c) MPN d) Citrate utilization

2) _____ is an example of semiperishable food.
   a) Potato b) Meat c) Bread d) Sugar

3) _____ used for quantitative analysis of water.
   a) MBRT b) IMViC c) MPN d) BOD

4) Droplets are larger than _____ mm in diameter.
   a) 0.1 b) 1 c) 5 d) 0.5

5) _____ is an example of food infection.
   a) Botalism b) Rabies c) Clostridial d) Salmonellosis

6) _____ does not show symptoms of disease but transmits the diseases.
   a) Host b) Carriers c) Patients d) Fomites

7) _____ is used as source of carbon in citrate utilization test.
   a) Na-citrate b) Glucose c) NaCl d) Peptone

8) _____ is used for disinfection of water.
   a) NaCl b) Chlorine c) HCl d) HNO_3

9) E.Coli is used as an indicator of _____ pollution of water.
   a) Nonfecal b) Chemical c) Fecal d) Industrial

10) Respiratory tract infections are transmitted by
   a) Water b) Food c) Soil d) Air

2. Answer on short **any five** of the following : **10**
   i) Define infectious dust
   ii) What are the inorganic substances in soil ?
   iii) Give the sources of microorganisms in water.
   iv) What is food poisoning ?
   v) Define epidemiology.
   vi) What are the endemic diseases ?

3. A) Answer **any two** of the following : **6**
   i) Bead bubler's method for air examination.
   ii) IMViC test.
   iii) Preservation of food by high temperature.

   B) Describe the municipal water purification. **4**

4. Answer **any two** of the following : **10**
   1) Types of diseases.
   2) Fecal pollution of water
   3) Describe various types of microorganisms in soil.

5. Describe **any one** of the following : **10**
   1) Describe various sources of contamination of milk.
   2) Describe the various modes of disease transmission and explain the preventive measures.

SLR-N – 65

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
CHEMISTRY (Old)
Paper – III : Organic Chemistry

Day and Date : Thursday, 11-12-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 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**

1) Dehydration of alcohol is an example of
   a) Addition reaction b) Elimination reaction
   c) Substitution reaction d) Rearrangement reaction

2) The optically active isomers which are not mirror images of each other are known as
   a) Enantiomers b) Diastereoisomers
   c) Mesomers d) None of these

3) The general formula for cyclo alkane is
   a) C_nH_{2n+2} b) C_nH_{2n} c) C_nH_{2n-2} d) None of these

4) Propyne on polymerisation gives
   a) Ethyl benzene b) Benzene
   c) Mesitylene d) Propyl benzene

5) The C – C – C bond angle in benzene is
   a) 120° b) 180° c) 45° d) 60°

6) The hybridization of carbon involved in acetylene is
   a) SP^2 b) SP^3 c) SP d) None of these

7) Anti-Markownikoff's addition of HBr is not observed in
   a) Propene b) 1-butene c) But-2-ene d) Pent-2-ene

P.T.O.

8) Methane is a _____ molecule.
   a) Planar b) Linear c) Tetrahedral d) None of these

9) An organic compound carries three dissimilar chiral carbons so the number of optical isomers are
   a) Nine b) Eight c) Six d) Four

10) Nucleophiles are
   a) Electron laving b) Nucleus laving
   c) Nucleus hating d) None of these

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

i) What are alkynes ? Give the general formula of alkynes.

ii) State Huckel's rule. Explain it with respect to Naphthalene.

iii) Write various resonating structure of phenol.

iv) Define (a) Bond length (b) Bond Energy.

v) Explain the term : (i) Non-aromatic (ii) Anti-aromatic.

vi) What is Halogenation ? Give suitable examples.

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

i) Define and explain Homolytis and Heterolytic bond fission.

ii) Explain the ozonolysis of ethylene.

iii) Explain hyperconjugation effect w.r.t. toluene.

B) Discuss optical isomerism in Tartaric acid. **4**

4. Answer **any two** of the following : **10**

i) What are dienes ? Describe different types of dienes with suitable examples.

ii) How will you prepare alkane by
   a) Kolbe's reaction b) Corey-House reaction

iii) Explain the steric effect w.r.t. mesitoic acid.

5. Answer **any two** of the following : **10**

i) What are reactive intermediates ? Define the term :
   a) Free radical b) Carbocation c) Carbene d) Nitrene

ii) Discuss mechanism of nitration of Benzene.

iii) Write note on elements of symmetry.

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SLR-N – 67

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
CHEMISTRY (Paper – IV) (Old)
Analytical Chemistry

Day and Date : Friday, 12-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *and* ***labelled*** *diagrams.*
3) Figures to the right indicate ***full*** *marks.*
4) 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) Viscosity of a liquid _____ with increasing temperature.
   a) Increases b) Decreases
   c) Remains constant d) None of these

2) Rise of a liquid in a capillary tube is due to
   a) Osmosis b) Surface tension
   c) Viscosity d) Diffusion

3) The distribution coefficient K is valid in case of
   a) C_1/C_2 b) $C_1/\sqrt{C_2}$ c) $C_1/C_2(1-\alpha)$ d) None of these

4) For easy and quick separation the extracting solvent should have _____ value of K in its favour.
   a) Large b) Small
   c) Constant d) None of these

5) _____ is defined as variability among the replicate measurements.
   a) Error b) Accuracy
   c) Precision d) None of these

P.T.O.

6) The purple coloured complex formed in the detection of sulphur is
   a) $Na_4[Fe(CN)_5ONS]$ b) $Fe[Na_4(CN)_5ONS]$
   c) $Fe_4[S(CN)_6]_3$ d) None of these

7) Carius method is used for the estimation of
   a) Sulphur b) Halogen c) Both a and b d) Nitrogen

8) COD is expressed in
   a) g/L b) Kg/L c) g/dm^3 d) mg/dm^3

9) The maximum percentage of fat and lactose is with _____ milk.
   a) Cow b) Buffalo
   c) Goat d) None of these

10) _____ is a minor essential nutrient for plant.
   a) Nitrogen b) Potassium c) Calcium d) Chlorine

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

   i) What is green house effect ?

   ii) What is adulteration of milk ? Mention any two methods of adulteration of milk.

   iii) Draw a neat and labelled diagram of Ostwald's viscometer.

   iv) Give the principle of estimation of nitrogen by Kjeldahl's method.

   v) Define mean deviation and standard deviation.

   vi) Draw a neat and labelled diagram of Liebig combustion method for estimation of carbon and hydrogen.

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

   i) What is indeterminate error ?

   ii) Explain determination of molecular weight of an acid by titration method.

   iii) Give the health effects of CO.

   B) Solve the problem. **4**

   Iodine has the same molecular weight in water and carbon tetrachloride. When varying amount of iodine were shaken with water and carbon tetrachloride mixture, the following results were obtained.

C_{H_2O} (gmole/lit)	0.000321	0.000502	0.000762
(C_{CCl_4} (gmole/lit)	0.02736	0.04282	0.06533

   Calculate the partition coefficient of iodine between water and carbon tetrachloride.

4. Answer **any two** of the following : **10**

   i) Describe the drop-weight method for the determination of surface tension.

   ii) What is an antacid ? Give the properties and functions of aluminium phosphate as an antacid.

   iii) 2.59×10^{-4} kg of organic compound gave 1.78×10^{-4} kg of AgCl in Carius method. Find percentage of chlorine in the organic compound.

5. Answer **any two** of the following : **10**

   i) What is coefficient of viscosity ? Give the applications of viscosity measurements.

   ii) What are limitations of distribution law ?

   iii) Give the types of water based on its source, preparation and applications.

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SLR-N – 69

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PHYSICS (Paper – III) (Old)
Classical Thermodynamics

Day and Date : Saturday, 13-12-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

***Instructions**: i) Figures to the **right** indicate **full** marks.*
*ii) **Use** of log table or calculator is **allowed**.*
*iii) **Neat** diagrams should be drawn **wherever** necessary.*
*iv) **All** questions are **compulsory**.*

1. Select correct alternative : **10**

i) For a given reduced temperature for _____ the co-ordinates P and V are same at a given point.
a) All gases b) Light gases c) Heavy gases d) Rare gases

ii) The zeroth law of thermodynamics leads to the definition of the term
a) Pressure b) Volume
c) Temperature d) Pressure and volume

iii) Entropy remains same during _____ process.
a) Isothermal b) Isobaric c) Isochoric d) Adiabatic

iv) For a given thermodynamic system P, V, T and ρ are called the thermodynamic
a) Functions b) Quantities c) Variables d) Constants

v) Temperature of paramagnetic substance _____ due to its adiabatic demagnetisation.
a) Decreases b) Increases
c) Remains constant d) None of the above

vi) The coefficient of self diffusion D is directly proportional to
a) $\eta^{1/2}$ b) η c) η^2 d) η^3

vii) Linde's method of liquefaction of air uses the principle of
a) Joule Thomson effect
b) Regenerative cooling
c) Joule Thomson effect and regenerative cooling
d) Isothermal expansion

P.T.O.

viii) For isothermal process the product of pressure and volume of a gas
a) Decreases b) Remains constant
c) Increases d) Remains zero

ix) Isotherms are the curves plotted at constant _____ of a gas.
a) Pressure b) Volume c) Density d) Temperature

x) In transport phenomenon, diffusion is due to a difference in _____ of a gas.
a) Concentration b) Momentum
c) Mass d) Temperature

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

i) Define critical point and critical temperature.

ii) State the dependance of coefficient of viscosity 'η' on temperature and pressure.

iii) Explain thermodynamic equilibrium.

iv) Show that entropy increases in a free expansion of a gas.

v) Explain the adiabatic process in thermodynamics.

vi) Draw schematic diagram of Linde's method of liquefaction of air.

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

i) State properties of liquid helium.

ii) Determine the thermal conductivity of nitrogen at N.T.P. from the following data. Density of nitrogen at N.T.P. = 1.2 kg/m^3 mean free path = 849.8×10^{-10} m. Average velocity of molecules = 450 m/s. $C_v = 8 \times 10^3$ J/kg. °K.

iii) State three laws of thermodynamics.

B) Derive an expression for the work done in an isothermal change. **4**

4. Answer **any two** of the following : **10**

i) Discuss reversible and irreversible process with suitable example.

ii) What is adiabatic demagnetisation ? Explain in brief experimental set up for adiabtic demagnetisation.

iii) Define mean free path of a gas. Derive an expression for mean free path by mutual collision cross section method.

5. Answer **any one** of the following : **10**

i) Describe the working of Carnot's heat engine and derive expression for its efficiency.

ii) From Vander Waal's equation of state obtain an expression for critical volume, critical temperature and critical pressure in terms of the constants a, b and R.

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SLR-N – 71

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PHYSICS (Paper – IV) (Old)
Electricity, Magnetism and Electronics

Day and Date : Monday, 15-12-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Use of log tables or calculator is ***allowed****.*
4) Neat diagrams must be drawn ***wherever*** *necessary.*

1. Select the correct alternative from the following : **10**

i) In forward biased condition a diode appears as

a) an OFF switch b) a high resistance

c) a capacitor d) an ON switch

ii) Figure of merit for ballistic galvanometer is

a) $\frac{I_g}{\theta}$ b) $\frac{\theta}{I_g}$ c) $I_g\theta$ d) None of these

iii) The current amplification factor in a common base configuration is the ratio

a) $\frac{\Delta I_E}{\Delta I_B}$ b) $\frac{\Delta I_B}{\Delta I_C}$ c) $\frac{\Delta I_C}{\Delta I_E}$ d) $\frac{\Delta I_E}{\Delta I_C}$

iv) In purely inductive circuit, the phase of the alternating current over the applied emf is

a) lagging by $\frac{\pi}{2}$ b) leading by $\frac{\pi}{2}$

c) lagging by $\frac{\pi}{4}$ d) leading by $\frac{\pi}{4}$

P.T.O.

v) The operator j turns a vector through 90° on
   a) addition b) subtraction
   c) multiplication d) division

vi) The cut-in voltage for silicon diode is about
   a) 0.3 V b) 0.7 V c) 1.5 V d) 0.1 V

vii) The _____ of a transistor is heavily doped.
   a) base b) collector
   c) emitter d) base and emitter

viii) The reciprocal of the power factor cos θ is known as
   a) Multiplication factor b) Voltage factor
   c) Quality factor d) AC factor

ix) Filter circuit removes _____ component of rectifier output.
   a) dc b) ac
   c) both dc and ac d) neither ac nor dc

x) Unit of voltage sensitivity of ballistic galvanometer is
   a) mm/μv b) mm/μc c) μv/mm d) μv/μA

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

i) Draw a positive clipper circuit with input and output waveforms.

ii) What is the principle of ballistic galvanometer ?

iii) Compare the CE and CB configuration of transistor.

iv) What do you mean by (a) rectifier (b) ripple factor ?

v) What is time constant of LR circuit and how growth and decay of current is represented graphically in L-R circuit ?

vi) Define the terms (a) Impedance (b) Admittance.

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

i) Obtain the relation between current amplification factors α and β.

ii) Define the terms (a) Figure of merit (b) Current sensitivity (c) Voltage sensitivity, in case of ballistic galvanometer.

iii) What is a zener diode ? Explain zener breakdown with typical characteristics of zener diode.

B) A series LCR circuit consists of a capacitance of reactance 100 Ω and a coil having resistance of 60 Ω and inductive reactance of 180 Ω. The combination is connected across a 500 V, 50 Hz source. Calculate the current in the circuit. **4**

4. Answer **any two** of the following : **10**

i) Explain transistor as an amplifier in CE mode.

ii) What is damping ? How damping correction is achieved ?

iii) Explain Owen's bridge to determine self inductance of a coil.

5. Answer **any one** of the following : **10**

i) Show that the growth of charge in LC circuit connected to a steady e.m.f. is oscillatory.

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

SLR-N – 75

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
STATISTICS (Paper – IV) (Old)
Probability and Probability Distributions – II

Day and Date : Wednesday, 17-12-2014 Total Marks : 50

Time : 11.00 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 : **10**

i) If E (X) = 5 and V (X) = 6 then E (X + 5) is
a) 11 b) 10 c) 5 d) 6

ii) pgf of r.v. is (0.7 + 0.3 × 5) then the r.v. is
a) Bernoulli b) Two point
c) Bernoulli with parameter 0.3 d) Bernoulli with parameter 0.7

iii) If X and Y are two independent random variables then
a) E (X + Y) = K, K is a constant b) E (X + Y) = 0
c) E (X Y) = E (X) . E (Y) d) None of these

iv) For binomial random variable with parameters n and p the mean number of success is
a) $\frac{p}{n}$ b) $\frac{X}{n}$ c) np d) npq

v) Pgf of one point r.v. which takes value K is
a) S b) S^K
c) KS d) None of these

vi) If X is a r.v. with mean m then V (X – m) =
a) 0 b) m c) V(X) d) X – m

vii) _____ moment is always zero.
a) First central b) First raw
c) First factorial d) None of these

P.T.O.

viii) If cov (X, Y) = 0 then
a) They are uncorrelated b) They are independent
c) They are equally distributed d) None of these

ix) A random sample of 5 lucky winners are to be selected from a group of 10 ladies and 15 men using simple random sampling without replacement. The number of ladies lucky winners will follow
a) Hypergeometric distribution b) Two point distribution
c) Binomial distribution d) Uniform distribution

x) If X is a discrete r.v. and a, b are real constants then V (aX + b) =
a) aV(X) b) a^2 V(X) c) aV (X)+ b d) 0

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

i) Let X be a discrete r.v. with pmf $P(x) = \begin{matrix} \frac{X}{15} & \text{for } X = 1, 2, 3, 4, 5 \\ 0 & \text{otherwise} \end{matrix}$. Find E (X).

ii) Define probability generating function of a r.v. X.

iii) Prove that Expectation of a constant is a constant.

iv) State addition theorem of bivariate r.v. (X, Y).

v) Find marginal pmf of X for the following bivariate probability distribution of (X, Y)

X \ Y	0	1	2
1	0.1	0.2	0.3
2	0.1	0.1	0.2

vi) Obtain mean of one point distribution.

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

i) The joint pmf of (X, Y) is given by $P(x, y) = \begin{matrix} \frac{1}{4} & x = 0, 1 \\ & y = 1, 2 \\ 0 & \text{otherwise} \end{matrix}$;

Discuss independence of X and Y.

ii) Show that pgf of sum of two independent r.vS is the product of their pgf's.

iii) Obtain mean of hypergeometric distribution.

B) Let X be a r.v. with following pmf. **4**

X	0	1	2	3
P (x)	0.1	0.3	0.4	0.2

Find E (X) and V (X).

4. Attempt **any two** of the following : **10**

i) Obtain pgf of Binomial distribution hence obtain it's mean.

ii) The joint pmf of (X, Y) is given by $P(x, y) = K(x + y) \quad x = 1, 2, 3 \quad y = 1, 2$

a) Find K

b) Find conditional pmf of X given Y = 2.

iii) Prove that

a) E (aX) = a E (X)

b) E (X + K) = E (X) + K

5. Attempt **any two** of the following : **10**

i) Define discrete uniform distribution and obtain it's mean and variance.

ii) The joint pmf of (X, Y) is

P(x, y) =

X \ Y	1	2
0	$\frac{1}{3}$	0
1	$\frac{1}{3}$	$\frac{1}{3}$

Find correlation coefficient of (X, Y).

iii) Find recurrence relation for Binomial probabilities.

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SLR-N – 76

Seat No.	

B.Sc. Part – I (Semester – II) Examination, 2014
ZOOLOGY (Paper – IV) (Old)
Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Wednesday, 17-12-2014 Max. Marks : 50

Time : 3.00 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 diagrams **wherever** necessary.*

1. Complete the sentence selecting appropriate answer : **10**

i) The process of community change is called _____
   a) Ecological regression b) Ecological depression
   c) Ecological progression d) Ecological succession

ii) The decomposers are also called as _____
   a) Microconsumers b) Macroconsumers
   c) Microorganisms d) Macroorganisms

iii) The network of food in a trophical level is called as _____
   a) Food chain b) Food net c) Food web d) Food well

iv) The ecological pyramid is always in _____ direction.
   a) Upward b) Downward c) Horizontal d) Longitudinal

v) In honey bees an exchange of food between one insect to another is called as _____
   a) Trophallaxis b) Topophallaxis
   c) Exchange d) Galaxophallaxis

vi) _____ is commonest species of vermiculture.
   a) Pheretima postoma b) Eisenia foetida
   c) Edrilus d) Pheretima Indica

P.T.O.

vii) The study of fossil is called as _____

a) Palaentology b) Litoentology
c) Osteoentology d) Paleogeography

viii) Over population and over crowding in the colonies of bees is avoided by _____ habit.

a) warming b) migration c) swarming d) group forming

ix) _____ is considered as a social insect.

a) Honey bee b) Cockroach c) Silkmoth d) Housefly

x) The culture of earthworm is called _____

a) sericulture b) apiculture c) vermiculture d) silviculture

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

I) Fossils

II) Beewax

III) Mimicry

IV) Aim of Ecology

V) Biosphere

VI) Swarming in honey bees.

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

I) Describe the vestigial organs

II) Give an account of food chain

III) Write a note on vermiwash.

B) Give an account of biotic factors of an ecosystem. **4**

4. Answer **any two** of the following : **10**

I) Describe the energy flow in ecosystem.

II) Describe the phenomenon of camouflage with suitable example.

III) What is apiculture ? Describe the different castes of honey bees of a colony.

5. Answer **any one** of the following : **10**

I) Describe the structural and functional components of a pond ecosystem.

II) What is vermiculture ? Describe the different steps which are practicing in Indian vermiculture.

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SLR-N – 77

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MATHEMATICS (Paper – III) (Old)
Geometry

Day and Date : Thursday, 18-12-2014 Total Marks : 50

Time : 11.00 a.m. to 1.00 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) The angle between the lines whose direction ratios are (5, –12, 13) and (–3, 4, 5) is

a) $\sin^{-1}\left(\frac{1}{65}\right)$ b) $\cos^{-1}\left(\frac{1}{63}\right)$

c) $\cos^{-1}\left(\frac{1}{65}\right)$ d) None of these

2) If a line L makes an angle 60° with X-axis and 30° with Y-axis then it makes _____ angle with Z-axis.

a) 30° b) 45°

c) 0° d) 90°

3) The distance of the plane $2x - 6y + 3z - 28 = 0$ from the origin is

a) 3 b) 5

c) 4 d) 6

4) The angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$ is

a) $\frac{\pi}{6}$ b) $\frac{\pi}{3}$

c) $\frac{\pi}{4}$ d) $\frac{\pi}{2}$

5) The line $\frac{x-1}{1} = \frac{y+2}{-2} = \frac{z-3}{2}$ meets the plane $x + 2y + 3z - 9 = 0$ at the point

a) (1, –4, 5) b) (2, –4, 5)

c) (–2, 4, 5) d) (2, 4, –5)

6) The equation of line through two points (–1, 2, 3) and (–2, 3, –6) are

a) $\frac{x+1}{1} = \frac{y-2}{-1} = \frac{z-3}{9}$ b) $\frac{x+1}{1} = \frac{y+2}{-1} = \frac{z-3}{9}$

c) $\frac{x+1}{1} = \frac{y-2}{1} = \frac{z-3}{9}$ d) None of these

7) The radius of the sphere $x^2 + y^2 + z^2 + 2x - 4y - 6z + 5 = 0$ is

a) 2 b) 3

c) 4 d) 5

8) The centre of the sphere $2x^2 + 2y^2 + 2z^2 - 2x + 4y + 2z + 3 = 0$ is

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

c) $\left(\frac{1}{2}, 1, -\frac{1}{2}\right)$ d) $\left(\frac{1}{2}, -1, -\frac{1}{2}\right)$

9) The equation of sphere with given diameter whose extremities are (4, 8, –3) and (–2, 3, 5) is

a) $x^2 + y^2 + z^2 + 2x + 11y + 2z + 1 = 0$

b) $x^2 + y^2 + z^2 + 2x - 11y + 2z + 2 = 0$

c) $x^2 + y^2 + z^2 - 2x - 11y - 2z + 1 = 0$

d) None of these

10) The Locus of Points whose Powers with respect to given two spheres are equal is a

a) sphere b) line

c) plane d) circle

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

1) Find the equation of a plane passing through three points P(3, 4, 2), Q(4, 6, 5), R(8, 2, 9)

2) Show that the equation of plane passing through a point $P(x_1, y_1, z_1)$ and perpendicular to a line with direction ratio A, B, C is

$A(x - x_1) + B(y - y_1) + C(z - z_1) = 0.$

3) What is the symmetric form of the equation of a line passing through $A(x_1, y_1, z_1)$ and having direction cosines l, m, n.

4) Find the direction cosines of the following lines $4x + 5y + 6z = 11$ and $5x + 7y + 9z = 17$.

5) Obtain the diameter form of the sphere, line segment joining the points $A(x_1, y_1, z_1)$ and $B(x_2, y_2, z_2)$.

6) Find the radius and the centre of the sphere $x^2 + y^2 + z^2 - 2x + 4y - 6z = 11$.

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

1) Find the equation of the plane through two points (2, 2, 1) and (9, 3, 6) and perpendicular to the plane $2x + 6y + 6z = 9$.

2) Find the symmetric form of the equations of the line $x + y + 2z = 3$ and $2x + 3y - z + 4 = 0$.

3) Show that the plane $Ax + By + Cz = D$ touches the sphere $x^2 + y^2 + z^2 + 2ux + 2vy + d = 0$ is $(Au + Bv + Cw + D)^2 = (A^2 + B^2 + C^2)(u^2 + v^2 + w^2 - d)$.

B) Prove that the straight line $\frac{x+1}{4} = \frac{y-2}{1} = \frac{z-2}{1}$ touches the sphere $x^2 + y^2 + z^2 = 9$. Find the point of contract.

4. Attempt **any two** from the following : **10**

1) Find the equation of the sphere for which the circle $x^2 + y^2 + z^2 + 7y - 2z + 2 = 0$ and $2x + 3y + 4z = 8$ is a great circle.

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

3) Show that the line $\frac{x-2}{3} = \frac{y-1}{-4} = \frac{z+2}{1}$ intersects the line $x + 2y + 3z + 6 = 0$ and $2x + 4y + 3z + 12 = 0$. Find the point of intersection.

5. Attempt **any two** from the following : **10**

1) Show that the general equation of the first degree in x, y, z represents a plane.

2) Show that the lines $\frac{x+3}{2} = \frac{y+5}{3} = \frac{z-7}{-3}$ and $\frac{x+1}{4} = \frac{y+1}{5} = \frac{z+1}{-1}$ are coplanar and find the equation of the plane containing them.

3) Obtain the equation of tangent plane at point $P(x_1, y_1, z_1)$ to the sphere $x^2 + y^2 + z^2 = a^2$.

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SLR-N – 80

Seat No.	

B.Sc. Part – I (Semester – II) Examination, 2014
BOTANY (Paper – IV)
Cell Biology and Plant Biotechnology (Old)

Day and Date : Friday, 19-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

Instructions *: i) Figures to the* ***right*** *indicate* ***full*** *marks.*
ii) Draw ***neat*** *labelled diagrams* ***wherever*** *necessary.*

1. Rewrite the sentence by choosing proper answer : **10**

i) _____ is the basic unit of life.
a) Organ b) Cell c) Tissue d) Nucleus

ii) _____ is eukaryotic organism.
a) PPLO b) Bacterium
c) Blue green algae d) Higher plant

iii) _____ was first discovered and named by Robert Brown in 1833.
a) Nucleus b) Nucleolus
c) Neucleoplasm d) Cell

iv) Which of the following metallic ion joins two subunits of the ribosome ?
a) Mg^{++} b) Ca^{++}
c) Fe^{+++} d) K^{+}

v) Golgi apparatus is not found in _____
a) Mycoplasma b) Angiosperms
c) Spirogyra d) Mucor

vi) _____ is related with hydrogen peroxide metabolism.
a) Mitochondrion b) Chloroplast
c) Peroxisome d) Glyoxysome

vii) The cells of plant tissues are cemented by _____
a) Tertiary cell wall b) Middle lamella
c) Cell membrane d) Secondary cell wall

P.T.O.

viii) _____ suggested fluid mosaic model of biological membranes.
a) Danielli and Davson b) Harvey
c) Danielli and Harvey d) Singer and Nicolson

ix) _____ is a multi disciplinary science.
a) Chemistry b) Botany
c) Physics d) Biotechnology

x) Rhizobium inhabits _____ of leguminious plant.
a) Roots b) Root nodules
c) Leaf tubercles d) Stem knots

2. Answer **any five** of the following : **10**
i) Define prokaryotic cell.
ii) What is mitosis ? Mention about the position of chromosomes during metaphase ?
iii) Draw neat and labelled diagram of nuclear pore complex.
iv) Enlist various histones present in chromosomes.
v) Mention any two functions of golgi apparatus.
vi) What is meant by 70 S and 80 S ribosomes ?

3. A) Answer **any two** of the following : **6**
i) Draw well labelled diagram of Singer and Nicoloson's Fluid-Mosaic model of membrane.
ii) What is cell wall ? Describe the chemical composition of cell wall.
iii) Write in brief about multidisciplinary nature of Biotechnology.

B) What are microbodies ? Describe the functions of glyoxysome. **4**

4. Answer **any two** of the following : **10**
i) What is the significance of mitosis ?
ii) Define tissue culture. Explain in brief the general technique of tissue culture.
iii) What is the role of Rhizobium in increasing the soil fertility ?

5. Write short notes on **any two** of the following : **10**
i) Blue Green Algae (BGA) as biofertilizer
ii) Cell cycle and apoptosis
iii) Nucleosome concept and solenoid model.

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SLR-N – 84

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MICROBIOLOGY (Paper – III) (Old)
Microbial Physiology

Day and Date :Saturday, 20-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

1. Multiple choice questions : **10**

1) Aminoacids in the protein are bound by _____ bond.
   a) peptide b) phosphodiester
   c) glycosidic d) ester

2) _____ is an example of polysaccharide.
   a) Glucose b) Starch c) Proteins d) Enzymes

3) In nucleic acids, nucleotides are linked by _____ bond.
   a) phosphodiester b) glycosidic c) hydrogen d) peptide

4) The number of organisms in the culture medium remains constant as the number of cells formed is equal to the number of cells that die, is seen in _____ phase of growth.
   a) Lag b) Log c) Stationary d) Decline

5) E. Coli is an example of _____
   a) chemoautotroph b) chemoheterotroph
   c) photoautotroph d) photoheterotroph

6) _____ is an example of differential medium.
   a) Macconkey's Agar b) Nutrient Agar c) Nutrient Broth d) Peptone water

7) All enzymes are _____ in nature.
   a) Lipids b) Proteins
   c) Polysaccharides d) Carbohydrates

8) In aerobic catabolism of glucose _____ ATP molecules are produced from one acetyl CoA in TCA cycle.
   a) 12 b) 24 c) 8 d) 32

P.T.O.

9) _____ is the type of harmful association.
a) Symbiosis b) Commensalism c) Parasitism d) Mutalism

10) Association of microorganism with rumen animals is an example of _____
a) Symbiosis b) Competition c) Parasitism d) Predation

2. Answer **any five** of the following : **10**
i) Polypeptide structure
ii) Cofactors
iii) Induced Enzymes
iv) ATP-structure
v) Define metabolism.
vi) Role of peptone.

3. A) Answer **any two** of the following : **6**
i) Active site
ii) Chemoorganotrophs
iii) Role of indicator in the culture medium.

B) Write a note on high energy compounds. **4**

4. Answer **any two** of the following : **10**
i) Ruminant symbiosis
ii) Write an account on nutritional requirements of microorganisms.
iii) Write an account on EMP.

5. Answer **any two** of the following : **10**
i) Classification of carbohydrates.
ii) Growth phases of bacteria. Explain.
iii) Classification of bacteria based on carbon and energy source.

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SLR-N – 88

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MICROBIOLOGY (Paper – IV) (Old)
Applied Microbiology – I

Day and Date : Monday, 22-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences by choosing correct alternative : **10**

i) The dust laden with infectious microorganisms is called
   a) aerosol b) air dust
   c) droplets d) infectious dust

ii) _____ is an indicator of faceal pollution.
   a) Salmonella b) Shigella
   c) Streptococcus faecalis d) Vibrio

iii) _____ is used for confirmed test.
   a) EMB agar b) Mac Conkey's agar
   c) Nutrient agar d) Blood agar

iv) Bead bubbler device is used for microbiological examination of
   a) air b) water
   c) soil d) sewage

v) _____ is used as reference table in determining MPN of coliforms.
   a) MacCrady's table b) MacConkey's table
   c) MacCarty's table d) None of these

vi) _____ test is used to check efficiency of pasteurization.
   a) MBRT b) MPN
   c) Eijeckman d) Phosphatase

vii) _____ is a main protein present in milk.
   a) Albumin b) Globulin
   c) Gelatin d) Casein

P.T.O.

viii) Non living objects involved in transmission of diseases are called
a) carriers b) parasites
c) fomites d) vectors

ix) Ability of organism to produce disease is called
a) Pathogenicity b) Virulence
c) Infection d) Poisoning

x) Disease constantly affects small number of people in particular area is called
a) Pandemic b) Epidemic
c) Sporadic d) Endemic

2. Answer the following questions (**any 5**) : **10**
i) Define droplet nuclei.
ii) Confirmed test.
iii) Filtration.
iv) Define B.O.D.
v) Define milk.
vi) Morbidity rate.

3. A) Write in short the following (**any 2**) : **6**
i) Seive device
ii) HTST and LTH
iii) Sources of microorganisms in water.
B) Explain 'municipal water purification process'. **4**

4. Answer the following (**any 2**) : **10**
i) Spoilage of pickles.
ii) Activated sludge process.
iii) MBRT test.

5. Answer the following (**any 2**) : **10**
i) MPN.
ii) Types of diseases.
iii) Preservation of food by high temperation.

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SLR-N – 1

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
ENGLISH (Compulsory) (CGPA Pattern)
'On Track' English Skills for Success

Day and Date : Saturday, 1-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory.***
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Solve ***each*** *Section in* ***separate*** *answer book.*

1. Complete the following statements by choosing the **correct** alternative from these given below **each**. **14**

1) Twenty years ago Jimmy and Bob dined at _____ restaurant.
   a) Big John Bradly's b) Big Joe Brady's
   c) Big Brother's d) Big Boss Brandy's

2) The narrator and Miss Krishna first met at _____
   a) A restaurant b) A mall
   c) An exhibition d) A school

3) Miss Krishna's another name was _____
   a) Maya b) Meena c) Mamata d) Mayuri

4) Mr. Binet was the Psychologist who developed _____
   a) Computer Software b) GK Test
   c) Aptitude Test d) IQ Test

5) Criminal Bob was wanted by _____ police.
   a) Scotland b) Chicago
   c) New York d) Washington

P.T.O.

6) The essay, 'The Myths of Artificial Intelligence' is written by _____
   a) Penrose b) Nargis Dalal
   c) Attila Narin d) Mr. Binet

7) In the poem, Bangle sellers, the speaker is _____
   a) A young unmarried woman b) A married woman
   c) Bangle seller d) A customer

8) The phrase 'like the flame of her marriage' is the _____ used by the poet.
   a) Simile b) Metaphor
   c) Personification d) Alliteration

9) The poem, 'An Irish Airman Foresees His Death' is written by
   a) W. H. Auden b) W. B. Yeats
   c) Robert Brooke d) Alfred Owen

10) My brother is an engineer. The underlined word is a _____ noun.
   a) Proper b) Common
   c) Collective d) Partitive

11) Kalidas is considered as _____ Shakespeare of India.
   a) a b) an c) the d) ⊗ (no article)

12) We went to Mumbai _____ train.
   a) by b) in c) on d) from

13) Meena was angry _____ Maya and spoke harshly to her.
   a) on b) with c) upon d) for

14) By nationality, John is _____ European.
   a) a b) an c) the d) ⊗ (no article)

2. Answer in brief **any seven** of the following questions : **14**

   1) Why did Bob decide to travel to the west ?

   2) Why does Jimmy send another policeman to arrest Bob ?

   3) What is the meaning of the title 'Connoisseur' ?

   4) What does the word 'intelligence' refer to in the English Language ?

   5) What is mean by, 'artificial intelligence' ?

   6) Why did the narrator invite Miss Krishna to stay at her house ?

   7) What types of bangles are carried by the bangle seller ?

   8) What does the Irish airman say about victory or loss in the war ?

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

      1) The relationship between Bob and Jimmy.

      2) Character-sketch of Miss Krishna.

      3) Myths regarding the intelligence of computer.

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

      1) How are the bangle sellers true friends of women ?

      2) What is the image of the bangle sellers at the temple fair ?

      3) What is the Irish airman's attitude towards the war ?

      4) How does the Irish Airman imagine he will die ?

4. Write an essay on 'The Importance of Internet in the recent times'. **14**

   OR

   Write paragraphs of **six** to **eight** sentences on **each** of the following :

   1) Mobile phone – a basic need of life.

   2) Superstitions.

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

The great advantage of early rising is the good start it gives us in our day's work. The early riser has done a large amount of hard work before the other men have got out of bed. In the early morning the mind is fresh, and there are few sounds or other distractions, so that work done at that time is generally well done. In many cases the early riser also finds time to take some exercise in the fresh morning air, and this exercise supplies him with a fund of energy that will last until the evening. By beginning so early, he knows that he has plenty of time to do thoroughly all the work he can be expected to do, and is not tempted to hurry over any part of it. All his work being finished in good time, he has a long interval of rest in the evening before the timely hour when he goes to bed. He goes to sleep several hours before midnight, at the time when sleep is most refreshing, and after a sound night's sleep rises early next morning in good health and spirits for the labours of a new day.

It is very plain that such a life as this is far conducive to health than that of the man who shortens his waking hours by rising late, and so can afford, in the course of the day, little leisure for necessary rest. Any one who lies in bed late, must, if he wishes to do a full day's work, go on working to a correspondingly late hour, and deny himself the hour or two of excercise that he ought to take for the benefit of his health. But, in spite of all his efforts, he will probably not produce as good a result as the early riser, because he misses the best working hours of the day.

SLR-N – 120

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
MICROBIOLOGY (Paper – VI) (New)
Bacterial Genetics

Day and Date : Tuesday, 9-12-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. : *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** answers. **10**

i) Plasmids having very low molecular weight and do not carrying any functional gene are called _____ plasmids.

a) Virulence b) Cryptic
c) Degenerative d) Col

ii) _____ plays an important role in photoreactivation.

a) Methylase b) Endonuclease
c) Exonuclease d) Photolyase

iii) Dimer formation occurs between _____

a) T – T b) C – G c) T – A d) A – G

iv) 5-bromouracil is an analogue of _____ base.

a) Cytosine b) Thymine
c) Guanine d) Adenine

v) The distance between two nucleotides is _____ A° in B form of DNA.

a) 20 b) 10 c) 3.4 d) 34

vi) The right handed double helix structure represents _____ form of DNA.

a) Z b) C c) B d) A

P.T.O.

vii) A split gene starts and ends with

a) Exons b) Recons

c) Mutons d) Introns

viii) There are _____ codons which specify 20 amino acids.

a) 16 b) 61 c) 50 d) 25

ix) Griffith discovered _____

a) Transformation b) Conjugation

c) Transduction d) All of these

x) _____ phage mediate generalized transduction.

a) ϕ 80 b) λ c) T_4 d) P_{22}

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

i) General properties of plasmids.

ii) Dark repair mechanism.

iii) Base analogues.

iv) Interrupted genes.

v) Phenotype and genotype.

vi) Transduction.

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

i) Photoreactivation and excision repair.

ii) Griffith experiment.

iii) Mechanism of mutation by base analogues.

B) Describe in detail the chemical nature and structure of genetic material. **4**

4. Write **any two** of the following : **10**

   i) What is genetic code ? Explain different properties of genetic code.

   ii) What is transduction ? Explain in detail specialized transduction.

   iii) Conjugation.

5. Write **any two** of the following : **10**

   i) Explain in detail the process of bacterial transformation.

   ii) Types of mutation.

   iii) Describe mechanism of mutation caused by hydroxylamine, nitrous acid and alkylating agents.

SLR-N – 170

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
ZOOLOGY (Paper – VIII)
Historology and Physiology

Day and Date : Saturday, 22-11-2014 Total Marks : 50
Time : 3.00 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 **right** indicate **full** marks.*
*4) Write the question **number** attempted in margin.*

1. Select the **appropriate** answer from those given below **each** question and complete the sentences. **10**

1) _____ tissue only originate from the embryonic ectoderm.

a) Epithelial b) Nervous
c) Muscular d) Connective

2) The haversian systems are present in _____ tissue.

a) Epithelial b) Cartilaginous
c) Bony d) Muscular

3) Typically the tooth of mammal is distinguished into _____ parts.

a) Two b) Three c) Four d) Five

4) The muscular coat of the middle one third region of the oesophagus consists of _____ muscle cells.

a) Straited b) Non-straited
c) Smooth d) Mixed

5) The presence of _____ is the characteristic feature of mammalian liver.

a) Hepatic artery b) Hepatic vein
c) Hepatic lobules d) Hepatic ducts

6) The thick striated membrane surrounding the oocyte is called _____

a) Corona radiata b) Zona pellucida

c) Discus proligerous d) Membrane granulosa

7) ACTH is secreted by _____ cells of the adenohypophysis.

a) Chromophobe b) Acidophil

c) Basophil d) Neutrophil

8) _____ hormone is secreted by the corpus luteum.

a) Estrogen b) Progesterone

c) Androgen d) Oxytocin

9) Female sterilization operation is called as _____

a) Vasectomy b) Overactomy

c) Tubectomy d) Castration

10) _____ in the eye kills the microbes as soon as they enter the body.

a) Pupil b) Retina

c) Nictitating membrane d) Tear

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

i) Stratified epithelial tissue.

ii) Parotid gland.

iii) Islets of Langerhans.

iv) Test tube baby.

v) Estrous cycle.

vi) Bone marrow.

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

   i) Histology of tooth.

   ii) Structure of smooth muscle.

   iii) Female sex hormone.

   B) Write about the oral contraceptive pills. **4**

4. Answer **any two** of the following : **10**

   i) Write an account on the areolar connective tissue.

   ii) Histology of Testis.

   iii) What is menstruation ? Describe the menstrual cycle.

5. Answer **any one** of the following : **10**

   i) Describe the histological structure of kidney.

   ii) Describe the various hormones secreted by the anterior lobe of pituitary gland.

SLR-N – 180

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
GEOGRAPHY (Paper – VIII)
Agricultural Geography

Day and Date : Thursday, 27-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *1) **All** questions are **compulsory.***
*2) Draw **neat** diagrams and maps **wherever** necessary.*
*3) **Use** of stencils is **allowed**.*
*4) Figures to the **right** indicate **full** marks.*

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

1) Agricultural geography is a branch of _____ geography.
   a) Physical b) Human
   c) Social d) Environmental

2) India is _____ in the production of food grains.
   a) Exporting b) Importing
   c) Deficit d) Self sufficient

3) _____ revolution has made possible higher crop production.
   a) Blue b) Yellow c) Green d) White

4) _____ is a major crop of extensive agriculture.
   a) Wheat b) Rice
   c) Maize d) Bajra

5) Plantation agriculture was introduced by the colonists to obtain
   a) Animal products
   b) Food grain
   c) Temperate products
   d) Tropical products

6) Alkaline soils are formed due to _____ of water in the fields.

a) Logging b) Flowing

c) Running d) Freezing

7) _____ district of Maharashtra is a part of drought prone area of India.

a) Gadchiroli b) Raigad

c) Nandurbar d) Solapur

8) One cattle requires _____ times more area than a sheep in general.

a) 02 b) 05 c) 07 d) 09

9) _____ rainfall is one of the reasons of low agricultural productivity in certain parts of India.

a) Uncertain b) Reliable

c) Reduced d) Increased

10) India ranks _____ in the production of dairy products in the world.

a) 1^{st} b) 3^{rd} c) 5^{th} d) 7^{th}

2. Write short answers (**any five**) : **10**

1) What is agriculture ?

2) What is 'wet farming' ?

3) Name any two produces of plantation agriculture.

4) What is extensive farming ?

5) What is biofertilizer ?

6) State the types of crops in mixed farming.

3. A) Give brief answers (**any two**) : **6**

   1) Explain the nature of agricultural geography.

   2) Write a note on sheep rearing.

   3) Describe the types of subsistence farming.

   B) Write a note on white revolution in India. **4**

4. Write short answers (**any two**) : **10**

   1) Describe the importance of relief on agriculture.

   2) State the government policies regarding agriculture.

   3) Elaborate the importance of ranches in animal products.

5. Write answers to the following (**any two**) : **10**

   1) State the importance of modern techniques in agricultural development.

   2) Write in brief importance of mixed farming.

   3) State the major problems of agriculture in India.

SLR-N – 265

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
ELECTRONICS (Special Paper – XVI)
Advanced Electronics Technology

Day and Date : Saturday, 8-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *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**

1) OLED stands for _____
   a) Organic Light Emitting Diode
   b) Orange Light Emitting Diode
   c) Over Light Emitting Diode
   d) None

2) In hetero junctions the band gaps of the two semiconductors must be _____
   a) Equal b) Unequal
   c) Matching d) None

3) The structure of flash memory is similar to _____
   a) FET b) MOSFET c) Flip-flop d) None

4) Resonant tunneling diode is suitable for _____ frequency applications.
   a) Low b) Mid c) High d) Very high

5) A CPLD is a _____
   a) CMOS programmable logic device
   b) Capacitive programmable logic device
   c) Complex programmable logic device
   d) None

P.T.O.

6) In programmable read only memory _____ array is programmable.

a) AND b) OR

c) Both AND and OR d) None

7) VHDL is a _____ language.

a) Hardware description b) Low level

c) Software description d) None

8) The hardware abstraction of a digital system is called _____

a) Architecture b) Entity

c) Structure d) None

9) _____ is the user interface of a Lab VIEW program.

a) Block diagram b) Front panel

c) Icon d) None

10) _____ programming is highly interactive.

a) Graphical b) Text based

c) Both a) and b) d) None

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

i) What are the advantages of nano-electronics ?

ii) Give the applications of single electron transistor.

iii) Give the major types of programmable logic devices.

iv) Name the two hardware description languages that are developed for programmable logic devices.

v) What are ports in entity ?

vi) What are the three main parts of virtual instruments ?

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

   i) What are lattice matched and pseudo morphic hetero structures ?

   ii) What is architecture body ? Give the different modeling styles to specify architecture body.

   iii) Explain the salient features in Lab VIEW software environment.

   B) What is SPLD ? Explain Programmable Logic Array (PLA). **4**

4. Answer **any two** of the following : **10**

   i) Explain energy bands in direct and indirect type semiconductors.

   ii) Explain the structural style of modeling with an example of half adder.

   iii) Draw and explain the virtual instrumentation model and graphical system design model.

5. Answer **any one** of the following : **10**

   i) Write notes on :

      a) Semiconductor nanowire FET

      b) Single electron transistor.

   ii) Explain CPLD with the help of block diagram. How it differs from SPLD ?

SLR-N – 10

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
ELECTRONICS (CGPA Pattern)
Fundamentals of Electronics (Paper – I)

Day and Date : Wednesday, 12-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 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 logtable and calculator is* ***allowed****.*
5) ***Two*** *sections should be written in* ***two separate*** *answer books.*

SECTION – I

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

1) Series resonant circuit is also known as _____ circuit.
   a) Acceptor b) Rejector
   c) High pass filter d) Low pass filter

2) The unit of resistance is _____
   a) Ohm b) Mhos
   c) Farad d) Henry

3) The admittance parameters are same as _____ circuit parameters.
   a) Short b) Open
   c) Hybrid d) Close

4) In case of pure capacitor current _____ voltage.
   a) Leads b) Lags
   c) In phase with d) Out of phase with

5) Four resistances each of 5.25 Ω are connected in series, the equivalent resistance will be _____ ohm.
   a) 22 b) 21
   c) 21.5 d) 22.5

P.T.O.

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

i) Define active and passive network.

ii) An oscilloscope shows 5 cycles of sine wave in 10 μs. Calculate time period and frequency.

iii) Define resonance frequency, band width and quality factor.

iv) State Kirchoff's laws.

v) Give classification of capacitor.

vi) What are admittance parameters ? Give their formulae.

vii) What is the value of resistance having colour bands, brown, black, red and gold ?

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

i) Fuse

ii) Maximum power transfer theorem

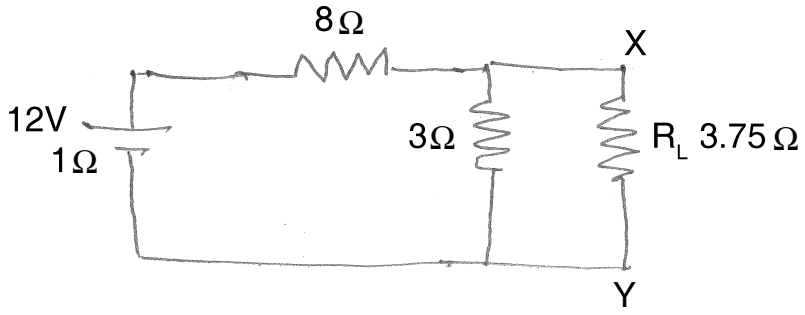
iii) Transformer.

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

i) Explain sinusoidal and nonsinusoidal current and voltage source. Define

1) Time period 2) Frequency.

ii) State and explain Thevinins theorem. Using Thevinins theorem find current through R_L for given network.



SECTION – II

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

1) The base of octal number system is

a) 2 b) 10 c) 8 d) 16

2) 1's compliment of 0101 is

a) 1001 b) 1000 c) 0101 d) 1010

3) Excess 3 of a number 8 is

a) 1101 b) 1011 c) 1010 d) 1100

4) IC 7404 is

a) NOT gate b) OR gate c) AND gate d) NOR gate

5) Half adder adds how much bits at a time ?

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

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

i) What is binary number system ?

ii) State DeMorgan's 1st theorem.

iii) Draw the logic diagram for the logic equation $Y = A + B \cdot C$.

iv) Draw the symbol of XOR gate. Write its truth table for 2 inputs.

v) Draw a logic diagram of OR gate using NAND gate.

vi) State the AND laws.

vii) Draw the logic diagram of Half subtractor.

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

i) What is binary number system ? Converts $(52)_{10}$ to equivalent binary number ?

ii) Show that $A \cdot \overline{C} + \overline{A} \cdot C = C$.

iii) Exclusive OR gate as a controlled inverter.

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

i) With the help of block diagram explain organisation of digital computer.

ii) Explain universality of NOR gates.

SLR-N – 101

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
GEOCHEMISTRY (Paper – I)
Introduction to Geochemistry (New)

Day and Date : Wednesday, 3-12-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

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

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

3) ***Draw*** *neat diagram* ***wherever*** *necessary.*

I. Choose the correct answer for the following : **10**

1) What is the minor element that replaces $Ca^{2+}_{1.00A^\circ}$ in calcium bearing minerals ?

a) $Sr^{2+}_{1.13A^\circ}$ b) $Li^{+}_{0.74A^\circ}$ c) $Ti^{4+}_{0.67A^\circ}$ d) None

2) The maximum number of crystalline phases that can coexist in rocks in stable equilibrium is equal to number of components was stated by

a) Lawson b) Winkler

c) Goldschmidt d) None

3) Find out the correct radius of K^+

a) 1.70 A° b) 1.38 A° c) 1.64 A° d) 1.51 A°

4) The concentration of a minor element replacing a major element in a mineral tends to _____ with increasing differentiation with the rule admittance.

a) Increase b) Decrease

c) Constant d) None

P.T.O.

5) In chain silicate S : : 0 ratio shall be

a) 1 : 2 b) 1 : 4 c) 1 : 3 d) 4 : 11

6) When a mineral has more than one type of bond then such condition is termed as

a) Homodesmic b) Hetrodesmic

c) Monodesmic d) None

7) What are the terms used in substitution of major ion by minor ion as proposed by Goldschmidt ?

a) Capture b) Camouflaged

c) Admittance d) All the above

8) What type of polymorphs are kyanite and sillimanite ?

a) Monotropic b) Enanbotropic

c) Polytropic d) None

9) The energy absorbed by a mole of the crystal to disperse into infinitely separated ions is termed as

a) Born-Lands energy b) Lattice energy

c) Freedom d) None

10) Identify the mineral belonging to neso silicate

a) Pyroxene b) Garnet c) Mica d) None

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

1) Lattice structure of NaCl

2) Mineralogical phase rule

3) Isomorphism

4) Homodesmic compounds

5) Radius ratio and coordination number

6) Rules governing the distribution of elements in RFM.

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

1) Polymorphs of silica

2) Sheet silicates

3) Stability of NaCl.

B) Write briefly on silicate structures noticed in RFM. **4**

IV. Answer **any two** of the following : **10**

1) Electronegativity

2) Structure of zinc sulphide

3) One component phase systems.

V. Answer **any two** of the following : **10**

1) Coordination number of aluminium in alumino silicate

2) Types of bonds

3) Ionic radii for elements that form RFM.

SLR-N – 103

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
STATISTICS (Paper – VI)
Discrete Probability Distributions and Statistical Methods

Day and Date : Thursday, 4-12-2014 Max. Marks : 50
Time : 11.00 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 : **10**

i) The family of parametric distributions which has mean always less than variance is

a) Beta distribution b) Poisson distribution
c) Geometric distribution d) Negative binomial distribution

ii) If $X \sim Geo(p)$ then $P(X \geq 2)$ is _____

a) pq b) p^2
c) q^2p d) q^2

iii) If $X \sim Geo(0.6)$ the mean of waiting time distribution is

a) $\frac{4}{10}$ b) $\frac{6}{10}$
c) $\frac{10}{6}$ d) None of these

iv) Let $(X_1\ X_2\ X_3)$ be a random vector follows multinomial distribution with usual notations then $CoV(X_1\ X_2)$ =

a) p_1p_2 b) $-np_1p_2$
c) $2p_1p_2$ d) None of these

P.T.O.

v) With usual notations, the regression equation X_2 on X_1 and X_3 is

a) $X_2 = b_{12.3} X_1 + b_{32.1} X_2$ b) $X_2 = b_{21.3} X_3 + b_{23.1} X_1$

c) $X_2 = b_{21.3} X_1 + b_{23.1} X_3$ d) $X_2 = b^2_{12.3} X_1 + b^2_{32.1} X_3$

vi) The distribution possessing the memoryless property is

a) Poisson distribution b) Geometric distribution

c) Hypergeometric distribution d) All the above

vii) A Poisson random variable $\mu_4 = 2$, the value of its mean is

a) $\frac{1}{3}$ b) $\frac{2}{3}$

c) $\frac{1}{4}$ d) $\frac{3}{4}$

viii) If $R_{1.23} = 1$ then $R_{2.13}$ is equal to

a) 0 b) 0 to +1

c) +1 d) None of these

ix) The correlation coefficient between $X_{1.3}$ and $X_{2.3}$ is

a) r_{23} b) $r_{12.3}$

c) $r_{13.2}$ d) r_{12}

x) The order of partial regression coefficient $b_{12.34 \ldots .n}$ is

a) n b) n + 2

c) n – 1 d) n – 2

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

i) State pmf of geometric distribution with parameter P.

ii) If X is a Poisson variate such that P(X = 2) = 9P(X = 4) + 90P(X = 6). Find λ.

iii) Find pgf of negative binomial distribution.

iv) Define multiple regression.

v) Find the coefficient of variation of Poisson distribution with mean 4.

vi) Give the recurrence relation of probabilities of negative binomial distribution.

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

   i) Find mean and variance of waiting time distribution.

   ii) With usual notations prove that $1 - R^2_{1.23} = \left(1 - r^2_{12}\right)\left(1 - r^2_{13.2}\right)$.

   iii) If $r_{23} = 1$ then prove that $r^2_{12} = r^2_{13} = R^2_{1.23}$.

   B) State and prove the recurrence relation for probabilities of Poisson distribution. **4**

4. Solve **any two** out of three : **10**

   i) If $r_{12} = r_{13} = r_{23} = \rho$ then show that $1 - R^2_{1.23} = \frac{(1-\rho)(1+2\rho)}{(1+\rho)}$.

   ii) If X and Y are two independent Poisson variates then show that conditional distribution of X given X + Y is binomial.

   iii) Prove that the necessary and sufficient condition for the three regression planes to coincide is $r^2_{12} + r^2_{13} + r^2_{23} - 2r_{12}r_{13}r_{23} = 1$.

5. Solve **any two** out of three : **10**

   i) If X_1, X_2, X_3 satisfy the relation $a_1X_1 + a_2X_2 + a_3X_3 = K$ prove that $r_{12} = \frac{a^2_3\sigma^2_3 - a^2_1\sigma^2_1 - a^2_2\sigma^2_2}{2a_1a_2\sigma_1\sigma_2}$.

   ii) With usual notations prove that $b_{12.3}b_{23.1}b_{31.2} = r_{12.3}r_{23.1}r_{31.2}$.

   iii) State and prove the lack of memory property of geometric distribution with parameter p.

SLR-N – 104

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
METEOROLOGY (Paper – II) (New)
General Meteorology

Day and Date : Thursday, 4-12-2014 Max. Marks : 50
Time : 3.00 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. Select the correct alternative : **10**

i) Collision theory is used to explain the puzzle of _____
   a) Evaporation b) Photosynthesis
   c) Raindrop formation d) Formation of cyclones

ii) For the formation of water droplets _____ nuclei are necessary.
   a) Peripheral b) Condensation c) Central d) Evaporation

iii) Rayleigh's scattering is also known as _____
   a) Coherent scattering
   b) Incoherent scattering
   c) Coherent as well as incoherent
   d) Incoherent but not coherent

iv) 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) $i \neq r$

v) In isothermal process _____ remains constant.
   a) Temperature b) Pressure c) Entropy d) Volume

vi) The ozone layer in the Earth's atmosphere absorbs _____ sunlight.
   a) Ultraviolet b) Visible c) Infrared d) Microwave

vii) Centrifugal force is given by F = _____
   a) $-mr$ b) $-mrw$ c) $-mrw^2$ d) $-mr^2w^2$

P.T.O.

viii) At the equator ($\phi = 0$) the Coriolis force is _____

a) Minimum b) Zero c) Maximum d) Moderate

ix) The man made satellite which have been launched in orbit round the Earth is known as _____ satellite.

a) Artificial b) Natural

c) Natural or artificial d) None of the above

x) An artificial satellite is given the correct horizontal velocity, called the _____ velocity, to put it into a stable circular orbit round the Earth.

a) Maximum b) Escape c) Critical d) Moderate

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

i) Define atmosphere.

ii) Mention effects of scattering of sunlight.

iii) What are effects of depletion of ozone layer ?

iv) Write photochemical reactions of ozone formation.

v) What is pressure gradient force ?

vi) What is short circuit current (I_{SC}) of a solar cell ?

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

i) Discuss in detail tephigram.

ii) How do the local winds occur ?

iii) What is a geo-synchronous satellite ?

B) Discuss effects of scattering. **4**

4. Answer **any two** of the following : **10**

i) Explain in detail Bergeron-Findeisen theory of precipitation.

ii) Discuss absorption of solar radiation by ozone.

iii) Explain launching of satellite.

5. Answer **any two** of the following : **10**

i) Write a note on 'Condensation nuclei'.

ii) Explain green house effect.

iii) Explain local winds.

_____

SLR-N – 105

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
GEOCHEMISTRY (Paper – II)
Introduction to Solar System and Geosphere (New)

Day and Date : Thursday, 4-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right i**ndicate **full** marks.*
*3) Draw neat diagrams **wherever** necessary.*

I. Choose the correct answer for each of the following : **10**

1) The salinity of ocean water is increasing because Na, Ca, Mg etc. elements have
   a) Low ($^{z}/_{r}$) b) Long residence time
   c) Both a and b d) None

2) The layer in the atmosphere which appears to be stratified in a number of layers between which no strong vertical circulation seems to exist is
   a) Troposphere b) Stratosphere c) Ionosphere d) None

3) What amount of oxygen is fixed in continental crust ?
   a) 30% b) 10% c) 41% d) 5%

4) Chalcophile elements are those which belong to _____ of period table.
   a) s-block b) d-block c) p-block d) f-block

5) According to Oddo-Harkin rule of cosmic abundance the odd atomic number elements are
   a) Equal b) Less abundant
   c) More abundant d) None

6) The average composition of CO_3, SO_4 and Cl in river water indicate the relative concentration as
   a) $CO_3 > SO_4 > Cl$ b) $Cl > SO_4 > CO_3$
   c) $SO_4 > CO_3 > Cl$ d) None

7) The distribution of elements in the earth is not directly controlled by gravity but by their
   a) Valency b) Chemical potential
   c) Bonds d) None

8) Moving across a horizontal row in the periodic table the radii of the ions.
   a) Increases b) Constant c) Decreases d) None

9) If the radius ratio of cation : anion is unity the coordination number of cation shall be
   a) 3 b) 6 c) 8 d) 12

10) The chlorinity is determined by the precipitation of the halides with
   a) H_2SO_4 b) HNO_3 c) HPO_3 d) $AgNO_3$

II. Answer **any five** of the following : **10**
   a) Ozone layer
   b) Acondrite
   c) Lithophiles
   d) Composition of crust
   e) Primary differentiation
   f) Geochemical cycle.

III. A) Answer **any two** of the following : **6**
   1) Differences between average composition of sea water and river water.
   2) Composition of Mantle.
   3) Composition of terrestrial water.

   B) Discuss the geochemical model of crust. **4**

IV. Answer **any two** of the following : **10**
   1) Cosmic abundance of elements.
   2) Composition of sun.
   3) Nature of hydrosphere.

V. Answer **any two** of the following : **10**
   1) Gains and losses to ocean.
   2) Atmosphiles
   3) Properties of chalocophiles.

SLR-N – 106

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
ZOOLOGY (Paper – VI) (New)
Cell Science, Genetics, Biological Chemistry and Economic Zoology

Day and Date : Thursday, 4-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the sentence by selecting appropriate answer : **10**

1) Cellulose is _____
   a) polysaccharide b) disaccharide
   c) oligosaccharide d) monosaccharide

2) Crossing over occurs between
   a) sister chromatids
   b) non-sister chromatids
   c) non-homologous chromosomes
   d) none

3) DNA replication takes place in
   a) G_1 b) S
   c) G_2 d) Prophase

4) Meiosis occurs in _____ cells.
   a) somatic b) gametic
   c) both somatic and gametic d) dead

5) The poultry bird leghron belongs to _____
   a) Asian b) American
   c) English d) Mediterian

6) Pollen basket is present _____ bees.
   a) Queen b) Drone
   c) Worker d) Queen and worker

P.T.O.

7) Rearing of silkworm is called as
   a) Apiculture b) Sericulture
   c) Fish culture d) Pearl culture

8) Ratio of supplementary factor is _____
   a) 9 : 3 : 3 : 1 b) 9 : 3 : 4
   c) 9 : 7 d) 1 : 1 : 1 : 1

9) _____ is a ornamental fish.
   a) Catla catla b) Rohu
   c) Gold fish d) Mrigal

10) The total number of eggs laid by one queen of a honey bee in one day be about _____
   a) 2000 b) 4000 c) 6000 d) 8000

2. Answer **any five** of the following : **10**
   i) Significance of mitosis
   ii) Hexoses
   iii) Albumen
   iv) Economic importance of Honey
   v) Milk product
   vi) Labio.

3. A) Answer **any two** of the following : **6**
   i) Biological significance of protein.
   ii) Economic importance of poultry.
   iii) Supplementary genes.

   B) Morphology of mulberry silk moth. **4**

4. Answer **any two** of the following : **10**
   i) Describe the structure of DNA and add a note on its biological significance.
   ii) Explain the construction and maintenance of fresh water fish farming.
   iii) What is linkage ? Describe complete linkage with suitable example.

5. Answer **any one** of the following : **10**
   i) Describe in detail process in mitosis.
   ii) Define poultry. Explain in detail housing system.

_____

SLR-N – 107

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2014
MATHEMATICS (Paper – V) (New)
Differential Calculus

Day and Date : Friday, 5-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) Polar sub tangent of the curve $r = a(1 - \cos\theta)$ is _____

a) $2a\cos^2 \theta/2 \cot \theta/2$ b) $2a\cos^2 \theta/2 \tan \theta/2$

c) $2a\sin^2 \theta/2 \tan \theta/2$ d) $2a\sin^2 \theta/2 \cot \theta/2$

2) Angle of intersection of curves $r = a(1 + \cos\theta)$ $r = b(1 - \cos\theta)$ is _____

a) π b) $\pi/2$ c) 0 d) $-\pi/2$

3) The angle of intersection of two curves is defined as the angle between their _____

a) normals b) tangents
c) radius vectors d) none of these

4) If $u = x + y - a - b$, $v = ab - bx - ay$ then $\frac{\partial(uv)}{\partial(xy)}$ = _____

a) a – b b) b – a c) $\frac{1}{a-b}$ d) none of these

5) If $u = e^x \cos y$ $v = e^x \sin y$ then $\frac{\partial(x,y)}{\partial(u,v)}$ = _____

a) e^x b) e^{-x} c) siny d) cosy

6) The radius of curvature of $\sqrt{x} + \sqrt{y} = 1$ at $\left(\frac{1}{4}, \frac{1}{4}\right)$ is _____

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\sqrt{2}$ d) none of these

P.T.O.

7) The intrinsic formula for radius of curvature is _____

a) $\rho = \frac{dy}{dx}$ b) $\rho = \frac{ds}{d\psi}$

c) $\rho = \frac{1}{s}\frac{ds}{d\psi}$ d) none of these

8) The radius of curvature at any point on curve $s = c\tan\psi$ _____

a) $c + s^2/c$ b) $s + c^2/s$

c) $c - s^2/c$ d) none of these

9) A function f(x, y) is maximum at point (a, b) if _____

a) $AC - B^2 > 0$ and $A > 0$
b) $AC - B^2 > 0$ and $A < 0$
c) $AC - B^2 < 0$ and $A > 0$
d) none of these

10) The maximum value of $\left(\frac{\log x}{x}\right)$ is _____

a) e b) $1/e$

c) 0 d) 1

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

1) If u = cosx v = sinxcosy w = sinxsinycosz then find $\frac{\partial(x, y, z)}{\partial(u, v, w)}$.

2) Find the angle between the curves $x^2 - y^2 = a^2$ and $x^2 + y^2 = a^2\sqrt{2}$.

3) Find the length of polar subnormal to the cardioid $r = a(1 + \cos\theta)$.

4) Find maximum value of the function f(x) = (x –1) (x – 2) (x – 3).

5) Find $\frac{dS}{dX}$ of the curve $y = \cosh\frac{x}{C}$.

6) Find radius of curvature of $x^{2/3} + y^{2/3} = a^{2/3}$ at any point.

3. A) Attempt **any two** of the following : **6**
   1) Find the equation of tangent at the point t to the curve $x = a\sin^3 t$ $y = b\cos^3 t$.
   2) Find the minimum value of $x^2 + y^2 + z^2$ when $x + 2y - 4z = 5$.
   3) Find the point on the parabola $y^2 = 8x$ where the radius of curvature is $\frac{125}{16}$.

   B) If z_1, z_2, z_3 are functions of three variables y_1, y_2, y_3 and y_1, y_2, y_3 are functions of three variable x_1, x_2, x_3 then **4**

$$\frac{\partial(z_1, z_2, z_3)}{\partial(x_1, x_2, x_3)} = \frac{\partial(z_1, z_2, z_3)}{\partial(y_1, y_2, y_3)} \frac{\partial(y_1, y_2, y_3)}{\partial(x_1, x_2, x_3)}.$$

4. Attempt **any two** of the following : **10**
   1) Show that the length of the portion of the tangent to the curve $x = a\cos^3\theta$, $y = a\sin^3\theta$ intercepted between the axes is constant.
   2) If $r = f(\theta)$ be the equation of the curve in polar form then show that radius of curvature $\rho = \frac{\left(r^2 + r_1^2\right)^{3/2}}{r^2 + 2r_1^2 - rr_2}$.
   3) Discuss the maxima and minima of function $u = \sin x \sin y \sin z$ where x, y, z are angle of triangle.

5. Attempt **any one** of the following : **10**
   1) Explain Lagrange's method of undertermined multipliers to determine the extreme values of $u = f(x, y, z)$ subject to $\phi_1(x, y, z) = 0$ and $\phi_2(x, y, z) = 0$
   2) A) Find radius of curvature for pedal equation.

      B) Find the radius of curvature at $X = \pi/2$ to the curve $y = 4\sin X - \sin 2X$.

SLR-N – 108

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
BOTANY (New)
Structure Botany and Taxonomy of Angiosperms (Paper – V)

Day and Date : Friday, 5-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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. Rewrite the following sentences, choosing the correct alternative : **10**

1) Multilayered epidermis is found in _____
   a) Hydrophytes b) Xerophytes
   c) Mesophytes d) Epiphytes

2) _____ tissue provide elasticity to plant organs.
   a) Parenchyma b) Selerenchyma
   c) Collenchyma d) Aerenchyma

3) The cells of promeristem differentiate in to _____ regions.
   a) 2 b) 3 c) 4 d) 5

4) Tunica- Corpous theory was proposed by _____
   a) Nageli b) Hanstein c) Schmidt d) Hofmiester

5) Insectivorous plants have _____
   a) Oil glands b) Water glands
   c) Resin duct d) Digestive glands

6) Bast fibres are components of _____ complex tissue.
   a) Cortex b) Pith c) Xylem d) Phloem

7) Climate variations are responsible for formation of _____
   a) Periderm b) Lenticel c) Bark d) Annual rings

8) Staminal tube is seen in family _____
   a) Fabaceae b) Combretaceae
   c) Acanthaceae d) Meliaceae

P.T.O.

9) Papilionaceous corolla is seen in family _____
   a) Meliaceae b) Liliaceae
   c) Asclepiadaceae d) Fabaceae

10) Adhatoda vasica is an example of family _____
   a) Asclepiadaceae b) Acanthaceae
   c) Amaranthaceae d) Liliaceae

2. Answer **any five** of the following : **10**
   i) What is meristem ?
   ii) Give functions of parenchyma tissue.
   iii) What are stomata ?
   iv) Sketch and label periderm.
   v) What are pollinia ?
   vi) Give any two economic importance of family meliaceae.

3. A) Answer **any two** of the following : **6**
   i) Give the functions of secretary tissue system.
   ii) Describe the elements of phloem with their functions.
   iii) Give important floral characters of family Asclepiadaceae.

   B) Describe types of woods studied by you. **4**

4. Answer **any two** of the following : **10**
   i) Describe types of vascular bundles studied by you.
   ii) Describe primary structures of monocot stem.
   iii) Give other examples with economic importance of family fabaceae.

5. Answer **any one** of the following : **10**
   i) Describe normal secondary growth in dicot stem.
   ii) Describe epidermal tissue system with reference to stomata.

_____

SLR-N – 109

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
MATHEMATICS (Paper – VI)
Real Analysis

Day and Date : Saturday, 6-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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**

1) Every monotonic increasing sequence which is not bounded above diverges to _____

a) $-\infty$ b) ∞
c) Both ∞ and $-\infty$ d) None of these

2) The sequence $\{1+(-1)^n\}\ \forall\ n \in N$ has limit point

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

3) The sequence $\{r^n\}$ converges to zero if

a) $|r| < 1$ b) $|r| > 1$ c) $|r| = 1$ d) $r = \infty$

4) The series $\Sigma\frac{1}{n}$ is divergent then $\Sigma\frac{1}{n^2}$ is _____

a) Convergent b) Divergent
c) May be divergent d) Both a) and b)

5) A positive term series converges iff the sequence of its partial sum is _____

a) Bounded below b) Bounded above
c) Both a) and b) d) None of these

6) A positive term series $\sum\frac{1}{n^p}$ is convergent iff _____

a) $p < 1$ b) $p = 1$ c) $p > 1$ d) $p = -\infty$

P.T.O.

7) The union of arbitrary family of open sets is _____

a) Open b) Not open c) Closed d) Not closed

8) The set $\left\{\frac{1}{n};\ n \in N\right\}$ has only one limit point is _____

a) 1 b) 0 c) 2 d) $\frac{1}{2}$

9) A subset S of real number is said to be bounded above if $\exists$ a real number K such that _____

a) $x \leq K\ \forall\ x \in S$ b) $x \geq K\ \forall\ x \in S$

c) $x < K$ for sum $x \in S$ d) $x > K$ for some $x \in S$

10) If $-|x| = -x < x$ if _____

a) $x < 0$ b) $x > 0$

c) Both a) and b) d) None of these

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

1) State the properties of ordered field.

2) Show that the set $S = \{x : 0 < x < 1, x \in R\}$ is open but not closed.

3) Show that the sequence $\{S_n\}$ where $S_n = 1 + \frac{1}{2} + \frac{1}{3} + \text{----} + \frac{1}{n}$ can not converge.

4) Show that $\lim_{n \to \infty} \frac{1+2+3+.....+n}{n^2} = \frac{1}{2}$

5) Test for convergence of the series $\left(1+\frac{1}{\sqrt{n}}\right)^{-n^{3/2}}$

6) Test for convergence of the series $\sum \frac{n^2-1}{n^2+1} x^n, x > 0.$

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

   1) Show that the sequence $\{S_n\}$ where $S_n = \left(1+\frac{1}{n}\right)^n$ is convergent the limit lies between 2 and 3.

   2) Prove that the intersection of an arbitrary family of closed sets is closed.

   3) Show that the series $\frac{1}{1^P}-\frac{1}{2^P}+\frac{1}{3^P}-\frac{1}{4^P}+$------- converges for $P > 0$.

   B) Prove that the set of rational numbers in [0, 1] is countable. **4**

4. Attempt **any two** of the following : **10**

   1) Show that $\sqrt{8}$ is not a rational number.

   2) Show that the series $\sum \frac{3.6.9....3n}{7.10.13....(3n+4)}x^n$, $x > 0$ converges for $x \leq 1$ and diverges for $x > 1$.

   3) If $\lim_{n \to \infty} a_n = a$ and $a_n \geq 0 \ \forall n$ then prove that $a \geq 0$.

5. Attempt **any one** of the following : **10**

   1) If $F = \{F_n\}$ is a countable class of non empty closed and bounded sets such that $F_1 \supset F_2 \supset F_3 \supset .....\supset F_n$ then show that $\bigcap_{n=1}^{\infty} F_n$ is non-empty.

   2) If $\sum u_n$ is positive term series such that $\lim_{n \to \infty} \frac{u_{n+1}}{u_n} = l$ then show that the series

      i) Converges if $l < 1$

      ii) Diverges if $l > 1$ and

      iii) Test fails if $l = 1$.

SLR-N – 11

Seat No.	

B.Sc. (Part – I) (Semester – I) (CGPA Pattern) Examination, 2014

PSYCHOLOGY (Paper – I)

General Psychology and Human Development

Day and Date : Wednesday, 12-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I
(General Psychology)

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

1) _____ is the first step in understanding anything.
A) Description B) Study
C) Prediction D) Goal

2) Determining what will happen in the future is a _____
A) Explanation B) Psychology
C) Prediction D) Science

3) _____ involves observing a behaviour and notice or noting everything about it.
A) Description B) Learning
C) Prediction D) Theory

4) _____ includes all of our outward or overt actions and reactions.
A) Behaviour B) Mind
C) Soul D) Mental process

5) _____ refer to all the internal, covert activity of our minds.
A) Mental process B) Learning
C) Study D) Exam

P.T.O.

2. Write the answer of the following (**any five**) : **10**

   1) Define psychology.

   2) State the goals of psychology.

   3) State the modern perspectives of spychology.

   4) What is meaning of hypothesis ?

   5) State the methods of psychology.

   6) Define variable.

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

   1) Survey method.

   2) Behavioural and Humanistic perspectives.

   3) The synapse.

4. A) Describe the goals of Pspychology in detail. **10**

   OR

   B) Explain the activation-synthesis hypothesis.

SECTION – II
(Human Development)

1. Multiple choice : **5**

   1) _____ gland located on either side of the vigina.

   A) Bartholins B) Cervix

   C) Hymen D) Uterus

   2) _____ is a flap of tissue that usually covers most of the viginal canal of virgins.

   A) Hyman B) Labia

   C) Fimbries D) Ova

   3) _____ begin interacting more with peers of the opposite six.

   A) Only boys B) Adolescence

   C) Young D) Childhood

4) Many psychologists believe that human sexuality develops in _____

A) Four B) Five

C) Three D) Six

5) _____ is not designed for giving and receiving pleasure.

A) Sex B) Thinking

C) Habit D) Life

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

1) What is human development ?

2) Define adolescence.

3) What is the main function of pituitary state ?

4) What are the seven forms of love ?

5) Define the cholesterol.

6) What is the anorexia nervosa ?

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

1) Depression and suicide in adolescence.

2) Dating.

3) Perry's Approach.

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

A) Explain the functions of Peer groups in Adolescence.

OR

B) Explain the stages of sexuality in adolescence.

_____

SLR-N – 110

Seat No.	

B.Sc. (Part – II) (Semester – III) (New Course) Examination, 2014
BOTANY (Paper – VI)
(Plant Ecology)

Day and Date : Saturday, 6-12-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 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**

1) The size of population that any environment can support indefinitely is called its _____
   a) Photosynthetic capacity b) Carrying capacity
   c) Ecotone d) None of these

2) Total amount of water present in the soil is called _____
   a) Holard b) Echard
   c) Creshard d) Combined water

3) Green plants are _____
   a) Secondary consumers b) Primary consumers
   c) Tertiary consumers d) Producers

4) The plant succession which starts in aquatic environment is called _____
   a) Xerosere b) Hydrosere
   c) Halosere d) Psammosere

5) The plants growing in extremely dry habitat are known as _____
   a) Hydrophytes b) Mesophytes
   c) Xerophytes d) Oxalophytes

6) Any undesirable change in the physical, chemical or biological characteristics of natural water, air or soil is termed as _____

a) Water pollution b) Air pollution

c) Soil pollution d) Environmental pollution

7) _____ is the way outward movement of individuals from their population.

a) Emigration b) Migration

c) Immigration d) None of these

8) The concept of ecosystem was first put forth by _____

a) A.G. Tansely (1935) b) Woodbury (1954)

c) Hutchinson (1970) d) Gleason (1939)

9) Aggregation of different types of plant populations at a habitat is known as _____

a) Biological community b) Animal community

c) Plant community d) Human community

10) _____ is the clean and pollution free energy source which helps to control environmental pollution.

a) Solar energy b) Atomic energy

c) Thermal energy d) All of these

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

i) What is natality and mortality in the population ?

ii) What is physiognomy ?

iii) What is food chain ? Write an outline of any grazing food chain you have studied.

iv) What is primary succession ?

v) Write any two sources of water pollution.

vi) Define hydrophyte.

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

   i) Define ecological pyramid and comment up on pyramid of number in forest ecosystem.

   ii) What is predation ? Comment in brief about its role in population regulation.

   iii) Write any three characters of xerophytes.

   B) What is life form ? Write the brief account of phanerophytes. **4**

4. Answer **any two** of the following : **10**

   i) What are gaseous cycles ? Explain in brief oxygen cycle.

   ii) What is water pollution ? Comment up on the effects of water pollution on human health.

   iii) What is ecosystem ? Write an account of energy flow in ecosystem.

5. Answer **any one** of the following : **10**

   i) What is population ecology ? Write brief account of age distribution of polpulation.

   ii) What is species diversity ? Explain α, β, γ diversity by giving suitable example.

SLR-N – 111

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2014
ELECTRONICS (New)
Electronics Circuits (Paper – V)

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 11.00 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. Select the correct alternative from the following : **10**

i) The ripple factor of half wave rectifier is _____

a) 0.482 b) 0.406 c) 0.812 d) 1.21

ii) Usually zener diode is used in _____

a) reverse bias b) forward bias

c) only positive bias d) none of these

iii) The d.c. load line of transistor can be drawn, if we know it's cut off point and _____

a) Q point b) Saturation point

c) V_{CC} d) None of these

iv) In multistage amplifier voltage gain _____

a) increases b) decreases

c) remains same d) none of these

v) The voltage gain of common collector amplifier is _____

a) zero b) unity

c) less than unity d) greater than unity

P.T.O.

vi) Capacitor is tapped in _____ oscillator.

a) Hartley b) Wienbridge

c) Colpitt's d) None of these

vii) Phase shift oscillator generally uses _____

a) one RC network b) two RC networks

c) three RC networks d) LC network

viii) In current series feedback amplifier the input resistance _____

a) increases b) decreases

c) remain unchanged d) none of these

ix) Stability of the circuit _____ with negative feedback.

a) increases b) decreases

c) does not change d) none of these

x) The main use of class c amplifier is _____

a) as an RF amplifier b) as a sterio amplifier

c) as distortion generator d) none of these

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

i) Draw the circuit diagram of zener voltage regulator.

ii) Enlist different methods of transistor biasing.

iii) In an amplifier with negative feedback. $A_V = 10$, $\beta = -0.4$. Calculate gain with feedback.

iv) What is Barkhausen criterion for sustained oscillations ?

v) Draw the circuit diagram of direct coupled amplifier.

vi) Draw the circuit diagram of FET as CS amplifier.

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

   i) Draw the circuit diagram of class B push pull power amplifier. What is it's maximum conversion efficiency.

   ii) An amplifier has a value of $A_V = 1000$ and $\beta = 0.2$. Determine the value of A_{Vf} when negative feedback is employed.

   iii) Explain Emitter bias circuit.

   B) Write a note on crystal oscillator. **4**

4. Answer **any two** of the following : **10**

   i) Explain working of half wave rectifier.

   ii) Explain RC coupled amplifier.

   iii) With neat circuit diagram, explain working of Wienbridge oscillator.

5. Answer **any one** of the following : **10**

   i) Derive the expression for gain of amplifier with feedback. What are the advantages of negative feedback and explain any one.

   ii) Explain the voltage divider bias and derive the expression for the stability factor.

SLR-N – 112

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
PSYCHOLOGY (Paper – V)
Experimental Psychology

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Fill in the blanks : **10**

1) _____ are the only means by which cause and effect can be established.
A) Experiments B) Research C) Tests D) Exams

2) The _____ is not typical of real life situations.
A) Experiment B) Test C) Study D) Analysis

3) _____ use several approaches to gain an understanding of behaviour.
A) Psychologists B) Sociologists
C) Experts D) Variables

4) _____ can be replicated.
A) Experiments B) Tests C) Research D) Understand

5) An _____ is a synopsis of the report.
A) Abstract B) Research C) Title page D) Method

6) The _____ method is to conduct the experiment.
A) Experimental B) Social C) Cognitive D) Pathology

7) Experiments are done on a _____ sample.
A) Limited B) Small C) Large D) Group

8) An _____ is conducted to answer a well-defined question or a problem.
A) Experiment B) Scale C) Research D) Study

9) The _____ method is a controlled observation.

A) Experimental B) Analysis C) Hypothesis D) Tests

10) _____ was an anatomist and physiologist.

A) Weber B) Wundt C) Galton D) Maslow

2. Answer the following (**any four**) : **8**

1) Who published the handbook of physiological optics ?
2) Who was founder of experimental psychology ?
3) Where established the first psychological laboratory ?
4) Define psychology.
5) Who was founder of the school of behaviourism ?
6) Who explain 'trial and error' method of learning ?

3. Write short notes **(Any four)** : **12**

1) Application in clinical setting.
2) Method of constancy of conditions.
3) Wilhelm Wundt's work in experimental psychology.
4) Application in organization.
5) Variables.
6) Control group method.

4. A) Explain the goals of experimental psychology. **10**

OR

B) Discuss on the nature of experimental psychology.

5. A) Describe the history experimental psychology. **10**

OR

B) Discuss on psychophysics.

SLR-N – 113

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
GEOGRAPHY (Paper – V)
Biogeography – I

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) ***Draw*** *neat diagram* ***wherever*** *necessary.*
4) ***Use*** *of stencil is* ***allowed****.*

1. Choose the correct alternative and rewrite it : **10**

1) There is an existence of life at the depth of _____ meters below the sea level.
(8000, 10000, 9000, 7000)

2) India has _____ percent land under forest cover.
(19.5, 15.5, 33.3, 20.5)

3) The _____ are classified as herbivores, carnivores and omnivores.
(Consumers, producers, autotroph, decomposers)

4) The _____ ecosystem is considered as richest in biodiversity.
(Desert, Taiga, Tundra, Tropical forest)

5) Wild animals attack human and crops mainly because of _____ forest cover.
(increasing, decreasing, constant, widespread)

6) Biogeography is the study of biological relations between man and whole of his animate and inanimate physical _____
(environment, ecology, habitat, settlement)

7) Most of the plants need _____ for chlorophyll production.
(moonlight, sunlight, stars, venuslight)

8) The study of biogeography is very _____ in its nature.
(simple, complex, easy, unique)

P.T.O.

9) When there is balance of input and output of energy the _____ tends to be in an equilibrium state.
(ecosystem, ecology, habitat, plants)

10) Western Ghats is known as one of the _____ spots of biodiversity in India.
(hot, warm, cool, cold)

2. Write short answer of **any five** : **10**

1) Explain the types of acquatic ecosystem.
2) What are the omnivores ?
3) What is a biogeochemical cycle ?
4) What is the phytogeography ?
5) Explain the energy pyramid.
6) Explain the hot spots of biodiversity.

3. A) Write answer of **any two** : **6**

1) Explain the term food web.
2) Discuss the types of biodiversity.
3) Explain energy flow in an ecosystem.

B) Explain the nature and function of biogeography. **4**

4. Write answer in short of **any two** : **10**

1) Importance of biogeography.
2) Consumers in the ecosystem.
3) Afforestation.
4) Nutritional cycle.

5. Write brief answer of **any two** : **10**

1) Discuss the factors affecting biogeography.
2) Explain the grassland ecosystem.
3) Causes of deforestation.
4) Explain the recycling nutrients in an ecosystem.

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SLR-N – 114

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
GEOLOGY (Paper – V)
Optics and Mineralogy

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 3.00 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. Fill in the blanks with correct answer from the given option. **10**

1) _____ substance transmit light with equal velocity in all directions.
   a) Isotropism b) Aniso tropism
   c) Isotropism and anisotropism d) none of these

2) _____ of a mineral is directly related to the refractive index.
   a) Cleavage b) Relife c) Form d) Alteration

3) Mineral nephelene belongs to _____
   a) mica group b) garnet group
   c) feldsphathoid d) chlorite group

4) Hardness of orthoclase is _____
   a) 5 to 5.5 b) 5.5 to 6 c) 6 to 6.5 d) 6.5 to 7

5) Pleochroism is exhibited only by _____ minerals.
   a) Colourless b) Coloured c) Black d) White

6) Calcite is principal constitute of _____
   a) Sandstone b) Shale c) Slate d) Limestone

7) A group of silicate mineral which contain discrete (Sio_4) tetrahedra is called as _____
   a) Cyclosilicate b) Sorosilicate c) Inosilicate d) Nesosilicate

8) The relief of olivine mineral is _____
   a) high to very high b) low
   c) medium d) low to medium

9) The composition of orthoclase is _____
   a) Na_3 (Na, K) Al_4 Si_4O_6 b) KAl Si_3O_8
   c) Ca (Al_2 Si_4 O_{12}) d) Al_3 $(PO_4)_2$ $(OH)_3$ $5H_2O$

10) Flint is usually _____ in colour.
   a) White b) Black c) Colourless d) Red

2. Answer **any five** of the following : **10**
   1) Physical properties of mica
   2) Inclusion
   3) Isotropism
   4) Alteration of mineral
   5) Cleavage
   6) Bire fringes.

3. A) Answer **any two** of the following : **6**
   1) Occurrence of clay minerals.
   2) Forms of minerals under petrological microscope.
   3) Chain silicate structure.

   B) Behaviour of light under petrological microscope. **4**

4. Answer **any two** of the following : **10**
   1) Describe phyllosilicate and tectosilicate.
   2) Explain varieties of silica mineral and note on their occurrence.
   3) Define and describe polymorphism.

5. Answer **any two** of the following : **10**
   1) Structure and chemistry of pyroxene group of minerals.
   2) Physical and optical properties of chlorite.
   3) Twinning and their types.

_____

SLR-N – 115

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
MICROBIOLOGY (Paper – V)
Cytology, Physiology of Bacteria and Virology

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose the correct answers from given alternatives : **10**

i) All the cells in a _____ culture divide at the same time.
a) Continuous b) Stationary
c) Synchronous d) Diauxic

ii) Bacterial endospores are mainly formed in_____phase.
a) Lag phase b) Log phase
c) Stationary d) Decline

iii) Lipid A, R core region and O side chain are components of _____ of cell wall.
a) Phospholipid b) Lipopolysaccharides
c) Glycolipid d) Peptidoglycan

iv) _____ granules were first discovered in spirillum volutans.
a) Volutin granules b) PHB granules
c) Starch granules d) Sulphur granules

v) Peptidoglycan is absent in _____bacteria.
a) Halobacterium b) E.Coli
c) Lactobacillus d) Salmonella

P.T.O.

vi) Magnetosomes contain chain of _____ particles.

a) Ferrite b) Magnetite

c) Nitrite d) Sulfite

vii) _____ is used to decrease the surface tension of media.

a) Calcium chloride

b) Charcoal powder

c) Aldehyde

d) Bile salts

viii) Volutin granules are reservoirs of _____

a) Sulfur b) Polysaccharide

c) Polyphosphate d) Lipid

ix) The enzymes in _____class are responsible for breakdown of bonds.

a) Lyases b) Ligases

c) Transferase d) Oxidoreductases

x) _____antibiotic inhibits cell wall synthesis.

a) Streptomycin b) Actinomycin

c) Penicillin d) Chloramphenicol

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

i) Define facilitated diffusion.

ii) Define photoreactivation.

iii) What is thermophile ?

iv) Define oxidoreductases with example.

v) Draw structure of HIV.

vi) Define synchronous growth.

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

   i) Describe gas vacuoles.

   ii) Write effect of osmotic pressure on growth of micro organism.

   iii) Differentiate between flagella and pili.

   B) Give an account of structure of endospore. **4**

4. Answer **any two** of the following questions : **10**

   i) Describe cyclic photophosphorylation.

   ii) Give effect of penicillin and streptomycin on growth of bacteria.

   iii) Explain batch and continuous culture.

5. Answer **any two** of the following : **10**

   i) Describe group translocation.

   ii) Write the effect of temperature on growth of bacteria.

   iii) Explain mechanism of enzyme action.

SLR-N – 116

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
ELECTRONICS
Paper – VI : Pulse and Switching Circuits

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 correct alternative from the following : **10**

i) The criterion for good integrating circuit is that its time constant should be _____

a) Much larger than the period of the input waveform
b) Equal to the period of the input waveform
c) Much smaller than the period of the input waveform
d) None of these

ii) The average output voltage of positive clipper circuit will always be _____

a) Positive b) Negative c) Zero d) Infinity

iii) The period of oscillation of particular UJT depends upon _____

a) Supply voltage V_{cc} b) Time constant
c) Temperature d) All of the above

iv) An astable multivibrator is widely used as the generator of _____

a) Sine wave b) Triangular wave
c) Square wave d) All of the above

v) In a monostable multivibrator using BJT, the timing components are 47 K Ω and 0.01 μ F, then the gate width obtained will be _____

a) 32 μ sec. b) 3.2 msec.
c) 32 msec. d) 0.32 msec.

P.T.O.

vi) In a Schmitt trigger circuit, the UTP is +3.5 V and LTP is +1.0V, then the hysteresis voltage will be _____

a) 4.5 V b) 1.0 V c) + 3.5 V d) 2.5 V

vii) In astable operation using IC 555, the sawtooth like waveforms are obtained at _____ pin.

a) Control voltage b) Output

c) Threshold and trigger d) Discharge

viii) The pulse width of monostable multivibrator is controlled by _____

a) Discharging time of capacitor b) Charging time of capacitor

c) Both of above d) None of the above

ix) In astable multivibrator, if the period of the wave is twice to that of gate width, the duty cycle is _____

a) 100% b) 75% c) 50% d) 10%

x) A Schmitt trigger is _____ coupled bistable circuit.

a) Collector b) Emitter c) Base d) None of the above

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

i) Explain the need of wave shaping circuit.

ii) Draw the circuit of shunt negative clipper.

iii) Show the timing waveforms of monostable multivibrator using IC 555, across timing capacitor and output.

iv) What is constant current charging ? How it is useful in sweep generators ?

v) Draw labelled pin diagram of IC 555.

vi) Draw the circuit diagram of voltage controlled oscillator using IC 555.

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

i) Draw the circuit of RC integrator and show its response to square wave input.

ii) Explain how sweep can be generated from a basic RC time-base circuit connected to d.c.voltage source.

iii) Draw the circuit diagram of astable multivibrator using NAND gates.

B) Explain the application of IC 555 as battery charger. **4**

4. Attempt **any two** of the following : **10**

   i) Draw the circuit of collector-coupled bistable multivibrator and explain in brief.

   ii) Explain with neat circuit diagram, the working of positive biased clipper. Draw the input-output waveforms.

   iii) Draw the function block diagram of IC 555 timer and explain in brief.

5. Attempt **any one** of the following : **10**

   i) Draw the circuit of monostable multivibrator using NAND gates and explain its working. Write applications also.

   ii) With neat circuit diagram explain the working of UJT relaxation oscillator with constant current source. Also draw the waveforms.

SLR-N – 117

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
PSYCHOLOGY (Paper – VI)
Social Psychology

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Fill in the blanks (Multiple choice) : **10**

1) _____ is the world's largest democracy.
   A) China B) India
   C) Japan D) Pakistan

2) _____ proposed three models of urban life.
   A) Social Psychologists B) Cognitive psychologists
   C) Psychopathologists D) Counsellors

3) _____ opposed the concept of group mind.
   A) Jung B) Miller
   C) All port D) Freud

4) There are _____ approaches of social psychology.
   A) 2 B) 4
   C) 6 D) 8

5) There are _____ components of attitudes.
   A) 3 B) 6
   C) 9 D) 12

6) Social Identity Theory developed by _____
   A) Tajfels B) Stephan
   C) Maslow D) Freud

7) _____ term was coined by Robert Butler.
   A) Sex B) Ageism
   C) Society D) Racism

P.T.O.

8) The term stereotype was coined in _____
   A) 1998 B) 1798
   C) 1898 D) 2008
9) _____ has created first attitude measurement.
   A) Freud B) Munn
   C) Thurstone D) Pavlov
10) _____ refers to negative attitude towards people.
   A) Stereotypes B) Prejudice
   C) Sex D) Mind

2. Answer the following **any four** : **8**
   1) State the affective component of prejudice.
   2) Give the term of Tokenism.
   3) State the concept of Discrimination.
   4) Give the two reasons of stereotypes.
   5) Give the concept of prejudice.
   6) State the three components of attitude.

3. Write short notes on **any four** of the following : **12**
   1) Health and social psychology.
   2) Cognitive Distance.
   3) Attitude strength.
   4) Nature of prejudice.
   5) Costs of stereotypes.
   6) Rating scales.

4. A) Describe the fundamental processes of attitude change. **10**

   OR

   B) Discuss on attitude formation.

5. A) Describe the applications of social psychology. **10**

   OR

   B) Explain the forms of prejudice.

_____

SLR-N – 118

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2014
GEOGRAPHY (Paper – VI) (New)
Soil Science – I

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 11.00 a.m to 1.00 p.m.

N. B. *: 1)* ***Use*** *of stencils is* ***allowed****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) ***All*** *questions carry* ***equal*** *marks.*
4) ***All*** *questions are* ***compulsory****.*

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

1) The science which studies 'soil' is known as _____
(Biology, Pedology, Hydrology, Phytology)

2) Soil is the _____ layer of the surface supporting the plants.
(Lowest, Topmost, Central, Basal)

3) Texture of soil determines _____ of soil.
(Porosity, Acidity, Alkali content, Permeability)

4) A soil is composed of humus derived from _____ organic material, air, water and rock pieces.
(Fresh, Decomposed, Living, Bacterial)

5) A typical soil horizon profile is developed in _____ climate.
(Dry, Wet, Moist, Semiarid)

6) Podzolization is associated with _____ climate.
(Hot and dry, Hot and humid, Cool and dry, Cool and humid)

7) Soil orders are classified on the basis of _____ major factors.
(8, 6, 4, 2)

8) The marshy soils are associated with water logging; known as _____
(Holomorphic, Hydromorphic, Zonal, Azonal)

P.T.O.

9) Regur soil is classified as _____ soil.
(Zonal, Azonal, Intrazonal, Transported)

10) Over grazing is responsible for _____ of soil.
(Formation, Conservation, Forestry, Degradation)

2. Write short answers (**any 5**) : **10**

1) What is a 'soil texture' ?
2) What are the soil organisms ?
3) Classify soils on the basis of pH.
4) What are intrazonal soils ?
5) What is 'conservation' of soil ?
6) Define soil fertility.

3. A) Write in short **(any 2)** : **6**

1) What are the major plant nutrients ?
2) Why the soil organisms are important ?
3) What is soil management ?

B) Draw a 'profile of a soil'. **4**

4. Write in short **(any 2)** : **10**

1) What is 'structure' of a soil ?
2) State the importance of humus.
3) What is soil conservation ?
4) Alluvial soils.

5. Write in brief **(any two)** : **10**

1) Explain the 'soil formation' process.
2) Describe the importance of soil temperature.
3) State the characters of laterite soils.
4) What are the causes of soil degradation ?

_____

SLR-N – 119

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
GEOLOGY (Paper – VI)
Structural Geology

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 3.00 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*** *mark.*

1. Fill in the blank with correct answer from the given option : **10**

1) Unconformity is traceable over large area is called as _____
   a) local unconformity b) regional unconformity
   c) disconformity d) non-conformity

2) _____ types of joints observed in igneous rock.
   a) Sheet joint b) Mural joints
   c) Columinar joints d) All of these

3) Aligned springs occur a long the base of slope is a physiographic evidence of _____
   a) joint b) unconformity c) fold d) fault

4) _____ in which hanging wall moved upward relative to the foot wall.
   a) Normal fault b) Reserve fault
   c) Strike slip fault d) None of these

5) Change in the size and shape under the influence of stress is known as _____
   a) Distortion b) Dialation c) Formation d) None of these

6) Limbs in the isoclinal fold are _____ to each other.
   a) Parallel b) Perpendicular c) Inclined d) Tangential

7) Bellow the elastic limit of deformation obeys _____ law.
   a) Newton's b) Hook's c) Young's d) Cobo's

P.T.O.

8) Rock in the centre of synclinal fold is _____
   a) Younger b) Older
   c) Younger and older d) None of these

9) The most common mineral lineation shown by _____ mineral.
   a) Orthoclase b) Calcite c) Hornblende d) Augite

10) The block bellow the fault is _____
   a) Hanging wall b) Foot wall
   c) Fault out crop d) Fault trace

2. Answer **any five** of the following : **10**
   1) Thrust fault
   2) Box fold
   3) Outlier
   4) Plastic deformation
   5) Slaty cleavage
   6) Shear joints.

3. A) Answe**r any two** of the following : **6**
      1) Angular unconformity
      2) Width of outcrop
      3) Normal fault.
   B) Explain the parts of faults. **4**

4. Answer **any two** of the following : **10**
   1) Describe Physiographic criteria for recognition of fault.
   2) What is foliation ? Describe two types of foliation.
   3) Explain the genetic classification of joints.

5. Answer **any two** of the following : **10**
   1) Parts of folds.
   2) Bedding plane and its attitude.
   3) Features characteristic of fault plane.

_____

SLR-N – 12

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2014
GEOLOGY (Paper – I)
Mineralogy, Palaeontology, Igneous, Sedimentary and Metamorphic Petrology

Day and Date : Wednesday, 12-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I
(Mineralogy and Palaeontology)

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

1) Colour of powder of mineral is called _____
   a) Lustre b) Colour
   c) Streak d) Cleavage

2) Mineral property _____ depends on reflection of light.
   a) Fracture b) Cleavage
   c) Hardness d) Colour

3) Quartz shows _____ fracture.
   a) Earthy b) Conchoidal
   c) Hackly d) Even

4) Two valves of shell joins at _____
   a) Hinge b) Pallial line
   c) Margin d) Umbo

5) Shape of conus is _____
   a) Conical b) Fusiform
   c) Rounded d) Small

P.T.O.

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

   i) Streak of mineral

   ii) Pearly lustre

   iii) Even form

   iv) Metallic lustre

   v) Pallia sinus

   vi) Sinistral coiling of gastropoda

   vii) Head of trilobites.

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

   i) Define mineral and write note on hardness of mineral.

   ii) Describe feldspar group of minerals.

   iii) Describe morphological characters of Brachiopoda shell.

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

   i) Describe silica group of minerals.

   ii) Describe modes of preservation of fossils.

SECTION – II
(Igneous, Sedimentary and Metamorphic Petrology)

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

   1) There are _____ primary magmas.

      a) 2 b) 3 c) 4 d) 5

   2) The minerals formed from 'fire' are called _____ minerals.

      a) Secondary b) Tertiary c) Essential d) Pyrogenetic

   3) Solution action is related to the formation of _____ rocks.

      a) Metamorphic b) Igneous c) Volcanic d) Sedimentary

   4) Variation in chemical composition is present in _____ intrusion.

      a) Multiple b) Composite c) Sill d) Dyke

   5) Slate is example of _____ metamorphism.

      a) Thermal b) Cataclastic c) Dynamothermal d) Plutonic

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

   i) Introduction to petrology

   ii) Granitic structure

   iii) Flow structure

   iv) Stalactitic structure

   v) Lamination structure

   vi) Granulose structure

   vii) Gneissose structure.

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

   i) Amygdaloidal and vesicular structure.

   ii) Classification of igneous rocks.

   iii) Dynamothermal metamorphism.

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

   i) Depth zones of metamorphism.

   ii) Classification of sedimentary rocks.

SLR-N – 121

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
CHEMISTRY (Old)
Organic Chemistry (Paper – V)

Day and Date : Friday, 28-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagram and give equations* ***wherever*** *necessary.*
3) Figures to ***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 the correct alternative for **each** of the following : **10**

i) A typical example of chromophore is _____

a) $>C=O$ b) – OH

c) $-NH_2$ d) – Cl

ii) Geometrical isomerism is not observed in _____

a) Alkenes b) Aldoximes

c) Ketoximes d) Alkanes

iii) In Kolbe reaction sodium phenoxide is converted into _____

a) Salicyclic acid b) O-hydroxybenzaldehyde

c) p-hydroxybenzaldehyde d) None of these

iv) _____ of the following undergoes Cannizzaro's reaction.

a) $CH_3 - CHO$ b) $C_6H_5 - CH_2 - CHO$

c) HCHO d) $CH_3 - CO - CH_3$

P.T.O.

v) Diazomethane on treatment with phenol in presence of HBF_4 forms _____

a) aniline b) anisole

c) toluene d) benzene

vi) Among the followings which is unsaturated acid

a) citric acid b) acrylic acid

c) phthalic acid d) chloroacetic acid

vii) In sandmeryer reaction benzenediazonium chloride on warming with _____ gives chlorobenzene.

a) $CuCl_2$ b) CuCl

c) Cu d) Cl_2

viii) Which type of electronic transition requires least energy ?

a) $\sigma \rightarrow \sigma^*$ b) $\pi \rightarrow \pi^*$

c) $n \rightarrow \sigma^*$ d) $n \rightarrow \pi^*$

ix) Pinacol-pinacolone rearrangement proceeds via formation of _____

a) carbanion b) free radical

c) carbocation d) carbene

x) In Beckmann transformation which of the following reagent is used ?

a) PCl_5 b) H_2 c) O_2 d) CH_3COCl

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

i) Explain Hypsochromic and Bathochromic shift.

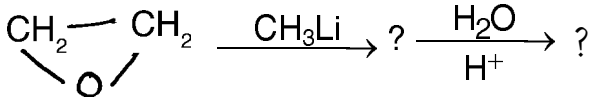
ii) Give statement and one example of Wolf-Kishner reduction.

iii) What is the action of ammonia and KI on chloroacetic acid ?

iv) How will you prepare phenol and benzene from benzene diazonium salt ?

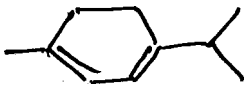
v) What are aldoximes and ketoximes ? Give suitable examples.

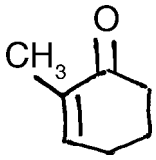
vi) Complete the following reaction :

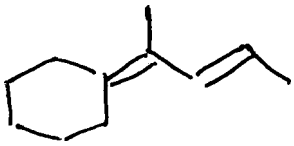


3. A) Answer **any two** of the following : **6**

i) Calculate the λ-max for following compounds by using Woodward and Fieser rule.

a) 

b) 

c) 

ii) How will you prepare salicylaldehyde from phenol ?

iii) Discuss the structure of carbonyl group.

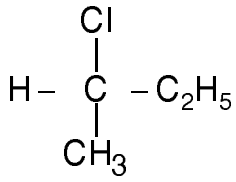
B) When 0.915×10^{-5} kg of methoxy compound having molecular formula C_7H_8O is subjected to Zeisel's method produced 2.164×10^{-5} kg of silver iodide. Calculate the percentage of methoxy group and number of methoxy groups per molecule of compound. **4**

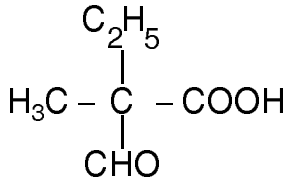
4. Answer **any two** of the following : **10**

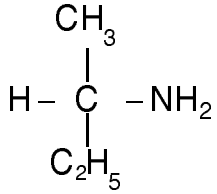
i) Explain Aldol condensation with mechanism involved.

ii) Give one method of preparation, two reactions and uses of cinnamic acid.

iii) A) Assign configuration R or S to the following compounds :

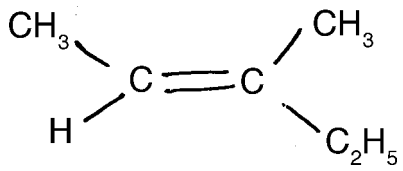
a) 

b) 

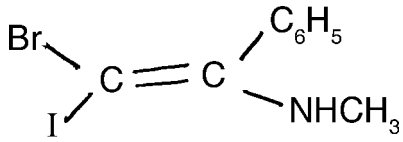
c) 

B) Assign configuration E or Z to the following compounds :

a)



b)



5. Answer **any two** of the following : **10**

i) Explain conformational isomerism in n-butane.

ii) What is the action of following reagents on glycerol ?

a) Na at room temp.

b) HCl gas at 383 K

c) Conc HNO_3 in presence of H_2SO_4 at 298 K

d) $KHSO_4$

e) $H_2O_2/FeSO_4$.

iii) Write note on application of UV spectroscopy.

Spectroscopic Chart

Woodward's-Fieser's rules for calculating ultraviolet absorption maxima

A) For substituted dienes (Ethanol solution)

No.	Basic Value	λ_{mas} (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 excyclic 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-N – 123

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
CHEMISTRY
Inorganic Chemistry (Paper – VI) (Old)

Day and Date : Saturday, 29-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Select the most correct alternative for the following and rewrite the sentences : **10**

1) In $[Co(NH_3)_6]Cl_3$, chloride ions are present in _____ sphere.
   a) Coordination sphere b) Inner sphere
   c) Non-ionisable sphere d) Ionisable sphere

2) 4d-series of transition element starts with _____ and ends with _____
   a) Scandium, zinc b) Lanthanum, cadmium
   c) Yttrium, cadmium d) Lanthanum, mercury

3) EDTA has _____ acidic functional groups.
   a) two b) four c) one d) six

4) H^+ is called hard acid, whereas H^- is _____
   a) soft base b) soft acid c) hard base d) none of these

5) To form a solution of solute, it should be dissolve in any _____
   a) compound b) solvent c) gas d) salt

6) Valence shell electronic configuration of gold is_____
   a) $5d^{10}\,6s^1$ b) $5d^9\,6s^1$ c) $6d^{10}\,7s^1$ d) $6d^9\,7s^2$

7) Relative dielectric constant of water at 298 K temperature is _____
   a) 82 b) 8.2 c) 27 d) 2.7

8) $AlCl_3$ is a _____
   a) Lewis base b) Lewis acid
   c) Soft base d) Covalent compound

P.T.O.

9) Stable chelate contains _____ membered heterocyclic ring.
   a) seven b) five c) six d) three

10) Those compounds loss their identity in aqueous medium are called _____
   a) Covalent compounds b) Salts
   c) Complex d) Chelates

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

   i) Write structure of Ca-EDTA chelate.

   ii) Define acid and bases on the basis of Lewis concept with suitable examples.

   iii) Discuss in short EAN rule.

   iv) Define double salt and complex salt.

   v) Give any two acid-base reactions in liquid ammonia.

   vi) Why transition metal shows complex formation ability ?

3. A) Answer **any two** of the following : **6**
   i) Discuss the applications of DMG as a chelating agent.
   ii) Write assumptions of Werner's theory.
   iii) What is Pearson's rule ? Write limitations of HSAB concept.

   B) Discuss the position of d-block elements. **4**

4. Write the short notes on **any two** of the following : **10**

   i) Conditions for chelate formations.

   ii) Merits and demerits of Lewis concept.

   iii) Limitations of VBT.

5. Answer **any two** of the following : **10**

   i) Explain the geometry and magnetic property of iron complex with strong field ligand on the basis of VBT.

   ii) Write the types of protonic and non-protonic solvents with suitable examples.

   iii) Discuss the variable oxidation states of 3-d block elements.

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SLR-N – 125

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
PHYSICS (Old)
General Physics and Sound (Paper – V)

Day and Date : Monday, 1-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *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) Acceleration due to earths gravity _____ with increasing altitude.
a) Increases b) Decreases
c) Remains constant d) Becomes zero

ii) The rate of precession ϕ is _____
a) $\frac{T_1}{I_\omega}$ b) $\frac{I_\omega}{T_1}$ c) $I\omega T_1$ d) $\frac{T_1}{\omega}$

iii) Gyrocompass is used to determine _____
a) Geographic north-south direction b) Angle of dip
c) Magnetic N-S direction d) None of these

iv) In flat spiral spring, the plane of each spiral is _____ to the axis of the cylinder of the spring.
a) Parallel b) Perpendicular
c) Not related d) Highly inclined

v) The C.G.S. unit of viscosity is _____
a) Paise b) gm. cm/s c) dyne/cm^2 d) dyne/cm

vi) Rankins method is used to determine the viscosity of _____
a) Gas b) Gas and liquid c) Liquid d) Water

vii) The audibility of human ear is _____
a) 20 Hz to 20 kHz b) 100 Hz to 20 kHz
c) 20 Hz to 10 kHz d) 10 kHz to 10 MHz

P.T.O.

viii) Two different musical instruments tuned to the same frequency can be differentiated by the characteristic of _____ of sound.

a) Loudness b) Pitch c) Intensity d) Quality

ix) The experimental work related with architectural acoustics was scientifically performed by _____

a) Newton b) Rayleigh c) W. C. Sabine d) Hertz

x) The coefficient of absorption of an open window is _____

a) Zero b) One c) One half d) Two

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

i) Define gravitational constant G.

ii) State Lanchester's rule.

iii) Explain the term precession.

iv) Explain the terms neutral surface and neutral axis.

v) Define phon.

vi) What is the difference between musical sound and noise ?

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

i) Explain the term reverberation time.

ii) Explain any one application of gyroscopic motion.

iii) Explain the term bending moment.

B) If the intensity of sound is 100 times the threshold of audibility then find the intensity level (S) in dB. **4**

4. Answer **any two** of the following : **10**

i) Derive an expression for determination of mass of sun.

ii) Write note on Searl's viscometer.

iii) Write note on carbon microphone.

5. Answer **any one** of the following : **10**

i) Derive an expression for the depression produced at the midpoint of a light beam supported at both ends and loaded at the centre.

ii) Discuss the various factors affecting the acoustics of buildings and hence write the requirements (remedy) of good acoustics.

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SLR-N – 126

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
BIOCHEMISTRY (Paper – I) (Old)
Biomolecules

Day and Date : Monday, 1-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 by selecting most correct answer from the given options : **(1×10=10)**

i) _____ is a ketose sugar.
a) Glucose b) Fructose c) Lactose d) Ribose

ii) Chitin contains _____
a) Glucosamine b) Deoxyribose
c) Myoinositol d) L-ascorbic acid

iii) Isoelectric pH (pI) for aspartic acid is _____
a) = 7.0 b) > 7.0 c) < 7.0 d) = 0.0

iv) Fibrous proteins are also called as _____
a) Globular proteins b) Albumins
c) Peptones d) Scleroproteins

v) Fumarase enzyme show _____ specificity for fumaric acid.
a) Geometric b) Group c) Optical d) Absolute

vi) _____ is a fat soluble vitamin.
a) Pantothenic acid b) Retinol
c) Niacin d) Pyridoxine

vii) Thiamine deficiency causes _____
a) Pellagra b) Burning feet
c) Night blindness d) Beriberi

P.T.O.

viii) Terpenes are the lipids derived from _____

a) Isoprenes b) Waxes c) Phospholipids d) Sterols

ix) Galactose is a component of _____

a) Sucrose b) Cellulose c) Lactose d) Amylose

x) When an enzyme requires coenzyme for reaction, its protein part is called _____

a) Holoenzyme b) Isoenzyme

c) Apoenzyme d) Prosthetic group

2. Answer **any five** : **(2×5=10)**

1) What is Zwitterion of an amino acid ?
2) Give two differences between myoglobin and haemoglobin.
3) Define isoenzyme. Give an example.
4) What are disaccharides ? How is maltose formed ?
5) Which reactions of amino acid metabolism require pyridoxal phosphate as a coenzyme ?
6) What are differences between oil and fats ?

3. A) Attempt **any two** : **(3×2=6)**

1) Write and explain Fehling test for carbohydrates.
2) What is the role of pantothenic acid in fatty acid biosynthesis ?
3) What is the effect of temperature on enzyme catalysed reaction ?

B) Write an account of competitive inhibition of enzymes. **4**

4. Answer **any two** : **(5×2=10)**

1) Explain the Fluid Mosaic Model of plasma membrane.
2) Describe the secondary structure of protein.
3) Write an account of fibrous and globular proteins.

5. Attempt **any two** : **(5×2=10)**

1) Explain in detail the Induced Fit hypothesis of enzyme catalysis.
2) Give structures and role of disaccharides.
3) Write and explain ninhydrin reaction for amino acids.

_____

SLR-N – 13

Seat No.	

B.Sc. – I (Sem. – I) Examination, 2014
(C.G.P.A. Pattern)
MICROBIOLOGY (Paper – I)
Fundamentals of Microbiology and Microbial Techniques

Day and Date : Wednesday, 12-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Answers to the ***two*** *Sections should be written on the* ***separate*** *answer books.*

SECTION – I

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

1) _____ are obligate intracellular parasites.
   a) Viruses b) Bacteria
   c) Mycoplasma d) Fungi

2) Penicillin antibiotic was discovered by _____
   a) Robert Koch b) Louis Pasteur
   c) Wakesman d) Alexander Fleming

3) In Escherichia Coli, Escherichia denotes the name of _____
   a) Genus b) Species
   c) Class d) Phylum

4) Bacilli are _____ shaped bacteria.
   a) Spiral b) Rod
   c) Round d) Spindle

5) Flagella are composed of _____ protein.
   a) Pillin b) Albumin
   c) Globulin d) Flagellin

2. Answer **any five** of the following : **10**
   i) Arrangements of flagella.
   ii) Give briefly structure of mesosomes.
   iii) What is Koch Postulates ?
   iv) Differentiate capsule and slime layer.
   v) Enlist general characteristic of viruses.
   vi) Give structure and function of pili.
   vii) Write beneficial activities of microorganisms.

3. A) Write short notes on **any two** of the following : **10**
   i) Write structure and functions of cell membrane.
   ii) Give different contributions of Louis Pasteur.
   iii) General characteristic of fungi-Enlist.

   B) Write/Answer **any one** of the following : **10**
   i) Differences between prokaryotic cell and eukaryotic cell with diagram.
   ii) Write an essay on structure and functions of cell wall of bacteria.

SECTION – II

1. Rewrite the following sentences by selecting correct answers from given alternatives. **5**
   1) Viruses can be cultivated in _____ media.
      a) Synthetic b) Living
      c) Semisynthetic d) Nonsynthetic
   2) Generally _____ is used as solidifying agent in culture media.
      a) Agar-Agar powder b) NaCl
      c) Peptone d) Meat extract
   3) _____ staining is an example of differential staining procedure.
      a) Capsule b) Cell wall
      c) Gram staining d) Negative staining
   4) Autoclave makes use of _____ for sterilization.
      a) Moist heat b) Dry heat
      c) Radiation d) Filtration

5) Refractive Index of oil immersion lense is _____

a) 0.5 b) 1.5

c) 1 d) 2

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

i) What is antiseptic ? Give 2 examples.

ii) What is neutral stain ?

iii) List types of objectives of light microscope.

iv) What is the composition of nutrient agar ?

v) What is pure culture ?

vi) What is oligodynamic action ?

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

i) What are the different methods of streak plate techniques.

ii) Explain the mechanism of Gram staining.

iii) Explain sterilization by dry heat.

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

i) With ray-diagram, explain working principle and application of compound light microscope.

ii) Write in detail about the living culture media.

_____

SLR-N – 133

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2014
GEOCHEMISTRY (Old)
Introduction to Geochemistry (Paper – I)

Day and Date : Wednesday, 3-12-2014 Total Marks : 50
Time : 3.00 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 the correct alternative each of the following : **10**

1) The number of phases in water system is
a) one b) two c) three d) four

2) The radius ratio for ionic solid having co-ordination number four is
a) 0.225 b) 0.414 c) 0.155 d) 0.303

3) The atomic substitution is ———— at high temperature.
a) lower b) higher c) minimum d) none of these

4) In a frame work structure of silicate, the ratio of silicon to oxygen is
a) 1 : 2 b) 1 : 3 c) 1 : 4 d) 2 : 3

5) The number of triple points in sulphur system is
a) 1.0 b) 2.0 c) 3.0 d) 4.0

6) The radius ratio of zinc sulphide crystal is
a) 0.1 b) 0.2 c) 0.3 d) 0.4

7) In a ———— bonding, there is a sharing of electrons.
a) ionic b) metallic c) co-valent d) none of these

8) The basic unit of silicate structure is
a) $(SiO_4)^{-1}$ b) $(SiO_4)^{-2}$ c) $(SiO_4)^{-3}$ d) $(SiO_4)^{-4}$

P.T.O.

9) The temperature at which Rhombic sulphur convert into Monoclinic sulphur is called as
   a) Transition temperature b) Melting point
   c) Boiling point d) Triple point

10) The number of atoms per unit cell of body centered cubic crystal is
   a) 4 b) 1 c) 3 d) 2

2. Answer **any five** of the following : **10**
   a) Define :
      i) Phase ii) Component
   b) Define : Radius ratio.
   c) Define : Electronegativity
   d) Explain : polymorphism.
   e) Give the mathematical equation of Gibb's phase rule.
   f) Explain the trends in ionic radii in a periodic table.

3. A) Answer **any two** of the following : **6**
      i) Discuss a brief idea of ionic radii of common ions in rock forming minerals.
      ii) Explain single chain structure of silicate.
      iii) Write a short note on isomorphism.

   B) Show that for a system $CaCo_{3(s)} \rightleftharpoons Cao_{(s)} + Co_{2(g)}$ the number of components is two. **4**

4. Answer **any two** of the following : **10**
      i) Discuss water system with respect to Gibb's phase rule.
      ii) Discuss general rules of bond type.
      iii) Discuss lattice energy of crystals.

5. Answer **any two** of the following : **10**
      i) Discuss sulphur system with respect to Gibb's phase rule.
      ii) Discuss general rules of three dimensional structure with the help of solid geometry.
      iii) Write a short note on Atomic substitution.

SLR-N – 134

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
ZOOLOGY (Old)
Animal Diversity – III (Paper – V)

Day and Date : Wednesday, 3-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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.*
4) ***Write*** *the question number* ***attempted*** *in margin.*

1. Select the appropriate answer from those given below **each** question and **complete** the sentences : **10**

1) Seastar belongs to _____ phylum.
a) Arthropoda b) Mollusca c) Echinodermata d) Hemichordata

2) Peripatus is connecting link between _____
a) Arthropoda and mollusca b) Annelida and arthropoda
c) Mollusca and echinodermata d) Echinodermata and Hemichordata

3) The number of spiracles in cockroach is _____
a) Six pairs b) Eight pairs c) Ten pairs d) Twelve pairs

4) Presence of pallial cavity is a characteristic feature of phylum _____
a) Arthropoda b) Mollusca c) Echinodermata d) Hemichordata

5) The structural and functional unit of cockroach eye is _____
a) Rods b) Cones c) Retina d) Ommatidium

6) Radula of pila consists _____ number of teeth in each row.
a) 5 b) 6 c) 7 d) 8

7) _____ mosquito is the vector of filarial worm.
a) Aedes b) Culex c) Anopheles d) Bed bug

8) Siphoning type of mouth parts are present in _____
a) Housefly b) Butter fly c) Mosquito d) Cockroach

P.T.O.

9) Heart of pila is _____ chambered.

a) One b) Two c) Three d) Thirteen

10) Foot is modified in byssus threads in _____

a) Sepia b) Pila c) Mytilus d) Patella

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

i) Salient features of phylum arthropoda.

ii) Mandibles of cockroach.

iii) Heart of cockroach.

iv) Statocyst of pila.

v) Housefly mouth parts.

vi) Malaria disease.

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

i) Heart of pila.

ii) Ovary of cockroach.

iii) Foot in Gastropoda.

B) Describe the mouth parts of mosquito. **4**

4. Answer **any two** of the following : **10**

i) Describe the nervous system of cockroach.

ii) Describe pallial complex of pila.

iii) Give the affinities of hemichordata.

5. Answer **any one** of the following : **10**

i) Describe the digestive system of pila.

ii) Describe the digestive system of cockroach.

_____

SLR-N – 135

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2014
STATISTICS (Paper – VI)
Discrete Probability Distributions and Statistical Methods

Day and Date : Thursday, 4-12-2014 Max Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

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

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

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

1) The family of parametric distributions which has mean always less than variance is

a) Beta distribution b) Poisson distribution

c) Geometric distribution d) Negative binomial distribution

2) Negative binomial distribution NB (x, r, p) for r = 1 reduces to

a) Binomial distribution b) Poission distribution

c) Hypergeometric distribution d) Geometric distribution

3) If X is a Poission variate with P (X = 1) = P (X = 2) then the second raw moment about origin μ_2^1 is ————————

a) 2 b) 6 c) 4 d) 1

4) If X ~ G (P) then P (X ≥ 2) is

a) pq b) p^2 c) q^2p d) q^2

5) If X ~ NB (r, p) such that E (X) = 12 V (X) = 36 then

a) $r = 3,\ p = \frac{1}{3}$ b) $r = 12, p = \frac{1}{4}$ c) $r = 36, p = \frac{1}{2}$ d) $r = 6, p = \frac{1}{3}$

6) If X is a geometric random variable then P [X ≥ 6 / X ≥ 3] is ————————

a) P [X ≥ 6] b) P [X ≥ 3]

c) P [X ≥ 6] · P [X ≥ 3] d) P [X ≥ 2]

P.T.O.

7) If X ~ P (1) and Y ~ P (2) are independent then P [X = 0/X + Y = 2] = ———

a) $\frac{1}{3}$ b) $\left(\frac{2}{3}\right)^2$ c) $\frac{2}{3}$ d) $\left(\frac{1}{3}\right)^2$

8) The range of multiple correlation coefficient is

a) 0 to + 1 b) – 1 to +1 c) $-\infty$ to ∞ d) 0 to ∞

9) Let $(X_1\ X_2\ X_3)$ be a random vector follows multinomial distribution with usual notations then coV $(X_1\ X_2)$ = ————————

a) $p_1\ p_2$ b) $-n\ p_1\ p_2$ c) $2p_1\ p_2$ d) none of these

10) The correlation coefficient between $X_{1.3}$ and $X_{2.3}$ is

a) r_{23} b) $r_{12.3}$ c) $r_{13.2}$ d) r_{12}

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

i) State the pmf of Poisson distribution with parameter λ.

ii) Show that geometric distribution is a particular case of negative binomial distribution.

iii) If X is a Poission variate such that P (X = 2) = 9 P (X = 4) + 90 P (X = 6) find λ.

iv) Show that a multiple correlation coefficient cannot be negative.

v) Find mean of the residual.

vi) Show that for negative binomial variance is greater or equal to mean.

3. A) i) Let X be geometric variate with parameter P then show that

$P(X \geq x) = (1-P)^x$. **6**

ii) With usual notations prove that $1 - R^2_{1.23} = \left(1 - r^2_{12}\right)\left(1 - r^2_{13.2}\right)$.

iii) With usual notations prove that $b_{12.3}\ b_{23.1}\ b_{31.2} = r_{12.3}\ r_{23.1}\ r_{31.2}$.

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) If X and Y are two independent Poisson variates, then show that conditional distribution of X given X + Y is binomial.

   ii) If $r_{12} = r_{13} = r_{23} = \rho$ then show that $1 - R^2_{1.23} = \frac{(1-\rho)(1+2\rho)}{(1+\rho)}$.

   iii) 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 $R_{1.23}$.

5. Answer **any two** of the following : **10**

   i) If r_{12} and r_{13} are given show that r_{23} must lie within the limits

   $r_{12}\, r_{13} \pm \left(1 - r^2_{12} - r^2_{13} + r^2_{12}\, r^2_{13}\right)^{1/2}$. Hence or otherwise if $r_{12} = k$, $r_{13} = -k$ then r_{23} lies between –1 and $1 - 2k^2$.

   ii) Define partial correlation coefficient. If $r_{23} = 1$ prove that $r^2_{12} = r^2_{13} = R^2_{1.23}$.

   iii) State the properties of residual. Prove any two of them.

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SLR-N – 139

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
MATHEMATICS (Paper – V) (Old)
Differential Calculus – II

Day and Date : Friday, 5-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) If $f(x) = |x|$ then
   a) $f'(0) = 0$ b) f(x) is maximum at x = 0
   c) f(x) is minimum at x = 0 d) None of these

2) If $y = a\log x + bx^2 + x$ has its extremum values at $x = -1, x = 2$ then
   a) $a = 2 \quad b = -1$ b) $a = 2 \quad b = -\frac{1}{2}$
   c) $a = -2 \quad b = \frac{1}{2}$ d) None of these

3) The necessary condition for a function f(x) to have a maxima at x = c is that
   a) $f'(c) > 0$ b) $f'(c) = 0$ c) $f'(c) < 0$ d) None of these

4) The function x^x is minimum for x = _____
   a) $\frac{1}{e}$ b) e c) $e^{\frac{1}{e}}$ d) $\left(\frac{1}{e}\right)^e$

5) Assuming u, v, w are functions of three variables x, y, z. If the Jacobian J of u, v, w w.r.to. x, y, z and Jacobian J′ of x, y, z w.r.to u, v, w exist then $J \cdot J' =$ _____
   a) 1 b) –1 c) 0 d) Does not exist

6) If $u = xy \quad v = x + y$ then $\frac{\partial(u, v)}{\partial(x, y)} =$ _____
   a) x – y b) y – x c) x + y d) xy

P.T.O.

7) If u, v are functions of two variables x, y then Jacobian of u, v, w.r.to x, y is of order _____

a) 1 b) 2 c) 3 d) Not defined

8) The curvature of a circle of radius r is

a) r b) –r c) $\frac{1}{r}$ d) $\frac{-1}{r^2}$

9) For the polar equation $r = f(\theta)$, $\frac{ds}{d\theta} =$ _____

a) $\left(r^2 - \left(\frac{dr}{d\theta}\right)^2\right)^{1/2}$ b) $\left(\left(\frac{dr}{d\theta}\right)^2 - r^2\right)^{1/2}$

c) $\left(r^2 + \frac{d^2r}{d\theta^2}\right)^{1/2}$ d) $\left(r^2 + \left(\frac{dr}{d\theta}\right)^2\right)^{1/2}$

10) For the curve $s = ae^{x/a}$

a) $\rho = s/\sqrt{s^2 - a^2}$ b) $s\sqrt{s^2 - a^2} = \rho$

c) $\rho = \sqrt{s^2 - a^2}$ d) $\rho = s\sqrt{s^2 - a^2}$

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

1) Define the term total curvature, average curvature of the curve at any pt.p.

2) Prove that for any curve $\frac{1}{\rho} = \frac{d}{dx}\left(\frac{dy}{ds}\right)$.

3) If $u = x^2 - y^2$ $v = xy$ then find $\frac{\partial(u, v)}{\partial(x, y)}$.

4) Find the Jacobian of u, v, w w.r.to x, y, z for the following transformation $u = 3x + 2y - z$ $v = x - 2y + z$ $w = x(x + 2y - z)$.

5) State the conditions for stationary value of a function of two variables.

6) Find the greatest and least values of the function $x^4 - 4x^3 - 2x^2 + 12x + 1$ in the interval $[-2, 5]$.

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

   1) Find the radius of the curvature of the curve $r = a \sin n\theta$ at the origin.

   2) Find the extreme values of $u = x^2 + xy + y^2$.

   3) If $x = a(u + v)$ $y = b(u - v)$ and $u = r^2 \cos 2\theta$ $v = r^2 \sin 2\theta$ find $\frac{\partial(x, y)}{\partial(r, \theta)}$.

   B) Derive an expression for the radius of curvature of the curve $p = f(r)$. **4**

4. Attempt **any two** of the following : **10**

   1) Prove that for the cardioide $r = a(1 + \cos\theta)$ $\frac{\rho^2}{r}$ is constant.

   2) Let p, q be the roots of z in the quadratic equation $\frac{x}{a+2} + \frac{y}{b+2} = 1$. Find $\frac{\partial(p, q)}{\partial(x, y)}$.

   3) Explain the Lagrange's method of undetermined multipliers to determine extreme values $u = f(x, y, z)$ when $\phi(x, y, z) = 0$.

5. Attempt **any two** of the following : **10**

   1) In the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ show that radius of curvature at an end of the major axis is equal to semilatus rectum of the ellipse.

   2) If $u = \frac{x}{y - z}$, $v = \frac{y}{z - x}$, $w = \frac{z}{x - y}$ find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.

   3) Prove that the stationary value of $u = \frac{x^2}{a^4} + \frac{y^2}{b^4} + \frac{z^2}{c^4}$ subject to the conditions $lx + my + nz = 0$ and $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ are the roots of the equation $\frac{l^2a^4}{1 - a^2u} + \frac{m^2b^4}{1 - b^2u} + \frac{n^2c^4}{1 - c^2u} = 0$.

SLR-N – 141

Seat No.	

B.Sc. – II (Semester – III) (Old) Examination, 2014
MATHEMATICS (Paper – VI)
Differential Equation – II

Day and Date : Saturday, 6-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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**

1) The general solution of the differential equation $(y - px)(p - 1) = p$ is given by _____

a) $y = cx - \frac{p}{p+1}$ b) $y = cx + \frac{p}{p-1}$ c) $y = cx - \frac{p}{p-1}$ d) $y = \frac{p}{p+1} - cx$

2) The solution of differential equation $p^2 - 7p + 12 = 0$ is _____

a) $(y + 3x + c)(y + 4x + c) = 0$ b) $(y + 3x + c)(y - 4x + c) = 0$
c) $(y - 3x - c)(y - 4x - c) = 0$ d) $(y - 3x - c)(y + 4x - c) = 0$

3) The P.I of the differential equation $x^2 \frac{d^2y}{dx^2} + y = 3x^2$ is _____

a) P.I = x^2 b) P.I = x
c) P.I = $(\log x)^2$ d) P. I = $\log x$

4) The C.F of differential equation $x^2 \frac{d^2y}{dx^2} + 2x\frac{dy}{dx} = 0$ is _____

a) C.F= $C_1e^x + C_2e^{-x}$ b) C.F = $C_1e^x + C_2e^{-2x}$
c) C.F = $C_1 + C_2e^{-x}$ d) C.F = $C_1 + C_2x^{-1}$

5) If $P + Qx = 0$ then the one solution of $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ is _____

a) $y = e^x$ b) $y = e^{-x}$ c) $y = x$ d) $y = x^2$

P.T.O.

6) The known solution of equation $x\frac{d^2y}{dx^2} - (x+2)\frac{dy}{dx} + 2y = 0$ is _____

a) $y = e^x$ b) $y = e^{-x}$ c) $y = x$ d) $y = x^2$

7) Find the general solution of $xdx + ydy + zdz = 0$ is _____

a) $x + y + z = C_1$ b) $xyz = C_1$

c) $x^2 + y^2 + z^2 = C_1$ d) $x^2 - y^2 - z^2 = C_1$

8) The solution of differential equation $(y + z)\,dx + dy + dz = 0$ is _____

a) $y + z = C_1e^{-x}$ b) $x + y + z = C_1$

c) $y + x = C_1e^{-z}$ d) $x + z = C_1e^{-y}$

9) The solution of differential equation $\frac{dx}{a} = \frac{dy}{a} = \frac{dz}{1}$ is _____

a) $x - y = C_1,\ y - az = C_2$ b) $x + y = C_1,\ y + az = C_2$

c) $x - y = C_1,\ ay - z = C_2$ d) $x + y = C_1,\ ay + z = C_2$

10) The solution of differential equation $\frac{dx}{\tan x} = \frac{dy}{\tan y} = \frac{dz}{\tan z}$ is _____

a) $\sin x.\sin y = C_1,\ \sin x.\sin z = C_2$ b) $\frac{\sin x}{\sin y} = C_1,\ \frac{\sin x}{\sin z} = C_2$

c) $\cos x.\cos y = C_1,\ \cos x.\cos z = C_2$ d) $\frac{\cos x}{\cos y} = C_1,\ \frac{\cos x}{\cos z} = C_2$

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

1) Solve : $x = y + a \log p$

2) Solve $y = x + a\tan^{-1}p$

3) Solve the differential equation $(x^2D^2 - xD + 4)\,y = 0$

4) Solve $\frac{dx}{z} = \frac{dy}{-z} = \frac{dz}{z^2 + (x+y)^2}$

5) Solve $yzdx + zxdy + xzdz = 0$

6) Solve $\frac{dx}{y^2} = \frac{dy}{x^2} = \frac{dz}{x^2y^2z^2}$.

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

1) Solve $y^2 = pxy + \left(\frac{py}{x}\right)^2$ by using substitution.
$x^2 = u, y^2 = v$

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

3) Solve $y^2dx - zdy + ydz = 0$.

B) Find the necessary condition of integrability of a differential equation $Pdx + Qdy + Rdz = 0$. **4**

4. Attempt **any two** of the following : **10**

1) 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.

2) Solve $\frac{dx}{x(y^2 - z^2)} = \frac{dy}{y(z^2 - x^2)} = \frac{dz}{z(x^2 - y^2)}$.

3) Explain the method of solving the homogenous differential equation.

$x^n \frac{d^ny}{dx^n} + P_1x^{n-1}\frac{d^{n-1}y}{dx^{n-1}} + ... + P_ny = X$ where $P_1, P_2 ... P_n$ are constant and X is function of x.

5. Attempt **any two** of the following : **10**

1) Explain how to solve the equation $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ where P, Q, R are functions of x only when one solution belonging to C.F. is known.

2) Solve $\frac{dx}{x(y^2 + z)} = \frac{dy}{-y(x^2 + z)} = \frac{dz}{z(x^2 - y^2)}$.

3) Solve $(2x^2 + 2xy + 2xz^2 + 1)\,dx + dy + 2zdz = 0$.

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Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
BOTANY (Old)
Paper – VI : Plant Ecology

Day and Date : Saturday, 6-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) The plants growing in sunlight are called _____
   a) Heliophytes b) Sciophytes
   c) Halophytes d) Hydrophytes

ii) _____ means the death rate of individuals in the population.
   a) Mortality b) Natality c) Vital index d) Density

iii) Which of the following is quantitative character ?
   a) Life form b) Density c) Phenology d) Stratification

iv) In grassland ecosystem grasshoppers are _____
   a) Producers b) Primary consumers
   c) Secondary consumers d) Tertiary consumers

v) Plants growing in acidic soil are called as _____
   a) Oxalophytes b) Mesophytes c) Xerophytes d) Halophytes

vi) The plant succession which starts on the extreme bare area which was previously occupied by vegetation is called _____
   a) Primary succession b) Secondary succession
   c) Halosere d) Psammoserw

vii) Equisetum is an indicator of _____
   a) Gold b) Silver c) Copper d) Uranium

viii) Plant species restricted to a definite small region are referred to as _____ species.
   a) Wide b) Endemic c) Discontinuous d) All of these

P.T.O.

ix) In _____, plants avoid competition with other plants by secreting the chemicals which are harmful to the other plants.
a) Antibiosis b) Predation c) Mortality d) None of these

x) The rate at which the energy accumulates in green plants is known as _____
a) Net primary productivity b) Primary productivity
c) Secondary productivity d) All of these

2. Answer **any five** of the following : **10**
i) What is xerosere ? Enlist various stages of xerosere.
ii) What is age pyramid ? Draw age pyramid of stable population.
iii) Define water holding capacity of soil.
iv) What is phytogeography ? Enlist various factors affecting the geographical distribution of the plant species.
v) What is significance of light to the plants ?
vi) What is food chain ? Give an outline of parasitic food chain.

3. A) Answer **any two** of the following : **6**
i) Comment up on any one phytogeographical region of India you have studied.
ii) What is immigration ? Explain the effects of immigration on population.
iii) Discuss the photosynthetic adaptations in C_4 plants.

B) What is ecosystem ? Write brief account of biotic factors in forest ecosystem. **4**

4. Answer **any two** of the following : **10**
i) What is adaptation ? Write an account of morphological and anatomical adaptations of hydrophytes.
ii) What is ecological pyramid ? Write an account of pyramid of number in parasitic food chain.
iii) Define succession. Explain in brief different steps involved in primary succession.

5. Answer **any two** of the following : **10**
i) What are analytical characters of the community ? Write brief account of any two qualitative characters of plant community.
ii) Explain the role of predators in regulating population size.
iii) Describe different kinds of plant indicators with suitable examples.

SLR-N – 143

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
ELECTRONICS (Old)
Electronics Circuits (Paper – V)

Day and Date : Monday, 8-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of log tables and calculator is* ***allowed****.*

1. Select the correct alternative. **10**

1) The current gain of CB amplifier is _____
   a) zero b) nearly equal to one
   c) very large d) none

2) The input resistance of FET CS amplifier is _____
   a) zero b) low c) high d) none

3) In class B power amplifier the transistor conducts for _____
   a) 90° b) 180° c) 360° d) none

4) The maximum conversion efficiency of RC coupled class-A power amplifier is _____
   a) 25% b) 50% c) 75% d) 100%

5) Stability of the circuit _____ with negative feedback.
   a) decreases b) increases
   c) does not change d) none

6) Gain of the amplifier _____ with negative feedback.
   a) decreases b) increases
   c) does not change d) none

P.T.O.

7) In phase shift oscillator, each RC network introduces _____ phase shift.
   a) 0° b) 30° c) 60° d) 90°

8) In Colpitt's oscillator _____ is tapped.
   a) R b) L c) C d) none

9) In differential amplifier, CMRR must be _____
   a) zero b) unity c) small d) large

10) Current mirror circuit is used to _____
   a) increase CMRR b) decrease CMRR
   c) increase output d) none

2. Answer **any five** of the following : **10**
   i) Give the important characteristics of common collector amplifier.
   ii) Draw the circuit diagram of class-B push pull power amplifier.
   iii) What is feedback ? Give its types.
   iv) What are the conditions for sustained oscillations ?
   v) Define differential gain and common mode gain.
   vi) What is multistage amplifier ? Why it is required ?

3. A) Answer **any two** of the following : **6**
   i) Give the classification of power amplifiers.
   ii) What are the advantages of negative feedback ?
   iii) Explain the basic action of transistor amplifier.

   B) Explain the working of Hartley oscillator. **4**

4. Answer **any two** of the following : **10**
   i) Explain constant current bias used in differential amplifier.
   ii) Explain direct coupled amplifier. Give its frequency response.
   iii) Explain Wien bridge oscillator. Give the formula for frequency of oscillation.

5. Answer **any two** of the following : **10**
   i) Derive the expression for gain of the amplifier with feedback.
   ii) Explain emitter coupled differential amplifier.
   iii) Explain complementary-symmetry power amplifier.

_____

SLR-N – 148

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
ELECTRONICS (Paper – VI) (Old)
Pulse and Switching Circuits

Day and Date : Tuesday, 9-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *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 correct alternative from the following : **10**

i) If $\pm$ 10 V ac input signal is applied to ideal diode positive clipper, the output signal will vary between _____

a) 0 to +10 V b) 0 to –10 V
c) +10 V to –10 V d) 0 to +20 V

ii) If $\pm$ 10V ac input signal is applied to ideal negative clamper circuit, the output signal will vary between _____

a) 0 to +10 V b) 0 to –10 V
c) 0 to +20 V d) 0 to –20 V

iii) A +12 V d.c. supply is connected across the base terminals B_1 and B_2 of UJT having intrinsic stand-off ratio of 0.70. The peak point voltage in ideal conditions will be _____

a) 8.4 V b) 9.6 V c) 12 V d) 0 V

iv) Difference in slope of the time-base signal at the beginning and end of the sweep is called _____

a) Sweep speed b) Slope error
c) Sweep time d) Flyback time

v) Turn-on time in switching transistor is the sum of _____

a) Storage and fall time b) Rise and fall time
c) Delay and storage time d) Rise and delay time

P.T.O.

vi) In collector-coupled astable multivibrator, the output waveforms at the collectors are _____

a) In phase with each other

b) 90° out of phase with each other

c) 180° out of phase with each other

d) 270° out of phase with each other

vii) The multivibrator that do not require external trigger for its operation is _____

a) astable multivibrator b) monostable multivibrator

c) bistable multivibrator d) both b) and c)

viii) The schmitt-trigger circuit can convert _____ waveform into rectangular waveform.

a) Sinusoidal b) Triangular

c) Sawtooth d) All of these

ix) As per the functional block diagram of IC 555, _____ flip-flop is used as a latch.

a) D b) JK c) RS d) All of these

x) For astable multivibrator using IC 555, if charging resistance R_A and discharging resistance R_B are made equal, the duty cycle obtained will be approx. _____

a) 50% b) 66% c) 33% d) 99%

2. Attempt **any five** : **10**

i) Show the response given by an RC integrator circuit to square wave input when RC >> T.

ii) Write the equation for frequency of UJT relaxation oscillator and comment on it.

iii) Define turn-on time and turn-off time of a switching transistor.

iv) Show the input-output waveforms for the schmitt-trigger circuit when sine-wave input is applied to it.

v) In astable using IC 555, if T_{ON} is three times T_{OFF}. Obtain percent duty cycle.

vi) Give the advantages of using timer IC 555.

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

   i) Draw the circuit of biased positive clipper. Show the input-output waveforms and comment.

   ii) Draw the electrical equivalent diagram for UJT. Comment on intrinsic stand-off ratio.

   iii) Determine the gate width of a monostable multivibrator using IC 555 for timing components R = 10 KΩ, C = 0.1 μF.

   B) Determine the period and frequency of oscillation of a collector-coupled astable multivibrator with timing component values R_1 = 5 KΩ, C_1 = 0.1 μF, R_2 = 2 KΩ, C_2 = 0.1 μF. **4**

4. Attempt **any two** of the following : **10**

   i) Give the need of waveshaping circuit. Explain any one waveshaping circuit.

   ii) With suitable diagram, explain the use of constant current charging in time-base circuit.

   iii) Explain how transistor can be used as a switch.

5. Attempt **any two** of the following : **10**

   i) Explain the application of IC 555 as voltage controlled oscillator.

   ii) With neat circuit diagram, explain the working of bistable multivibrator. Draw the waveforms.

   iii) Using the functional block diagram of IC 555 explain its operation as astable multivibrator.

SLR-N – 15

Seat No.	

B.Sc. (Part – I) (Sem. – I) Examination, 2014
CHEMISTRY (Paper – I) (Old)
Physical Chemistry

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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.*
4) ***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 for **each** of the following : **10**

1) _____ method is used to determine order of reaction.
   a) Derivative b) Multiplication
   c) Addition d) Integration

2) Slope of line is given by _____
   a) $\tan\theta$ b) $\sin\theta$ c) $\cos\theta$ d) $\cot\theta$

3) Hot body in heat engine is called as _____
   a) sink b) engine
   c) source d) working substance

4) The gas which obeys ideal gas equation at all temperatures and pressures is known as _____
   a) real gas b) permanent gas
   c) non-ideal gas d) ideal gas

5) Sum of all exponents of concentration term in rate law is known as _____ of reaction.
   a) order b) molecularity c) rate d) rate constant

6) Equation for straight line with positive slope having an intercept on Y-axis is _____

a) $y = mx + c$ b) $y = -mx + c$

c) $y = mx$ d) $y = -mx$

7) The process occuring at constant temperature is known as _____

a) Isobaric b) Isothemal

c) Isotonic d) Isochoric

8) Rate of a reaction depends upon _____

a) temperature b) concentration

c) catalyst d) all of these

9) The temperature at which a real gas shows ideal behaviour is known as _____

a) Critical temperature b) Reduced temperature

c) Boyle temperature d) Inversion temperature

10) The parameter Z used to compare deviations of gases from ideal behaviour is called

a) Gas constant b) Critical constant

c) Van der Waals constant d) Compressibility factor

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

1) Write the equation for rate constant of a second order reaction where initial concentration are same. What is its unit ?

2) Define ideal gas and non-ideal gas.

3) State spontaneous process.

4) Give example of second order reaction with reaction.

5) Define molecularity of the reaction with example.

6) Differentiate following equation with respect to T at constant pressure $H = E + PV$.

3. A) Answer **any two** of the following : **6**
   1) Explain decomposition of N_2O_5.
   2) Give any three characteristics of differentiation.
   3) Acetone has Van der Waals constants as,
      $a = 1.406\ Nm^4/mol^2$
      $b = 9.94 \times 10^{-5}\ m^3$.
      Find critical pressure.

   B) Find out the order of reaction for which times for half change are given with pressure. **4**

Pressure (mm)	:	400	600	800
$t^1/_2$ (sec.)	:	300	199	149

4. Answer **any two** of the following : **10**
   1) Derive the kinetics equation of velocity constant of first order reaction.
   2) Define the term intercept. Give the characteristics of intercept.
   3) Discuss the factors affecting the rate of reaction.

5. Answer **any two** of the following : **10**
   1) Describe graphical methods of determining order of reaction.
   2) Calculate work done by Carnot engine operating between 300 K and 415 K, if heat supplied to the engine is 2015 Kj.
   3) Derive Van der Waals equation for one mole of gas.

SLR-N – 154

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – VII)
Data Structure

Day and Date : Monday, 17-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Each*** *question carries* ***equal*** *marks.*

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

1. Choose **correct** alternatives. **10**

1) The memory require for long double data type is _____ byte.
   a) 2 b) 4
   c) 8 d) 10

2) An array can be collection of _____ data item.
   a) Same b) Different
   c) Both d) None of these

3) _____ operation on stack is used to perform to add element in stack.
   a) Add b) Insert
   c) Push d) POP

4) _____ condition is not checked when stack implemented dynamically.
   a) Empty b) Full
   c) Initialization d) All of above

5) Which function is used dynamically allocate a memory which append memory to existing memory block ?
   a) Malloc b) Calloc
   c) Realloc d) Free

P.T.O.

6) Stack perform _____ operation.

a) LIFO b) FIFO

c) LILO d) All of above

7) Link list is example of _____ data structure.

a) Dynamic b) Static

c) Linear d) Single

8) We can delete item from empty linked list

a) True b) False

9) The _____ search algorithm requires large space for storing element.

a) Binary b) Sequential

c) Indexed sequential d) All of above

10) In selection sort we first select the _____ no. in the list and place it at the end.

a) Smallest b) Largest

c) Same d) First

2. Answer the following : **10**

1) Write the application of binary trees.

2) Drawbacks of sequential storage.

3) Find out the preorder traversal of ... DEBFCA.

4) Define Array.

5) What are the advantage of pointer.

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

   1) Explain B^+ tree with its advantage.

   2) Write a short note on 'Priority Queue'.

   3) Write different operations on doubly linked list.

   b) Write a program to implement exchange sort. **4**

4. Answer **any two** of the following : **10**

   1) Write a program to implement binary search tree.

   2) Differentiate Stack and Queue.

   3) List out the advantages of AVL tree over other binary tree.

5. Answer **any two** of the following : **10**

   1) Explain insertion sort with example.

   2) Explain applications of binary trees.

   3) Explain tree traversal technique.

SLR-N – 156

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
COMPUTER SCIENCE
Paper – VIII : System Analysis and Design

Day and Date : Tuesday, 18-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the **correct** alternatives. **10**

1) _____ is defined as the result of an operation.
   a) Input b) Process
   c) Output d) None of these

2) A _____ system is a system which is self contained.
   a) Closed b) Open
   c) Physical d) None of these

3) System analyst is a _____
   a) Motivator b) Organizer
   c) Both A and B d) None of these

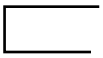
4) System analyst should create models/prototypes of the system.
   a) True b) False

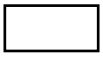
5) Logical decisions, conditions and actions represented by table is known as _____
   a) Decision Tree b) Decision Table
   c) Flowchart d) None of these

6) Which of the following is not a component of a Data Dictionary ?
   a) Version b) Length
   c) Range d) Aliases

P.T.O.

7) _____ symbol is used data Flow.

a) b) 

c) d) 

8) Which of the following is not considered during output design ?
   a) Format
   b) Content
   c) Delay
   d) Volume

9) In an E-R Diagram to represent an attribute we use
   a) Rectangle
   b) Ellipse
   c) Diamond
   d) Line

10) The interconnections and interactions between the subsystem are termed as _____
   a) Input
   b) Output
   c) Interface
   d) None of these

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

i) What is meant by Feedback ?

ii) What are advantages of Interview ?

iii) Explain system flowchart in short.

iv) What is Normalization ?

v) Explain field check.

vi) What is Implementation ?

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

   i) What is feasibility study ? Explain in detail.

   ii) Explain in detail decision table.

   iii) What is Entity ?

   B) State the design principle of output. **4**

4. Answer **any two** of the following : **10**

   i) Distinguish between system analysis and system design.

   ii) Explain various roles of system analyst.

   iii) Draw CLD and DFD for Payroll System.

5. Answer **any two** of the following : **10**

   i) What are the various fact finding technique ? Discuss the advantages and disadvantages of Interview.

   ii) Explain 1 NF, 2 NF and 3 NF in detail.

   iii) Discuss the different methods of conversion from old system to new system.

SLR-N – 157

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
PHYSICS
Electronics (Paper – VII)

Day and Date : Wednesday, 19-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) In phase shift oscillator three RC networks produce total phase shift of _____
a) 90° b) 180° c) 360° d) 270°

ii) The feedback used in amplifier circuit to work as an oscillator is _____
a) Positive b) Negative c) Zero d) One

iii) Intrinsic stand off ratio of an UJT is always _____
a) Less than 1 b) Greater than 1
c) Equal to 1 d) Equal to zero

iv) The logic circuit used to perform addition of three binary bits is called as _____
a) Half adder b) Full adder c) Flip-flop d) Amplifier

v) The bubbled AND gate is equivalent to _____
a) NOR b) NAND c) XOR d) NOT

vi) The inner surface of C.R.T. screen is coated with _____ material.
a) Zinc b) Phosphor bronze
c) Fluoroscent d) Carbon particles

vii) The single stage amplifier contains _____ number of transistors.
a) One b) Two c) Three d) Four

P.T.O.

viii) When negative feedback is used in amplifier its gain _____
a) Increases b) Decreases c) Remains same d) Becomes zero

ix) The vertical deflection plates in C.R.T. are mounted in the _____
a) Vertical plane b) Horizontal plane
c) Plane inclined at 45° d) Plane inclined at 90°

x) The electronic device used to study the nature of waveform is _____
a) C.R.T. b) C.R.O. c) V.T.V.M. d) Amplifier

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

i) Give any two uses of CRO with details.

ii) What is transistor biasing ?

iii) Explain Barkhausen criterion ?

iv) What are the types of waves observed in oscillator ?

v) Give the construction of FET.

vi) How XOR gate can be constructed with NAND gate ?

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

i) Explain the construction of UJT.

ii) Give an account of RS flipflop circuit using gates.

iii) Give the construction and working of CRT.

B) A parallel LC circuit has a resonant frequency of 160 kHz if C = 100 pF find the value of inductance. **4**

4. Answer **any two** of the following : **10**

i) Explain the working of half adder circuit using truth table.

ii) With a neat circuit diagram explain the working of crystal oscillator.

iii) Explain positive and negative feedback in amplifier.

5. Answer **any one** of the following : **10**

i) State and prove De Morgan's theorems.

ii) Give an account of D.C. and A.C. equivalent circuits. Explain D.C. and A.C. load lines ?

_____

SLR-N –158

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
BIOCHEMISTRY
Nutrition and Metabolism (Paper – III)

Day and Date : Wednesday, 19-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***maximum*** *marks.*
3) Write biochemical reactions ***where*** *involved.*

1. Write following sentences by selecting most correct answer from the given options : **10**

1) Elements for which per day nutritional requirements are greater than _____ are referred to as minerals.
   a) 100 micrograms b) 100 milligrams
   c) 100 grams d) 100 picograms

2) _____ are non-essential food components in diet.
   a) Carbohydrates b) Lipids
   c) Proteins d) Vitamins

3) _____ does not inhibit or block electron transport from cytochrome aa_3 to molecular oxygen.
   a) Hydrogen cyanide b) Hydrogen sulphide
   c) Piericidine d) Carbon monoxide

4) All spontaneous reactions proceed with _____ in free energy.
   a) Increase b) Equilibrium c) Decrease d) Zero value

5) Glycolysis requires _____ molecules of ATP per glucose molecule for activation.
   a) 2 b) 4 c) 12 d) 36

6) UTP is required in the process of _____
   a) Glycolysis b) TCA cycle c) Glycogenolysis d) Glycogenesis

P.T.O.

7) Osmolarity of intracellular fluid decreases in _____ condition.
   a) Dehydration b) Overhydration
   c) Metabolic acidosis d) Respiratory alkalosis

8) _____ buffer system is principal buffer system of blood.
   a) Phosphate b) Protein c) Bicarbonate d) Haemoglobin

9) β-oxidation of fatty acids takes place in _____ of the cell.
   a) Cytoplasm b) Mitochondria c) Lysosomes d) Nucleus

10) Decarboxylation of amino acids require _____ cofactor.
   a) FAD b) NAD c) PLP d) Lipoic acid

2. Answer **any five** of the following : **10**
   1) What is the function of atrial natriuretic peptide hormone ?
   2) What are the causes of dehydration ?
   3) Give any two causes of metabolic acidosis.
   4) Explain phosphate buffer system in the body.
   5) List various ions contributing to the osmotic pressure of the body fluids.
   6) What is role of water in the body ?

3. A) Attempt **any two** of the following : **6**
   1) Which are essential fatty acids ? Why ?
   2) What is effect of hormones on basal metabolic rate ?
   3) What are exergonic and endergonic reactions ?

   B) Draw a labelled diagram of a constant volume adiabatic bomb calorimeter. What is its use ? **4**

4. Answer **any two** of the following : **10**
   1) Write an account of chemiosmotic coupling hypothesis.
   2) Write and explain the reactions of preparatory phase of glycolysis.
   3) Explain ATP as a high energy molecule.

5. Answer **any two** from the following : **10**
   1) How are lipids oxidised in the body ? Explain the β-oxidation of palmitic acid.
   2) Explain different deamination reactions for amino acid metabolism in the body.
   3) Write an explain the reactions of urea cycle.

_____

SLR-N –159

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
PLANT PROTECTION
Paper – III : Introduction to Weeds and Non-Insect Pests

Day and Date : Wednesday, 19-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the sentences by selecting **correct** answers from the given alternatives. **10**

1) Weeds are _____ to animals.
   a) Useful b) Harmful
   c) Good d) None of these

2) Weeds _____ flow of water in channels.
   a) Increase b) Check
   c) Both a and b d) None of these

3) Cyperus rotundas is also called _____
   a) Nagarmotha b) Doob grass
   c) Good gross d) None of these

4) In Tridax seed dispersal takes place by _____
   a) Water b) Animals
   c) Wind d) Man

5) Cuscuta is a parasitic plant of _____
   a) Root b) Leaf
   c) Stem d) Fruit

P.T.O.

6) Xanthium weed seeds are dispersed by _____

a) Wind b) Animals

c) Water d) None of above

7) Parthenium weed introduced to India from _____

a) Japan b) Brazil

c) China d) America

8) Weeds are abundent in _____ season.

a) Rabi b) Summer

c) Kharif d) None of these

9) Cynodon dactylon has _____ types of stems.

a) One b) Two

c) Three d) Four

10) Perennial weeds are effective and controlled by _____

a) Harrowing b) Hoeing

c) Deep Ploughing d) None of these

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

i) Reproduction and mode of seed dispersal in parthenium.

ii) Advantages of crop rotation.

iii) Field sanitation.

iv) 2, 4-D properties and uses.

v) Rats losses caused and control.

vi) Role of any two insects in weed control.

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

   i) Classification of weedicides.

   ii) Snails and slugs losses caused and control.

   iii) Morphology of Argemone Mexicana.

   B) Write a note on : **4**

   Nematode-losses caused and control.

4. Answer **any two** of the followings : **10**

   i) Cynodon dactylon mode of reproduction and control.

   ii) Describe any two poisonous weeds.

   iii) Describe any two root parasitic weeds.

5. Answer **any two** of the followings : **10**

   i) Losses caused by weeds.

   ii) Describe any two aquatic weeds.

   iii) Euphorbia hirta – reproduction, seed dispersal and control.

SLR-N – 16

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Paper – I) (Old)
Computer Fundamental – I

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

1. Multiple choice questions : **10**

1) _____ in language 0's and 1's are used.
   a) High level language
   b) Low level language
   c) Assembly language
   d) Machine level language

2) The earliest calculating devices are _____
   a) Abacus b) Clock
   c) Calculator d) Search engine

3) _____ is main unit of computer and contains internal storage, processing and control unit.
   a) ALU b) Control unit
   c) Output unit d) CPU

4) The third generation of computer was characterised by the use of _____
   a) ICS b) VLSI
   c) Transistors d) Vacuum tubes

5) _____ is the computer that can process discrete quantities /data.
   a) Digital computer b) Analog computer
   c) Personal computer d) Hybrid computer

P.T.O.

6) _____takes the entire program and generates the objects code of the program.
   a) Interpreter b) Compiler
   c) Control unit d) RAM

7) _____ it is a peripheral device, which assists the user in getting data into a computer.
   a) Output device b) Input device
   c) ALU d) Mother board

8) _____software performs user tasks.
   a) System b) Application
   c) MS-DOS d) None of them

9) _____ displays the current DOS version.
   a) VER b) DATE
   c) ADDITION d) VERSION

10) Batch file contains _____ commands.
   a) Formal b) System
   c) File d) DOS

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

a) ASCII code

b) Batch file

c) Joysticks

d) Low level language

e) Copy con commands

f) Bar code reader.

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

   a) Explain laserjet orienter

   b) Explain features of operating system

   c) Explain block diagram of computer.

   B) Convert following : **4**

   a) $(AB_9\ D23)_{16} \rightarrow (\ ?\ )_2$

   b) $(85.CA3)_{16} \rightarrow (\ ?\ )_2$

4. Answer **any two** : **10**

   a) Explain secondary storage device

   b) Explain keyboard

   c) Generation of computer.

5. Answer **any two** of the following : **10**

   a) Explain characteristics of computers

   b) Differentiate high level language and low level language

   c) Explain monitors.

SLR-N – 160

Seat No.	

B.Sc. (Part– II) (Semester – IV) Examination, 2014
PHYSICS (Paper – VIII)
Modern Physics

Day and Date : Thursday, 20-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *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 the **correct** alternative from the following : **10**

i) Special theory of relativity was developed of _____

a) Einstein b) Newton

c) Galileo d) Kepler

ii) The Lorentz transformation equation of time shows that the space and time are not two _____ entities.

a) Related b) Dependent

c) Independent d) Same

iii) Radiation has _____ nature.

a) Only particle b) Only wave

c) Dual d) Unique

iv) Phase velocity u and particle velocity v are related by equation _____

a) $uv = c$ b) $uv = c^2$

c) $uv = c^3$ d) $u^2v = c^2$

P.T.O.

v) The magnitude of Compton wavelength is _____

a) $1\,A^{\circ}$ b) $0.0242\,A^{\circ}$

c) $0.0422\,A^{\circ}$ d) $0.242\,A^{\circ}$

vi) X-rays were discovered by _____

a) Bohr b) Rutherford

c) Roentgen d) Thomson

vii) Bragg's law of X-ray diffraction is _____

a) $d\sin\theta = n\lambda$ b) $2d\sin\theta = n\lambda$

c) $d\sin\theta = \frac{n\lambda}{2}$ d) $d\sin\theta = 2n\lambda$

viii) In stern and Gerlac experiment _____ type of magnetic field is used.

a) Uniform b) Non-Uniform

c) Uniform or non-uniform d) Constant

ix) mj can have _____ values, from – j to + j, excluding zero.

a) 2j + 1 b) 2j – 1 c) j (j + 1) d) j + 1

x) The α – particle is identified as the _____ nucleus.

a) Hydrogen b) Helium

c) Nitrogen d) Lithium

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

i) State Einstein's postulates of special theory of relativity.

ii) What is de-Broglie wavelength of electron accelerated through 54 volts ?

iii) State Bohr's quantum condition.

iv) State Mosley's law.

v) State Pauli's exclusion principle.

vi) Define half life and mean life of a radioactive substance.

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

   i) Explain the concept of time dilation.

   ii) Obtain the expression for de-Broglie wavelength of matter waves.

   iii) How the intensity of X-rays is measured ?

   B) State and explain Hund's rule. **4**

4. Attempt **any two** of the following : **10**

   i) Derive Bragg's law of X-ray diffraction.

   ii) Write a note on carbon dating.

   iii) What is Zeeman effect ? Describe in brief the experimental setup used for Zeeman effect.

5. Attempt **any one** of the following : **10**

   i) Describe an experiment to verify Compton effect.

   ii) Derive Einstein's mass-energy relation.

SLR-N – 163

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
STATISTICS (Paper – VII)
Continuous Probability Distributions – II

Day and Date : Friday, 21-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) If X and Y are independent gamma variates then $\frac{X}{X+Y}$ has _____ distribution.

a) Normal b) Gamma
c) Beta distribution of first kind d) None of these

ii) If X~ G (α , $\lambda = 1$), then the p.d.f. of X is _____

a) Chi-square distribution b) Normal distribution
c) Exponential distribution d) None of these

iii) If X ~ β_2 (7, 8) , then E(X) = _____

a) 1 b) 0.75
c) 0 d) None of these

iv) Moment generating function of the Chi-square distribution is _____

a) $(1 - 2t)^{-n/2}$ b) $(1 - 2t)^{n/2}$
c) $(1 - t)^{-n/2}$ d) None of these

v) Mean of the F-distribution with n_1 and n_2 d.f. is _____

a) $\frac{n_2}{n_2 - 2}$ b) $\frac{n_1}{n_1 - 2}$ c) $\frac{n_2}{n_1 - 2}$ d) None of these

P.T.O.

vi) If n, the sample size is larger than 30, the students t-distribution tends to _____

a) Normal distribution b) F-distribution

c) Chi-square distribution d) None of these

vii) If $X \sim N(\mu, \sigma^2)$ r.v. then the values of coefficients β_1 and β_2 are _____

a) (μ, σ^2) b) (0, 3)

c) (0, 1) d) None of these

viii) The mode of beta (3, 4) of first kind is _____

a) $\frac{2}{5}$ b) $\frac{3}{7}$

c) $\frac{4}{7}$ d) None of these

ix) If X and Y are independent normal variates with respective means – 3, 4 and respective variances 3, 6. Then V (2X – Y) = _____

a) 10 b) 14 c) 2 d) 18

x) If X and Y are independent Chi-square variates with n_1 and n_2 d.f. then $\frac{X/n_1}{Y/n_2}$ has _____distribution.

a) Normal b) t

c) F d) None of these

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

i) Let X, Y and Z be three independent G (6, 3), G (6, 4) and G(6, 2) variates resp. then identify the distribution of W = X + Y + Z also write the mean of W.

ii) Obtain mean of 't' distribution with n.d.f.

iii) State and prove additive property of Chi-square distribution.

iv) Discuss the nature of probability curve in case of F distribution with (n_1, n_2) d.f.

v) If $X \sim \beta_2$ (m, n) then write the probability distribution of $\frac{1}{X}$.

vi) If $X \sim N(\mu = 5, \sigma^2 = 4)$ then find the probability distribution of 2X + 3.

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

   i) Write the p.d.f. of normal distribution with parameters μ and σ^2. State its mean, mode, median and variance.

   ii) Find harmonic mean of beta distribution of second kind.

   iii) Let X ~ β_1 (m, n), obtain the distribution of (1 – X).

   B) Obtain the m.g.f. of gamma (α, λ) variate. **4**

4. Attempt **any two** of the following : **10**

   i) State and prove the relation between t and F variate.

   ii) If X~N(μ, σ^2) then find its moment generating function.

   iii) If X and Y are independent gamma variates with (α_1 λ_1) and (α_1 λ_2) resp. then find the distribution of $\frac{X}{Y}$.

5. Attempt **any two** of the following : **10**

   i) Obtain mode of t-distribution with n.d.f.

   ii) Obtain mean and variance of Chi-square distribution with n degrees of freedom.

   iii) Show that if X follows F distribution with (n_1, n_2) d.f. then $\frac{1}{X}$ follows F distribution with (n_2, n_1) d.f.

SLR-N – 165

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
GEOCHEMISTRY
Principles of Geochemistry (Paper – III)

Day and Date : Friday, 21-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions** : 1) **All** questions are **compulsory.
*2) Figures to **right** indicate **full** marks.*
*3) Draw **neat** labelled diagrams **wherever** necessary.*

1. Select the most correct alternative from each of the following : **10**

1) _____ reaction never stops .
   a) Reversible b) Irreversible
   c) Fast d) None of these

2) According to Bronsted Theory, base is _____ acceptor.
   a) Electron b) Proton c) Radical d) Atom

3) The functional group of ester is _____
   a) $-\overset{O}{\overset{\|}{C}}-0-$ b) > OH
   c) > C = 0 d) None of these

4) _____ solution does not pass through parchment paper.
   a) Water b) True solution
   c) Colloidal solution d) None of these

5) pH of water is _____
   a) 7 b) Less than 7
   c) Greater than 7 d) None of these

P.T.O.

6) Decrease in temperature, favour _____ reaction.
   a) Endothermic b) Reversible
   c) Exothermic d) Chemical

7) Alkane contains _____ bonds.
   a) Double b) Triple c) Single d) Multiple

8) Dispersion of solid in liquid is called as _____
   a) Sol b) Gel
   c) Emulsion d) True solution

9) The basic rock contains high percentage of _____
   a) FeO b) NaO c) CaO d) MgO

10) The purest form of coal is _____
   a) Wood b) Peat
   c) Anthracite d) Calcite

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

i) State the law of mass action.

ii) Give two geological uses for acids and bases.

iii) Define : colloidal solution. Give one example.

iv) Apply law of mass action to following reaction :

a) $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$

b) $CO_{2(g)} + H_2O_{(l)} \rightleftharpoons H_2CO_{3(l)}$

v) Write the reaction only for the hydrolysis of Na_2CO_3.

vi) Define :

a) Dispersed phase

b) Dispersion medium

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

   i) Distinguish between reversible reaction and irreversible reaction.

   ii) Write a short note on electrophoresis.

   iii) State and explain the concept organic activity.

   B) Show that chemical equilibrium is dynamic in nature for the reaction **4**

   $H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$

4. Answer **any two** of the following : **10**

   i) Estimate the concentration of $(HCO_3)^{-1}$ and $(CO_3)^{-2}$ from the hydrolysis of Na_2CO_3.

   ii) Discuss : Tyndall effect.

   iii) State and explain Lechatalier's Principle.

5. Answer **any two** of the following : **10**

   i) Discuss origin of petroleum.

   ii) Write a short note on : Clay mineral as colloids.

   iii) Write the structure of :

   a) Cyclohexane

   b) Glycine

   c) Pentane

   d) Methyl alcohol

   e) Toluene.

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Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
ZOOLOGY (Paper – VII)
Animal Diversity – IV

Day and Date : Friday, 21-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. : *1) **All** questions are **compulsory**.*
*2) Draw **neat** and labeled diagrams **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) Write the question number **attempted** in margin.*

1. Select the **appropriate** answer from those given below each question and rewrite the sentences. **10**

i) The skin of _____ is dry, rough and non-glandular.

a) Amphibians b) Reptiles
c) Birds d) Mammals

ii) The number of clawed digits in the hand of rat are _____

a) Four b) Five
c) Six d) Eight

iii) In rat _____ of the small intestine starts from the end of pyloric stomach.

a) Ileum b) Jejunum
c) Caecum d) Duodenum

iv) _____ types of salivary glands are present in rat.

a) Two b) Three
c) Four d) One

P.T.O.

v) In the respiratory system of rat, the actual exchange of gases takes place in the _____

a) Trachea b) Bronchi

c) Alveoli of lungs d) Bronchioles

vi) In the rat's blood, the _____ are poly nucleated.

a) Neutrophils b) Acidophils

c) Basophils d) Monocytes

vii) Among the Mesozoic reptiles, the _____ were also called as "flying dragons".

a) Ichthyosaurs b) Plesiosaurs

c) Pterosaurs d) Dinosaurs

viii) _____ is an extinct bird representing the transitional stage between reptiles and birds.

a) Archaeopteryx b) Parrot

c) Kite d) Vulture

ix) _____ beak of birds looks like broken.

a) Mud-probing b) Flower probing

c) Skimming d) Open

x) The subclass Metatheria includes _____ mammals.

a) Pouched b) Egg-laying

c) Placental d) Large sized

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

i) Pancreas of rat

ii) Ear of rat

iii) Triceratops

iv) Climbing feet of birds

v) Causes of bird migration

vi) Echidna.

3. A) Write answer to **any two** of the following. **6**

i) Digestion of food in the intestine of rat.

ii) Mechanism of snake bite.

iii) Mud-probing beak of birds.

B) Write about the structure of nephron present in the kidney of rat. **4**

4. Write answer to **any two** of the following. **10**

a) Describe the structure and functions of heart of rat.

b) Describe the morphological adaptions in birds for aerial mode of life.

c) Write an account on the dentition in mammals.

5. Write **any one** of the following : **10**

i) Describe the reproductive system of male rat.

ii) Describe the kinds of migration in birds.

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Seat No.	

B.Sc. II (Semester – IV) Examination, 2014
STATISTICS (Paper – VIII)
Applied Statistics

Day and Date : Saturday, 22-11-2014 Max. Marks : 50
Time : 11.00 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. **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) The number of possible samples of size n from a population of N units with replacement is
   a) N^2 b) n^2 c) ∞ d) N!

iii) 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

iv) Variation in the items produced in a factory may be due to
   a) Chance factors
   b) assignable causes
   c) both (a) and (b)
   d) none of the above

v) The faults due to assignable causes
   a) can be removed
   b) cannot be removed
   c) can sometimes be removed
   d) all the above

vi) The value of Net Reproduction Rate (NRR) <1 indicates
   a) increase in population
   b) reduction in population
   c) population remain constant
   d) all of these

vii) Accepting H_0 when H_0 is false is
   a) Type – I error
   b) Type – II error
   c) Type – III error
   d) None of these

viii) Student's t test is applicable only when
   a) The sample observations are independent
   b) The sample is not large
   c) The variable is normally distributed
   d) All of these

ix) Which of the following leads to two tailed test ?
   a) $H_1 : p = 0.5$
   b) $H_1 : p \neq 0.5$
   c) $H_1 : p > 0.5$
   d) $H_1 : p < 0.5$

x) 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

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

i) Define Crude Death Rate (CDR) and Crude Birth Rate (CBR).

ii) Define a 'Statistic'. Giving two examples.

iii) Explain what is a simple hypothesis. Give an example.

iv) Define level of significance and critical region.

v) Explain 'Population' with illustration.

vi) Explain the term fraction defective.

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

i) State various measures of fertility and compare them.

ii) Write the standard errors of the following.
   a) Sample mean
   b) Sample proportion
   c) Difference of two sample means.

iii) Distinguish between chance causes and assignable causes of variation.

B) Solve the following. **4**

For the 2×2 contingency table, prove that the Chi square test for independence gives $\chi^2 = \frac{N(ad-bc)^2}{(a+b)(a+c)(b+d)(c+d)}$ where N = a+ b +c+ d

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

i) Prove that in a simple random sampling without replacement sample mean square is an unbiased estimate of population mean square.

ii) Explain the construction of $\overline{X}$ chart when standards are given.

iii) Distinguish between Total Fertility Rate (TFR) and Gross Reproduction Rate (GRR)

5. Answer **any two** of the following : **10**

i) Explain various methods of population projection.

ii) State the advantages of sample survey over census survey.

iii) Explain the methods of sampling.

SLR-N – 169

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
GEOCHEMISTRY (Paper – IV)
Chemistry of the Earth

Day and Date : Saturday, 22-11-2014 Total Marks : 50
Time : 3.00 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. Fill in the blanks with **correct** answer from given options. **10**

1) _____ clay mineral is formed in humid climate.
(Kaolinite, Montmorillonite, Smectite, Illite)

2) Hydration of the ion is proportional to its _____
(radius, diameter, atomic number, charge)

3) When pH of water is greater than 7, then it is _____
(alkaline, neutral, acidic, basic)

4) Shape of clay particles is _____
(angular, rounded, scaly, nodular)

5) Primary geochemical differentiation took place due to _____
(gravity, magnetism, ionisation, affinity of ions)

6) Biological Oxygen Demand (BOD) of pure water is _____ ppm.
(1, 2, 3, 4)

7) _____ is responsible for alteration of orthoclase to Kaolinite clay.
(oxidation, carbonation, hydration, hydrolysis)

8) Which of the following is a type of soil structure ?
(sigmoidal, spiral, columnar, none of these)

P.T.O.

9) _____ soil horizon is composed of organic matter.
(O, A, B, C)

10) Zn has _____ tendency to donate e^- than Cu.
(equal, more, less, none donate e^-)

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

1) Sequence of mineral alteration.

2) What is pedocal soil ?

3) Define pollution.

4) Explain roll of SO_2 in air pollution.

5) Name the soil pollutants.

6) Name the layer below the crust, which is plastic in nature.

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

1) Oxidation Potential.

2) Hydration.

3) Eh and pH.

B) Describe modern classification of soil. **4**

4. Answer **any two** of the following : **10**

1) Process of chemical weathering.

2) Describe any five structures of soil.

3) Smectite structure.

5. Answer **any two** of the following : **10**

1) Explain geochemical cycle in brief.

2) Formation of soil.

3) Kaolinite structure.

_____

SLR-N – 171

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
MATHEMATICS (Paper – VII)
Integral Calculus

Day and Date : Monday, 24-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) Perimeter of cardioid $r = a(1 + \cos\theta)$ is

a) 8a b) 4a c) 2a d) None of these

2) Whole area of curve $r = 2a\cos\theta$

a) πa^2 b) $\frac{1}{2}\pi a^2$ c) $2\pi a^2$ d) None of these

3) The volume of the solid generated by revolution of the loop of the curve $y^2 = x^2(a - x)$ about x – axis

a) $\frac{4}{3}\pi a^4$ b) $\frac{1}{12}\pi a^4$ c) $\frac{3}{4}\pi a^4$ d) None of these

4) The area enclosed between one arc of the cycloid $x = a(\theta - \sin\theta)$ $y = a(1 - \cos\theta)$ at its base is

a) $3a^2\pi$ b) $\frac{3}{4}a^2\pi$ c) $3a\pi^2$ d) None of these

5) The value of $\int_0^1 x^4(1-x)^3\,dx$ is

a) $\frac{1}{280}$ b) $\frac{1}{180}$ c) $\frac{1}{380}$ d) None of these

P.T.O.

6) Another form of $\beta(m, n)$ 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) $\int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}}\,dx$ d) None of these

7) The value of $\int_0^\infty \frac{x^{p-1}}{1+x}\,dx$ where $0 < p < 1$ is

a) $\frac{\pi}{\sin\frac{p\pi}{2}}$ b) $\frac{\pi}{\sin p\pi}$ c) $\frac{\pi}{\cos p\pi}$ d) None of these

8) The value of $\int_1^2 \int_0^{1/2} y\,dy\,dx$ is

a) 1/6 b) $\frac{7}{6}$ c) 2/3 d) None of these

9) For transformation $x + y = u$, $y = uv$ the value of dxdy is

a) dudv b) u^2dudv c) u dudv d) None of these

10) The value of $\int_0^a \int_0^b \left(x^2 + y^2\right) dxdy$ is _____

a) $ab(a^2 + b^2)$

b) $\frac{1}{2}(ab)\,(a^2 + b^2)$

c) $\frac{1}{3}ab\,(a^2 + b^2)$

d) None of these

2. Attempt **any five** : **10**

1) Rectify the curve $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$

2) Find the area between the ellipses $x^2 + 2y^2 = a^2$, $2x^2 + y^2 = a^2$.

3) Show that $\int_0^2 \left(4 - x^2\right)^{3/2} dx = 3\pi$.

4) Prove that $\lceil n = (n-1) \lceil n-1$

5) Prove that $\int_0^\infty x^4 e^{-x} dx = 24$.

6) Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} \sqrt{a^2 - x^2 - y^2}\ dy\ dx$.

3. A) Attempt **any two** : **6**

1) To show that $\beta(m, n) = \beta(m + 1, n) + \beta(m, n + 1)$.

2) Evaluate $\int_0^\pi \int_0^{a\theta} r^3\ d\theta\ dr$.

3) Find the perimeter of the loop of the curve $9ay^2 = (x - 2a)(x - 5a)^2$.

B) Prove that $\beta(m, n) = \dfrac{\lceil m \lceil n}{\lceil m + \lceil n}$ **4**

4. Attempt **any two** : **10**

1) Solve $\int_0^{\pi/2} (\sin x)^{8/3} (\sec x)^{1/2} dx$.

2) Transform $\int_0^a \int_0^{a-x} V \, dxdy$ by substitution $x + y = u$, $y = uv$ and V being function of x, y.

3) Find area bounded by the curve $xy^2 = 4a^2 (2a - x)$ and its asymptotes.

5. Attempt **any two** : **10**

1) Evaluate $\int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} \, dx$.

2) Change the order of integration $\int_0^b \int_x^{a^2/x} f(x, y) \, dxdy$.

3) Find the volume of the solid obtained by revolving the ellipse $x^2/a^2 + y^2/b^2 = 1$ about the axis of X.

SLR-N – 173

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
MATHEMATICS
Integral Transforms (Paper – VIII)

Day and Date : Tuesday, 25-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

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

1) $L\{\sinh at\} =$ _____

a) $\frac{a}{p^2+a^2}$ b) $\frac{a}{p^2-a^2}$ c) $\frac{1}{p^2+a^2}$ d) None of the above

2) $L\{F''(t)\} =$ _____

a) $PL\{F(t)\} - PF'(0) - F(0)$ b) $P^2L\{F(t)\} - PF'(0) - F(0)$

c) $PL\{F(t)\} - F'(0) - F(0)$ d) None of the above

3) $L\{t^3e^{-3t}\} =$ _____

a) $\frac{6}{(p-2)^4}$ b) $\frac{6}{(p+3)^3}$ c) $\frac{6}{(p+3)^4}$ d) None of the above

4) $L\{(t+3)^2\} =$ _____

a) $\frac{2+6p+9p^2}{p^2}$ b) $\frac{2-6p+9p^2}{p^3}$ c) $\frac{2+6p-9p^2}{p^2}$ d) $\frac{2+6p+9p^2}{p}$

5) $L\{e^t \sin^2 t\} =$ _____

a) $\frac{2}{p^2+4}$ b) $\frac{2}{p(p^2+4)}$ c) $\frac{1}{p(p^2+4)}$ d) $\frac{2}{p^3(p+4)}$

P.T.O.

6) $\int_0^{\infty} \frac{\sin t}{t} dt =$ _____

a) $\frac{\pi}{2}$ b) π c) $\frac{\pi}{3}$ d) None of the above

7) $L^{-1}\left\{\frac{1}{p^2-a^2}\right\} =$ _____

a) sinhat b) $\frac{\text{sinhat}}{a}$ c) sinat/a d) sinhat

8) Convolution of two function is always

a) Commutative b) Associative c) Both a) and b) d) None of the above

9) $L^{-1}\left\{\frac{1}{\sqrt{p}}\right\} =$ _____

a) $\frac{1}{\sqrt{\pi t}}$ b) $\frac{1}{\sqrt{\pi}}$ c) $\sqrt{\pi t}$ d) πt

10) The Beta function is defined as B(m, n) = _____

a) $\int_0^2 x^{m-1}(1-x)^{n-1}dx$ b) $\int_0^1 x^{m-1}(1-x)^{n-1}dx$

c) $\int_0^1 x^{m}(1-x)^{n-1}dx$ d) None of the above

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

i) Find $L\left\{e^{at}\right\}$

ii) Find L {coshat}

iii) Find L {sint.cost}

iv) Find $L^{-1}\left\{\frac{6}{2p-3} - \frac{3+4p}{9p^2-16}\right\}$

v) Find $L^{-1}\left\{\frac{1}{p^2+8p+16}\right\}$.

vi) Prove that $L^{-1}\{C_1f_1(p) + C_2f_2(p)\} = C_1L^{-1}\{f_1(p)\} + C_2L^{-1}\{f_2(p)\}$

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

i) Find L {F(t)} where

$$F(t) = \begin{cases} \cos\left(t - \frac{2\pi}{3}\right), & t > \frac{2\pi}{3} \\ 0, & t < \frac{2\pi}{3} \end{cases}$$

ii) Solve $(D^2 - D - 2)\, y = 20 \sin 2t$

$y = 1, Dy = 2$

iii) If $L^{-1}\{f(p)\} = F(t)$

then prove that $L^{-1}\{f(ap)\} = \frac{1}{a} F\left(\frac{t}{a}\right)$.

B) Find $L\{t^2 \sin at\}$. **4**

4. Attempt **any two** of the following : **10**

i) If $L\{F(t)\} = f(p)$

and $G(t) = \begin{cases} F(t-a), & t > a \\ 0, & t < a \end{cases}$

then prove that $L\{G(t) = e^{-ap} f(p)$.

ii) Let F(t) and G(t) be two functions of class A and $L^{-1}\{f(p)\} = F(t)$ and $L^{-1}\{g(p)\} = G(t)$ then prove that

$$L^{-1}\{f(p)\, g(p)\} = \int_0^T F(x)G(t-x)dx$$

$$= F * G$$

iii) Find $L\left\{\sin\sqrt{t}\right\}$.

5. Attempt **any two** of the following : **10**

i) Find $L^{-1}\left\{\log\left(1-\frac{1}{p^2}\right)\right\}$.

ii) If F(t) is a function of class A and L {F(t)} = f(p) then prove that

$L\{t^n F(t)\} = (-1)^n \frac{d^n}{dp^n} f(p)$ where n = 1, 2, 3 ...

iii) Evaluate $L^{-1}\left\{\frac{3p+7}{p^2-2p-3}\right\}$.

SLR-N – 174

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
BOTANY (Paper – VIII)
Utilization of Plants

Day and Date : Tuesday, 25-11-2014 Total Marks : 50

Time : 3.00 p.m. to 5.00 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 centre of origin of Cicer arietinum (chik-pea) is _____ region.

a) Hindusthan b) Chinese-Japnese
c) South American d) Near Eastern

2) Lucerne is a _____

a) Grass b) Food legume
c) Fodder legume d) None of these

3) _____ oil is used as insect repellent.

a) Patchouli b) Citronella
c) Jasmine d) Rose

4) Cotton is obtained from the _____ of Gossypium.

a) Stems b) Roots
c) Seeds d) Leaves

5) 'Otto' of Rose is obtained from

a) Leaves b) Flowers
c) Fruits d) Seeds

P.T.O.

6) The drug source of Adathodo Zeylanica plant is _____

a) Root b) Stem

c) Leaf d) Fruit

7) Quisqualis indica is a _____

a) Herb b) Shrub

c) Climber d) Tree

8) _____ is obtained from Azadirachta indica.

a) Dye b) Rubber

c) Natural insecticide d) Fibre

9) The common name of Cicer arietinum is _____

a) Lucerne b) Sesbania

c) Red gram d) Bengal

10) Bryophyllum is a _____

a) Climber b) Succulen plant

c) Twiner d) Seasonal plant

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

1) What is mean by fodder legume ? Give its two example.

2) What are plant fibres ?

3) What are plant perfumes and cosmetics ?

4) State the botanical name and source of drug of Ginger.

5) What are plant dyes ? Give any two environmental advantages of plant insecticides.

6) Give ornamental values of perennials.

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

   1) Describe in short the domestication of plants.

   2) Give the economic uses of groundnut.

   3) Describe Rose as a source of perfumes and cosmetics.

   B) Write on Aloe as a medicinal plant. **4**

4. Answer **any two** of the following : **10**

   1) Write the objectives of plant introduction.

   2) Give the botanical name, source and economic importance of Lucerne.

   3) Give the botanical name, source and economic importance of coir.

5. Answer **any two** of the following : **10**

   1) Give the botanical name, source and economic importance of Jasmine.

   2) Give the brief account of drugs obtained from rhizome, state botanical name, chief chemical constituents and medicinal uses.

   3) Give an account of plant rubber source along with economic importance of rubber.

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SLR-N – 175

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
GEOGRAPHY
Biogeography (Paper – VII)

Day and Date : Wednesday, 26-11-2014 Total Marks : 50
Time : 11.00 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. Multiple choice questions. **10**

1) The earths _____ history is divided into 5 eras.
(geological, geomorphological, climatic, biotic)

2) The first terrestrial _____ plants were evolved from the aquatic red brown algae.
(black, yellow, red, green)

3) The migration of animals from their original place to some other regions is called as _____
(dispersal, spreading, scattering, movement)

4) Coal and oil are called as _____ fuels.
(non exhaustive, exhaustive, renewable, party renewable)

5) _____ is prohibited in all wild life sanctuaries.
(gathering, eating, roaming, hunting)

6) _____ and oil contribute maximum amount of the energy resources.
(coal, wood, rubber, plastic)

P.T.O.

7) _____ sheep of Australia are famous for wool production.

(Marino, Pashmina, Jersey, Geer)

8) Project tiger is a type of _____ conservation.

(insitu, exsitu, genetic, archeological)

9) Air prevention and control act was enforced in _____

(1972, 1977, 1981, 1989)

10) Chemical industries are responsible for mostly _____ pollution.

(noise, water, land, none of these)

2. Answer in short (**any five**). **10**

1) What is dispersal ?

2) What is a resource ?

3) What is an era ?

4) Define the term 'conservation'.

5) Describe the plant dispersal.

6) Explain in brief 'over exploitation of resource.

3. A) Answer in short (**any two**). **6**

1) What is geological time scale ?

2) Describe causes of noise pollution.

3) Describe the evolution of life in early geological period.

B) What are the causes of soil erosion ? **4**

4. Answer **any two** of the following : **10**

   1) Describe the methods of plant dispersal.

   2) State the importance of marine resources.

   3) Explain how forestry causes degradation of environment.

5. Answer **any two** of the following : **10**

   1) Explain the importance of livestock farming.

   2) State the importance of conservation of resources.

   3) What are the causes of water pollution ?

SLR-N – 177

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
ELECTRONICS
Fundamentals of Operational Amplifier (Paper – VII)

Day and Date : Wednesday, 26-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. *: 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****.*

1. Select correct alternatives for the following : **10**

i) To rectify voltage less than 0.6 V _____ is used.
a) Tunel diode b) Varicup
c) Precision diode d) LED

ii) OP-amp differentiator can be used as _____ filter.
a) Low pass b) High Pass c) Band pass d) Band stop

iii) An ideal op-amp has _____ I/P impedance.
a) $75\,\Omega$ b) $0\ \Omega$ c) $2\ \Omega$ d) $\infty\,\Omega$

iv) The o/p of integrator is _____

a) $V_0 = -\frac{1}{RC}\int V_i dt$ b) $V_0 = \frac{1}{RC}\int V_i dt$

c) $V_0 = -RC\int V_i dt$ d) $V_0 = RC\int V_i dt$

v) CMRR can be increased by using _____
a) Fixed bias b) Current mirror bias
c) Voltage divider bias d) None

vi) In IC – 741, supply terminals are _____
a) 2, 3 b) 7, 4 c) 1, 5 d) 6, 8

P.T.O.

vii) Zero crossing detector is with V_{erf} = _____
a) +5V b) – 5V c) OV d) ± 5V

viii) _____ converts square waves into spikes.
a) Integrator b) Amplifier c) Differentiator d) None

ix) In IC – 741, bias current is in range of _____
a) nA b) mA c) μA d) A

x) A – ve feed back in op-amp reduces _____
a) gain b) o/p impedance c) noise d) all

2. Answer **any five** of the following : **10**
   i) Define any two op-amp parameter and give their ideas magnitudes.
   ii) List any two applications of Schmitt's trigger.
   iii) Draw the diagram of monostable multivibrator.
   iv) What is zero crossing detector ?
   v) Give the comparison between inverting and non inverting amp.
   vi) Draw the diag. of S/H circuit.

3. A) Answer **any two** of the following : **6**
   i) What is full wave precision rectifier ? Explain in brief.
   ii) Explain open loop configuration of op-amp.
   iii) Explain op-amp as the I/P subtractor.

   B) Explain op-amp as non-inv. amp. A non-inv. op-amp has I/P resist 4.7k and feed back resistance of 47 k. Calculate O/P voltage, if I/P voltage is 0.7 V. **4**

4. Answer **any two** of the following : **10**
   i) Explain op-amp as regenerative comparator.
   ii) What is the effect of temp. on offset voltage and offset current ?
   iii) Explain Hartley oscillator using op-amp.

5. Answer **any two** of the following : **10**
   i) How op-amp act as integrator ? Draw its O/P wave forms when I/P is sine and square wave.
   ii) Explain op-amp as voltage follower amp.
   iii) Explain op-amp as peak detector.

_____

SLR-N – 179

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – VII)
Immunology and Medical Microbiology

Day and Date : Wednesday, 26-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose the **correct** alternative and rewrite the sentence again : **10**

i) _____ is the causative agent of oral thrush.

a) Candida albicans b) Cryptococcus neoformans
c) T. rubrum d) Proteus vulgaris

ii) The antibody playing role in allergic reaction is _____

a) IgM b) IgE
c) IgG d) IgA

iii) _____ is a primary lymphoid organ.

a) Lymph node b) Spleen
c) Thymus d) Kidney

iv) _____ is the widely accepted theory of antibody production.

a) Natural selection theory b) Instructive theory
c) Cast-off receptor theory d) Burnet's clonal selection theory

v) In antibody structure L chain is attached to H chain by_____

a) Disulfide bond b) Hydrogen bond
c) Carbon-oxygen bond d) Carbon-carbon bond

P.T.O.

vi) Blood group antigen represent best example of _____

a) Autoantigens b) Isoantigen

c) Hapten d) Heterophile antigen

vii) The substance which induces an immune response is known as _____

a) Antibiotics b) Antibody

c) Antigen d) Hapten

viii) _____ is a macroglobulin.

a) IgA b) IgG

c) IgD d) IgM

ix) Lymphocytes which are processed in thymus are known as _____

a) B. cells b) T. cells

c) Null cells d) Plasma cells

x) Gastric juice of stomach contain _____ acid.

a) Nitric b) Hydrochloric

c) Sulphuric d) Glacial acetic

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

i) Define 'Immunity'.

ii) Give morphological characters of staphylococcus aureus.

iii) Explain collection and handling of clinical specimen.

iv) Give list of primary and secondary lymphoid organs.

v) Give functions of IgM.

vi) Define 'Pathogenicity'.

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

   i) Explain mechanism of bacterial invasion.

   ii) Write a note on precipitation test.

   iii) Explain passive acquired immunity.

   B) Draw a well labelled basic structure of Immunoglobulin. **4**

4. Answer **any two** of the following : **10**

   i) Write an essay on 'Enteric fever'.

   ii) Give various types of bacterial toxins and explain mechanism of action of any two toxins.

   iii) What is complement ? Explain complement fixation test.

5. Answer **any two** of the following : **10**

   i) What is immunity ? Explain second line of defense.

   ii) Explain agglutination test.

   iii) Write an essay on 'Urinary tract infection'.

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Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Paper – II) (Old)
Programming Using 'C' – I

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m.to 5.00 p.m.

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

1. Choose correct alternative : **10**

1) In C language variable cannot start with _____
   a) alphabet b) digit
   c) both a) and b) d) none of above

2) _____ is binary operator.
   a) ++ b) – – c) % d) none of above

3) All arithmetic operator's have same level of precedence.
   a) true b) false

4) _____ is char constant.
   a) "a" b) a c) 'a' d) all of above

5) C language was developed by _____
   a) Ken Thompson b) Dennis Ritchic
   c) Peter d) Martin

6) C programs are converted into machine language with the help of
   a) editor b) compiler
   c) operating system d) none of above

7) The while statement first execute loop body and then loop control expression.
   a) True b) False

8) Every program statement in C program must end with _____
   a) end b) stop c) space d) semicolon

P.T.O.

9) _____ is used for inputting.

a) printf ( ) b) scanf ( ) c) clrscr ( ) d) putchar ( )

10) Array is _____ data type.

a) Primary b) User defined

c) Derived d) None of above

2. Answer **any five** : **10**

1) What are steps in problem solving ?
2) Use of continue statement.
3) Characteristics of algorithm's.
4) Do-while loop.
5) List the primary data type's in C.
6) List the string functions.

3. A) Answer **any two** : **6**

1) Define flow chart. Write features of flowchart.
2) Write logical operators used in C.
3) Write string manipulation function (any 3).

B) Write a program to check the given number is divisible by 3 and 2 or not. **4**

4. Answer **any two** : **10**

1) Which are branching control statements. Explain any 2.
2) Write a program to reverse the string.
3) Write a program for addition of two matrix.

5. Answer **any two** : **10**

1) Explain the basic structure of C program.
2) Explain break and goto statement.
3) Write a program for display maximum number from array.

_____

SLR-N –183

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
GEOLOGY (Paper – VIII)
Sedimentary and Metamorphic Petrology

Day and Date : Thursday, 27-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

I. Fill in the blanks with **correct** answer from given option : 10

1) _____ is a felspathic sandstone.
   a) Grit b) Arkose
   c) Quartzite d) Arenite

2) The most common mineral group is sedimentary rock is _____
   a) Silica b) Mica
   c) Clay d) Felspar

3) _____ sands show the most perfect of grains.
   a) Marine b) Fluviatile
   c) Lacustrine d) Desert

4) The argillaceous rock which lacks the fissility and lamination is know as _____
   a) Mudstone b) Shale
   c) Graywacke d) Phyllite

5) Precipitation of $CaCO_3$ are as the result of _____
   a) Loss of CO_2
   b) Rise of temperature
   c) Loss of CO_2 and rise of temperature
   d) Increase in CO_2

P.T.O.

6) Eclogite metamorphic facies is of _____ composition.

a) Granite b) Basalt

c) Rhyolite d) Diorite

7) Strongly foliated metamorphic rock is _____

a) Hornfels b) Slate

c) Marble d) Gneiss

8) The lighter bands in migmatites are composed of _____

a) Quartz and mica b) Felspar and mica

c) Quart and felspar d) Mica and calcite

9) Two sets of foliation is indicative of _____

a) Alteration b) Granitisation

c) Polymetamorphism d) Metasomatism

10) Metasomatic effects are greatest in _____ rocks adjacent to granitic intrusions.

a) Carbonate b) Argillaceous

c) Basic d) Arenaceous

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

i) Grit

ii) Sphericity

iii) Graywacke

iv) Greenschist facies

v) Porphyroblastic texture

vi) Metamorphic portion of migmatites.

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

   i) Bauxite

   ii) Calcareous sediments

   iii) Metamorphic facies.

   B) What is sandstone ? Describe types of sandstones. **4**

4. Explain **any two** of the following : **10**

   i) Anatexis

   ii) Polymetamorphism

   iii) Explain characters of foliated rocks and with the help of examples.

5. Describe **any two** of the following : **10**

   i) Argillaceous deposits.

   ii) Classification of sediments based on grade size.

   iii) Marine deposits.

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Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
MICROBIOLOGY
Applied Microbiology – II (Paper – VIII)

Day and Date : Thursday, 27-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the sentences by selecting correct answer from the given alternatives : **10**

i) Solvent extraction method is used for recovery of _____
a) Alcohol b) Penicillin c) Lysine d) SCP

ii) The aeration device used with fermentor is _____
a) Sparger b) Impeller c) Rotameter d) Stirrer

iii) Stock culture is maintained by _____
a) Tyndallization b) Lyophilization
c) Sterilization d) Drying

iv) _____ precursor is used in penicillin fermentation.
a) Corn Steep Liquor b) Cobalt
c) Phenyl acetic acid d) Phenyl ethyl carbonate

v) _____ are provided with fermentor to avoid vertex formation.
a) Baffles b) Seed tank c) Spargers d) Rotameter

vi) _____ pH is required for alcohol production.
a) 7.5 b) 9.0 c) 5.0 d) 0.5

vii) _____ medium is used for production of phosphate solubilising bacteria.
a) Pikovskyay's b) Soya c) Wheat bran d) Jackson's

viii) _____ control over temperature during fermentation.
a) Sparger b) Cooling Coils c) Baffles d) Impeller

P.T.O.

ix) Molasses is a byproduct of _____ industry.

a) Starch b) Sugar c) Textile d) Leather

x) _____ is the carrier material in the production of biofertilizer.

a) Silica b) Charcoal c) Sand d) Soil

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

i) Dual fermentation.

ii) Define Biopesticides.

iii) Lyophilization.

iv) Aeration.

v) Batch fermentation.

vi) Surface culture.

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

i) Strain improvement.

ii) Submerged culture.

iii) Phosphate solubilising bacteria.

B) Describe design of typical fermentor. **4**

4. Answer **any two** of the following : **10**

i) Primary screening.

ii) Alcohol fermentation.

iii) Preservation of industrially important microorganisms.

5. Write short notes on (**any two**) : **10**

i) Production of Biofertilizer (Azo-Rhizo)

ii) Recycling of industrial waste-Molasses.

iii) SCP.

_____

SLR-N – 185

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
ENGLISH COMPULSORY
Countdown – English Skills for Success

Day and Date : Saturday, 1-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. A) Complete the following sentences choosing the **correct** alternative given below them. **6**

1) The experiments which led to the discovery of the 'Raman effect' were conducted at the _____

a) Pune b) Calcutta
c) Bangalore d) Chennai

2) 28th February is celebrated as _____

a) National Science Day b) Global Science Day
c) Regional Science Day d) International Science Day

3) Cuddalore is in the state of _____

a) M.P. b) U.P.
c) Tamil Nadu d) Kerala

4) The tsunami had struck on a _____

a) Tuesday night b) Monday afternoon
c) Sunday morning d) Saturday morning

P.T.O.

5) Patik found city life_____

a) Liberating b) Boring

c) Suffocating d) None

6) The poet believes that life is _____

a) Transitory b) Full of sorrow

c) Full of joy d) Meaningless

B) Fill in the blanks using appropriate **modal** verb. **2**

1) Children _____ Obey their parents.
(may, must)

2) Rekha loves apples, _____ we take some for her ?
(must, shall)

C) Rewrite the following sentences in indirect speech. **2**

1) 'The boys are playing', Vandana says.

2) 'Samarth runs fast', said his friend.

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

1) Write brief note on Raman's career at Calcutta University.

2) What is Raman effect ?

3) What measures were taken to help children affected by the tsunami ?

4) Write a note on problems faced by the administration with regard to relief material.

5) How did Phatik behave with his mother ?

6) Write a brief note on Bishamber's wife.

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

   1) How do the lives of great men affect those around them ?

   2) Write brief note on quality of emotions depicted in the poem 'Village Song'.

   3) What is the central theme of the poem 'Village Song' ?

   B) Write reports in brief on **any two** of the following : **4**

   1) A car Accident

   2) A visit to Garden

   3) A Blood Donation Camp.

4. Prepare a presentation script on **any one** of the following using charts or slides **10**

   i) Promotion of a bathing soap

   ii) Importance of voting.

5. Prasad, Raju, Priyanka and Prajkata are discussing the topic 'Information Technology Age' : Write the transcript of the discussion using the following points. **10**

   a) Introduction

   b) Causative agents

   c) Effects etc.

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Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
PHYSICS
Special Paper – IX : Mathematical Physics and Statistical Physics

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 alternative : **10**

1) Phase space is _____
   a) 1-d space b) 2-d space
   c) 3-d space d) 6-d space

2) R. M. S. speed of gas molecule is _____
   a) $\sqrt{\frac{kT}{m}}$ b) $\sqrt{\frac{2kT}{m}}$
   c) $\sqrt{\frac{3kT}{m}}$ d) $\sqrt{\frac{8kT}{\pi m}}$

3) Relation between radiation pressure and energy density is _____
   a) $P = \frac{u}{3}$ b) $P = \frac{3}{u}$ c) $P = 3u$ d) $P = u$

4) Photons obey _____
   a) M-B statistics b) B-E statistics
   c) F-D statistics d) a) and c)

5) Energy of highest filled quantum state is_____
   a) Electron energy b) Free energy
   c) Fermi energy d) Zero point energy

P.T.O.

6) Vector product of three vectors $\overline{A}$, $\overline{B}$ and $\overline{C}$ is _____

a) $\overline{A} \cdot (\overline{B}\ \overline{C})$ b) $\overline{A} \cdot (\overline{B} \times \overline{C})$ c) $\overline{A} \times (\overline{B} \times \overline{C})$ d) $\overline{A} \times (\overline{B} \cdot \overline{C})$

7) In orthogonal curvilinear system, the coefficient h_1, h_2 and h_3 are called _____

a) scale coordinates b) scale coefficients

c) scale factors d) scale vectors

8) The constant β in M-B distribution law is given by _____

a) kT b) $(kT)^{-1}$ c) $\frac{kT}{2}$ d) $\frac{3kT}{2}$

9) For the distribution to be the most probable, then _____

a) W = 0 b) log W = 0 c) $\delta(\log W) = 0$ d) $\frac{1}{\log W} = 0$

10) For occupation index $\left(\frac{n_i}{g_i}\right) <<< 1$, the system obeys _____

a) M-B statistics b) B-E statistics

c) F-D statistics d) b) and c)

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

1) Define :
   a) Canonical ensemble
   b) Micro canonical ensemble.

2) Explain surface integral of a vector field.

3) Define :
   a) Energy density
   b) Specific intensity.

4) Show that, $A \cdot (B \times A) = 0$.

5) Draw the M-B distribution curve for molecular speeds. Locate the positions of $\overline{v}$, v_{rms} and v_{mp} appropriately. Write their formulae.

6) Specify all the notations in M-B distribution law $n_i = \frac{g_i}{e^{\alpha} e^{\beta u_i}}$.

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

   1) Calculate the shortest wavelength of radiation emitted by a star with its surface temperature 5800 K.

   2) Define divergence of a vector field and obtain an expression for it.

   3) Derive thermodynamical functions Helmottz's free energy and Gibb's function in terms of Boltzmann's partition function.

   B) Distinguish between M-B, B-E and F-D statistics. **4**

4. Answer **any two** of the following : **10**

   1) Derive the relation $g(p)\,dp = \frac{4\pi V p^2}{h^3} dp$ in usual meanings.

   2) Obtain an expression for divergence of vector field in orthogonal curvilinear coordinates.

   3) Deduce Stefan's law of radiation from Planck's law of radiation.

5. Answer **any one** of the following : **10**

   1) State common features in M-B, B-E and F-D statistics. Derive Maxwell-Boltzmann distribution law.

   2) State and prove Stoke's theorem in vector field.

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Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
BOTANY
Biology of Cryptogams (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) ***Draw*** *neat labelled diagram* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicates* ***full*** *marks.*

1. Rewrite the following sentences choosing correct option for each sub-question. **10**

1) Unilocular and plurilocular sporangia are found in _____
   a) Polysiphonia b) Batarchospermum
   c) Ectocarpus d) Spirogyra

2) A star shaped stele in psilotum is called _____
   a) Haplostele b) Atactostele
   c) Actinostele d) Eustele

3) *Agaricus bisporus* is commonly known as _____
   a) Oyester mushroom b) Button mushroom
   c) Dhingari d) All of these

4) Which of the following genus belongs to class phycomycetes ?
   a) Albugo b) Polyporus c) Uncinula d) Agaricus

5) A plate like a part of mushroom bearing spores on it's both sides is _____
   a) Gills b) Pileus c) Stipe d) Hyphae

6) Powdery mildew of Teak is caused by _____
   a) Penicillium b) Agaricus c) Polyporus d) Uncinula

7) In Marchantia, the chloroplast is _____
   a) Ovoid b) Cup-shaped c) Star-shaped d) Ribbon shaped

8) Stele evolved plants are _____
   a) Bryophytes b) Thallophytes c) Pteridophytes d) Both a) and b)

P.T.O.

9) In psilotum the synangium is _____
   a) Trilobed b) Bilobed c) Teralobed d) Pentalobed

10) The outer and inner phloem present in _____
   a) Psilotum b) Selaginella c) Marsilea d) All the above

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

   I) Give the systematic position of *Batarachospermum* with its characteristics.

   II) Comment upon origin and evolution of sex in algae.

   III) Illustrate Haplodiplontic type of life cycle with the help of graphic representation.

   IV) Discuss the range of thallus structure in algae.

   V) Describe the structure of nucle in *Chara*.

   VI) State classes and principle photosynthetic pigments of *Ectocarpus* and *Bataracho spermum*.

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

   I) Sketch and labelled external and internal structure of basidiocarp of *Polyporus*.

   II) Give the occurrence and thallus structure of *Ectocarpus*.

   III) Draw the life cycle of *Chara* with the help of well diagrams.

   B) What is white rust ? Describe the life history of the fungus causing white rust disease of Mustard/*Brassica*. **4**

4. Answer **any two** of the following : **10**

   I) Write a note of the synangium in the psilotum.

   II) Give the detailed internal structure of the sporocarp in marsilea.

   III) Give the comparative account of morphology in *Psilotum* and *Marsilea*.

5. Answer **any two** of the following : **10**

   I) Describe the antheridiophore and archegoniophore of Marchantia.

   II) Give the systematic position of *Uncinula*. Describe it's cleistothecium in detail with the help of diagram.

   III) With the help of labelled diagrams, illustrate the life cycle of *Marsilea*.

_____

SLR-N – 189

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – IX)
Non-Chordates

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 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. Select appropriate answer from each of the following and rewrite the sentences : **10**

1) In Porifera, the most complex type of canal system is _____ type.
a) asconoid b) syconoid c) rhagonoid d) rhambonoid

2) _____ is a most common method of sexual reproduction in paramoecium.
a) conjugation b) binary fission
c) conidiospore formation d) binary fusion

3) _____ is the larva of sea star.
a) bipinaria b) doliolaria c) ophiopluteus d) echinopluteus

4) Sea star belongs to _____ class of phylum echinodermata.
a) holothuroidea b) ophiuoridea
c) crinoidea d) asteroidea

5) Body plan of peripatus is constructed on the typical _____ plan.
a) echinoderm b) annelidan c) avian d) molluscan

6) In _____ body segments possesses both types of nephridia in Hirudinaria.
a) 7^{th} to 10^{th} b) 6^{th} to 22^{nd} c) 10^{th} to 20^{th} d) 9^{th} to 19^{th}

7) In Hirudinaria, the space between body wall and alimentary canal is filled with _____
a) haemal fluid b) botryoidal tissue
c) air space d) osteoblast

P.T.O.

8) _____ is the larva of coleopteran beetles.
   a) polypod b) apodous c) oligopod d) diplodus

9) A coral island with a central shallow lake is known as _____
   a) coral reef b) lagoon c) atoll d) corallite

10) Autotrophic type of nutrition is found in _____
   a) amoeba b) trypanosoma c) paramoecium d) euglena

2. Answer **any five** of the following : **10**
   i) Apodous larva
   ii) Paripatus zoological importance
   iii) Megalopa larva
   iv) Body wall of Leech
   v) Aboral surface of sea-star
   vi) Define Holometabola metamorphosis.

3. A) Answer **any two** of the following : **6**
   i) Food and feeding in Leech
   ii) Salient features of Lingula
   iii) Madreporite of sea-star.

   B) Describe ascon type of canal system. **4**

4. Answer **any two** of the following : **10**
   i) Describe binary fission in Paramoecium.
   ii) Write salient features of ctenophora.
   iii) Describe economic importance of Leech.

5. Answer **any one** of the following : **10**
   i) Describe male reproductive system in Leech.
   ii) Write a detail account on digestive system of sea-star.

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SLR-N – 19

Seat No.	

B.Sc. – I (Sem. – I) (Old) Examination, 2014
PHYSICS (Paper – I)
Mechanics and Properties of Matter

Day and Date : Friday, 7-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 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 logarithmic table and calculator is* ***allowed****.*

1. Select correct alternatives from the following : **10**

i) The tortional pendulum can be used to determine ———— of the material of a wire.
   a) Young's modulus b) Modulus of rigidity
   c) Bulk modulus d) Poisson's ratio

ii) The M.I. of a spherical shell of mass 6 kg and radius 1 m, about its diameter is
   a) 4 kg m^2 b) 6 kg m^2
   c) 12 kg m^2 d) 3 kg m^2

iii) Viscosity of water ———— with increase in pressure.
   a) Decreases b) Increases
   c) Remains same d) None of these

iv) ———— indicates the resistance of elastic solid to elongation.
   a) Bulk modulus b) Young's modulus
   c) Modulus of rigidity d) Poisson's ratio

v) M.I. of circular disc about an axis passing through its centre and perpendicular to its plane is given by

   a) MR^2 b) $\frac{2}{5}MR^2$

   c) $\frac{MR^2}{2}$ d) $\frac{MR^2}{3}$

P.T.O.

vi) The profile of the advancing liquid in the capillary tube is a

a) Hyperbola b) Circular

c) Parabola d) Rotatory

vii) Bulk modulus is property of

a) Only solids b) Only liquids

c) Solids, liquids and gases d) Only liquid and gases

viii) If T is the surface tension of a soap solution then the excess pressure inside its bubble of radius r is

a) $\frac{2T}{r}$ b) $\frac{4T}{r}$

c) $\frac{T}{2r}$ d) $\frac{T}{4r}$

ix) Moment of inertia in rotational motion is analogous to———— in translational motion.

a) Mass b) Force

c) Momentum d) Velocity

x) When water flow through a pipe of varying cross section then the speed is 25 cm/s for cross section of 100 cm^2. Now the speed will be ———— at cross section 50 cm^2.

a) 12.5 cm/s b) 75 cm/s

c) 50 cm/s d) 100 cm/s

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

1) What is Poisson's ratio ?

2) Give the physical significance of moment of inertia.

3) State any two applications of surface tension.

4) M.I. of as spherical shell of mass 3 kg and radius 2 m, about a diameter is 8 kg m^2. What is its M.I. about a tangent ?

5) What is the significance of Reynold's number ?

6) What do you mean by centre of suspension and centre of oscillation in a compound pendulum ?

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

   1) Show the relation between elastic constants.

   2) For a Kater's pendulum the distance between the knife edges is 1 m. The time taken for 100 oscillations of the pendulum are 200.4 sec. and 200.2 sec. respectively about the two knife edges. Find the value of acceleration due to gravity (g).

   3) Obtain an expression for rectangular lamina about an axis through its centre and parallel to its sides.

   B) Write a note on automiser. **4**

4. Answer **any two** of the following : **10**

   1) What is a fly wheel ? Obtain an expression for M.I. of a fly wheel about an axis passing through its centre and perpendicular to its plane.

   2) State and prove the Bernoulli's theorem for flow of liquid in pipes.

   3) Calculate the modulus of rigidity for a material for which $K = 14 \times 10^{10}$ N/m^2 and $Y = 11.455 \times 10^{10}$ N/m^2.

5. Answer **any one** of the following : **10**

   1) What is a bar pendulum ? Describe how it is used to determine acceleration due to gravity (g). How radius of gyration (k) of the bar is determined ?

   2) Describe with neat diagram the Jaeger's method to determine surface tension of a liquid.

      In Jaeger's experiment, the capillary tube of internal radius 0.025 cm dips 3 cm inside the water. The difference in the levels of water manometer found to be 9 cm, when the bubble just burst. Calculate surface tension of water. (Density of water = 1 gm/cm^3, g = 980 cm/s^2).

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SLR-N – 190

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
MATHEMATICS
Real Analysis (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

1) Which of the following is wrong ?

a) $f(x \cup y) = f(x) \cup f(y)$

b) $f^{-1}(x \cup y) = f^{-1}(x) \cup f^{-1}(y)$

c) $f(x \cap y) = f(x) \cap f(y)$

d) $f^{-1}(x \cap y) = f^{-1}(x) \cap f^{-1}(y)$

2) The set {1, 4, 9, 16, 25.... } is

a) Countable b) Uncountable

c) Bounded d) None of these

3) If $f : \mathbb{R} \to \mathbb{R}$ such that $f(x) = \frac{x-2}{x+3}$ then $f^{-1}(x) =$ _____

a) $\frac{x+3}{x-2}$ b) $\frac{x+1}{x-1}$ c) $\frac{3x+2}{1-x}$ d) $\frac{x+3}{x+1}$

P.T.O.

4) If $\{S_n\}_{n=1}^{\infty}$ and $\{t_n\}_{n=1}^{\infty}$ are sequences of real numbers such that $\{S_n\}_{n=1}^{\infty}$ diverges to ∞ and $\{t_n\}$ is bounded then $\{S_n + t_n\}_{n=1}^{\infty}$ is _____

a) Bounded
b) Diverges to ∞
c) Converges
d) Diverges to $-\infty$

5) Consider the sequence $\{-1, 1, -2, 1, -3, 1, -4, 1, ...\}$ then $\lim_{n\to\infty}$ sup of this sequence is equal to _____

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

6) A monotonic increasing sequence which is not bounded above is

a) Diverges to ∞
b) Diverges to $-\infty$
c) Converges to zero
d) Converges to 1

7) $\lim_{n\to\infty}\left(\frac{n}{n+2}\right) =$ _____

a) 1
b) 0
c) ∞
d) $\frac{1}{2}$

8) _____ is not a test for absolute convergence.

a) Leibnitz
b) Comparison
c) Ratio
d) Root

9) The series $\sum_{n=2}^{\infty}\left[\frac{1}{n(\log n)^p}\right]$ converges if

a) $p > 1$
b) $p < 1$
c) $p = 1$
d) $p = 0$

10) If $\{a_n\}_{n=1}^{\infty}$ is sequence of positive numbers such that :

i) $a_1 \geq a_2 \geq a_3 \geq .... \geq a_n \geq a_{n+1} \geq ...$

ii) $\lim_{n\to\infty} a_n = 0$ then $\sum_{n=1}^{\infty} a_n . (-1)^{n+1}$

a) Converges
b) Diverges
c) Oscillate
d) None of these

2. Attempt **any five** out of six : **10**

1) Using Cauchy condensation test prove that the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges.

2) $f(x) = x^3$ and $g(x) = \cos x$ for $-\infty < x < \infty$, then show that $fog \neq gof$.

3) Show that the sequence $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} +$ .... is monotonic increasing.

4) Prove that the set I of all integers is countable.

5) If $\lim_{n\to\infty} S_n = L$ and $\lim_{n\to\infty} t_n = M$ then prove that $\lim_{n\to\infty} (S_n + t_n) = L + M$.

6) If $0 < x < 1$ then show that $\sum_{n=0}^{\infty} x^n$ converges to $\frac{1}{1-x}$.

3. A) Attempt **any two** out of three : **6**

1) Let $0 < a_n \leq c_n$ for every $n \geq m; m \in \mathbb{N}$; prove that ΣC_n converges then Σa_n converges.

2) If $\{S_n\}_{n=1}^{\infty}$ is a bounded sequence of real numbers and $\{t_n\}_{n=1}^{\infty}$ converges to zero then prove that $\{S_n.t_n\}_{n=1}^{\infty}$ converges to zero.

3) If A and B are subsets of S then prove that : $(A \cap B)' = A' \cup B'$.

B) For any a, $b \in \mathbb{R}$ prove that $\big||a|-|b|\big| \leq |a-b|$. Hence prove that $\{|S_n|\}_{n=1}^{\infty}$ converges to $|L|$ if $\{S_n\}_{n=1}^{\infty}$ converges to L. **4**

4. Attempt **any two** out of three : **10**

   1) If $\lim_{n\to\infty} t_n = M$; $M \neq 0$ then prove that $\lim_{n\to\infty} \frac{1}{t_n} = \frac{1}{M}$.

   2) If $\{a_n\}_{n=1}^{\infty}$ is decreasing sequence of positive numbers and Σa_n converges then prove that $\lim_{n\to\infty} n.a_n = 0$.

   3) If A_1 , A_2 , A_3 .. are countable sets then prove that $\bigcup_{n=1}^{\infty} A_n$ is countable.

5. Attempt **any two** out of three : **10**

   1) Prove that every bounded sequence of real numbers has a convergent subsequence.

   2) If Σa_n converges absolutely then prove that Σa_n convergent.

   3) If A and B are countable sets then prove that A×B is countable.

SLR-N – 191

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
STATISTICS
Statistical Inference – I (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 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) Statistic is a

a) Sample characteristic b) Population characteristic

c) Both a) and b) d) None of the above

ii) Efficiency is a property associated with

a) Sample size b) Variance of the estimator

c) Both a) and b) d) None of the above

iii) The estimator $\sum X_i / n$ of population mean is

a) Unbiased b) Consistent

c) Both a) and b) d) None of the above

iv) Based on a random sample of size n, the unbiased estimator for the population variance σ^2 of N (μ, σ^2) is

a) $\sum X_i^2 / n$ b) $\sum (X_i - \overline{X})^2 / n$

c) $\sum X_i^2 / (n-1)$ d) $\sum (X_i - \overline{X})^2 / (n-1)$

P.T.O.

v) If T is a consistent estimator of θ, then

a) T is also consistent estimator of θ^2

b) T^2 is also a consistent estimator of θ

c) T^2 is also a consistent estimator of θ^2

d) None of the above

vi) A sufficient statistic is minimal if and only if it is a

a) Function of UMV estimators

b) Function of every other sufficient statistic

c) Function of consistent estimators

d) None of the above

vii) The sufficient statistic for σ^2 of N (0, σ^2) based on a single observation X is

a) X^2 b) X c) $|X|$ d) $X^2/2$

viii) The denominator in the Cramer-Rao inequality is known as

a) Information limit b) Lower bound of variance

c) Upper bound of variance d) All the above

ix) If $X_1, X_2, ..., X_n$ is a random sample of size n from a Poisson distribution with parameter λ, the maximum likelihood estimator (MLE) for λ is

a) $\sum X_i$ b) $\sum X_i / n$ c) $\sum X_i^2$ d) $\sum X_i^2 / n$

x) Based on a random sample of size n, the moment estimator of μ in N (μ, σ^2) is

a) $\sum X_i^2 / n$ b) $\sum X_i^2 / (n-1)$ c) $\sum X_i$ d) $\sum X_i / n$

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

   i) Define an estimate of a parameter and give an example.

   ii) Define point estimation of a parameter and give an example.

   iii) Show that sample mean is an unbiased estimator of population mean.

   iv) Define uniformly minimum variance unbiased estimator (UMVUE) for a parameter.

   v) If $X_1, X_2,...,X_n$ is a random sample from B (l, p) distribution, show that sample mean $\bar{x}$ is a consistent estimator of p.

   vi) Define Fisher information function in a statistic T about the parameter θ.

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

   i) Prove that if T is an unbiased estimator of θ, then $\phi(T)$ is also an unbiased estimator of $\phi(\theta)$ provided the function $\phi(.)$ is linear.

   ii) Let $X_1, X_2,...,X_n$ be a random sample from $f(x,\theta) = \theta x^{\theta-1}, \ \theta > 0, 0 < x < 1$ obtain a sufficient statistic for θ.

   iii) State the properties of MLE.

   B) Based on a random sample of size n from $P(x, \theta) = \theta^x (1 - \theta)$, x = 0, 1, 2, ... $0 < \theta < 1$ obtain the moment estimator for θ. **4**

4. Answer **any two** of the following : **10**

   i) State and prove the sufficient conditions for the consistency of an estimator.

   ii) Let $X_1, X_2,...,X_n$ be a random sample from $N(\mu, \sigma^2)$ distribution. Obtain sufficient statistic for : a) μ when σ^2 is known b) σ^2 when μ is known.

   iii) Let $X_1, X_2,...,X_n$ be a random sample from Poisson distribution with parameter θ. Obtain

   a) Likelihood function L.

   b) Fisher information function $I(\theta)$.

5. Answer **any two** of the following : **10**

i) Let $X_1, X_2,...,X_n$ be a random sample from $f(x,\theta) = \frac{1}{\theta}e^{-x/\theta}, x > 0$. Show that the Cramer-Rao lower bound for the variance of unbiased estimator of θ is θ^2/n.

ii) Let $X_1, X_2,...,X_n$ be a random sample from B(n, p) distribution with n unknown. Obtain the MLE of the parameter p.

iii) If $X_1, X_2,...,X_n$ is a random sample from f (x, θ) = $(1+\theta)x^{\theta}$, $0 < x < 1$ find the estimator of the parameter θ by the method of moments.

SLR-N – 192

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – IX)
Earth's Physics and Dynamics

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Fill in the blanks with correct answer from the given options : **10**

1) Age of seafloor is _____ towards continental borders from mid-oceanic ridges.
   a) Decreasing b) Increasing c) Same d) constant

2) _____ means all lands.
   a) Pangaea b) Gondwana c) Panthalassa d) Tethys

3) _____ is the smaller plate.
   a) Indian plate b) Australian plate
   c) Pacific plate d) Cocos plate

4) The average thickness of plate is _____ kg.
   a) 500 b) 300 c) 100 d) 200

5) The transform fault is _____
   a) strike-slip b) normal c) horst d) reverse

6) The oldest sea is _____
   a) Red sea b) Arabian sea c) Black sea d) China sea

7) Oceanic trenches are an example of _____ plate boundary.
   a) transform fault b) divergent
   c) convergent d) strike-slip

8) Airy postulated the hypothesis of isostasy considering the _____ density of the outer crust.
   a) uniform b) varying c) very low d) moderate

P.T.O.

9) _____ is an example for vertical uplift of the continental margin for restoration of isostatic balance.
   a) Raised beach b) Normal fault
   c) Strike joint d) Transform fault

10) Magnetic normal and reversals have a bilateral symmetry _____ to the oceanic ridges.
   a) transverse b) oblique c) parallel d) horizontal

2. Answer **any five** of the following : **10**
   a) Gondwana
   b) Fault block mountain
   c) Isostasy means
   d) Lithosphere
   e) Volcanic mountain
   f) Transform fault.

3. A) Write notes on **any two** of the following : **6**
      a) Pratt's hypothesis
      b) Level of compensation
      c) Palaeo-climatic evidences for continental drift.
   B) Characteristics of plates. **4**

4. Describe **any two** of the following : **10**
   a) Evidences for seafloor spreading.
   b) Mountain means and Fold mountain.
   c) Subduction zone.

5. Explain **any two** of the following : **10**
   a) Divergent plate boundary.
   b) Crustal movements.
   c) Causes of plate motion.

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SLR-N – 193

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
MICROBIOLOGY
Virology, Extremophiles and Bioinformatics (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the sentences by choosing correct answer from given alternatives. **10**

1) One step growth experiment was deviced by _____
   a) Hershy and Chase b) Beadle and Tatum
   c) Ellis and Delbruck d) Watson and Crick

2) The site for inoculation of Roussareoma virus is _____ cavity of embryonated chicken eggs.
   a) Yolk b) Amniotic
   c) Allantoic cavity d) Chorioallantoic

3) _____ is the only gene that is expressed during lysogenic state of "λ" phage.
   a) C_{III} b) C_{II} c) C_{I} d) N gene

4) _____ virus shows presence of segmented RNA as a genetic material.
   a) Influenza b) Adeno
   c) Herpes d) Picorna

5) Archaea is a phylogenic domain of prokaryotes consists of _____
   a) Halophiles and extreme thrmophiles
   b) Hetrophiles
   c) Chemolethotrophs
   d) Organotrophs

P.T.O.

6) Thiobacillus spp. grows at extreme _____
   a) Alkaline pH b) Neutral pH
   c) Acidic pH d) Pressure

7) Polystyrene latex is used for enumeration of viruses in a sample by _____
   a) Direct electron microscopic count
   b) Pock method
   c) Acid end point assay
   d) Haemagglutination assay

8) _____ includes whole repertoire of mostly computational tools to acquire, generate and manage the genomic data.
   a) Bioinformatics b) Biostatistics
   c) Datamining d) PDB

9) Oncogene theory is proposed by _____
   a) Huebner and Todaro b) Temin
   c) Baltimore d) Spigelman

10) _____ is present in Retrovirus.
   a) Plasmid b) Episome
   c) Reverse transcriptase d) Repressor

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

a) Virogenes

b) Tempsatephage

c) Halophiles

d) NCBI

e) How influenza virus adsorb to their host cells ?

f) LHT system of viral classification.

g) Latent period.

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

   1) Explain genomic organization, morphology and antigenic characters of HIV (Human Immunodeficiency Virus).

   2) Briefly explain applications of Bioinformatics.

   3) Describe briefly reproduction of T_4 bacteriophage.

   B) Explain briefly different methods used for viral cultivation. **4**

4. Answer **any two** of the following : **10**

   1) Discuss briefly different characteristics of cancerous cells.

   2) Explain in detail reproduction of 'λ' phage.

   3) Discuss briefly intracellular development of influenza virus.

5. Answer **any two** of the following : **10**

   1) Explain in detail Extremophiles.

   2) Describe in detail hypothesis about cancer.

   3) Discuss in brief different agencies available for Bioinformatics.

SLR-N – 194

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
ELECTRONICS (Special Paper – IX)
Linear Integrated Circuits and Applications

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 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 diagram ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed.***

1. Select the correct alternative for the following : **10**

i) MOS family that dominates the LSI field is _____
   a) NMOS b) PMOS
   c) CMOS d) None of these

ii) First integrated circuit chip was developed by _____
   a) C. V. Raman b) W. H. Brattain
   c) J. S. Kilby d) Robert Noyce

iii) In second order low pass butterworth filter gain decreases at the rate of _____
   a) 10 dB/decade b) 20 dB/decade
   c) 40 dB/decade d) 80 dB/decade

iv) Number of RC combinations in filter decides the _____of filter.
   a) Order b) Type
   c) Class d) None

v) In PLL circuit phase detector is followed by _____

a) VCO b) Low pass filter

c) High pass filter d) None of these

vi) 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

vii) IC LM 337 is _____ terminal negative voltage regulator.

a) 8 b) 16 c) 3 d) 4

viii) To have regulated negative D.C. voltage, we must use _____

a) 79 XX series b) 78 XX series

c) 74 XX series d) None of the above

ix) IC 8038 generates _____

a) Sine wave b) Square wave

c) Triangular wave d) All of the above

x) The conversion time in successive approximation converter is given by _____

a) $T = \frac{n}{f}$ b) $T = \frac{f}{n}$ c) $T = nf$ d) $T = \frac{1}{nf}$

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

i) Mention the advantages of integrated circuits.

ii) What are the three stages through which PLL operates ?

iii) What are the advantages of active filters ?

iv) What is the purpose of having input and output capacitors in three terminal IC regulators ?

v) Draw the circuit diagram of DAC using R-2R ladder network.

vi) Explain the accuracy and resolution of DAC.

3. A) Answer **any two** (**3** marks **each**)**:** **6**

   i) Explain the need of A/D and D/A conversion.

   ii) Explain the use of PLL as FM demodulator.

   iii) Explain variable voltage regulator using IC LM 317.

   B) Design a second order low pass filter at a high cutoff frequency of 1 KHz. **4**

4. Answer **any two** (**5** marks **each**) : **10**

   i) Explain the operation of dual slope technique for ADC.

   ii) Draw the block diagram of IC regulator and explain the function of each block in brief.

   iii) Explain second order high pass filter.

5. Answer **any one** : **10**

   i) In case of PLL, give the meaning of capture range and lock range. Obtain an expression for capture range and lock range.

   ii) Explain briefly fabrication of NPN and PNP transistor in IC.

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SLR-N – 195

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
COMPUTER SCIENCE
Visual Programming (Special Paper – IX)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

1. Choose correct alternative : **10**

   1) A constructor is special type of _____
      a) class b) field c) method d) property
   2) Polymorphism makes if easier to _____
      a) Reuse and modifying existing modules of code
      b) Write and read code by sharing method name
      c) Hide and protect data from external code
      d) Both a) and b)
   3) What will the function val($165.30) returns ?
      a) 0 b) 165 c) 165.30 d) $165.30
   4) A method in a clan is _____
      a) A sub procedure b) A function
      c) An event d) Both a) and b)
   5) When using encapsulation how should data be shared with external code ?
      a) Events b) Methods
      c) Properties d) Private variable
   6) The term instantiation refers to the creation of _____
      a) A class from a blueprint b) An object from class
      c) A method from an object d) Properties from method
   7) Which function returns the numbers represented in the string "$56.7" ?
      a) Abs b) CDbl c) Int d) Rnd e) Val

P.T.O.

8) Which method will return the no. of element in an array ?
   a) Dimension b) Length c) Number d) None of these
9) An assembly is _____
   a) Properties of C#
   b) Events of C#
   c) A collection of files that appear to the programmer
   d) None of above
10) Arraylist class has ability to grow automatically
   a) True b) False

2. Answer the following : **10**
   i) Explain multicast delegate with example.
   ii) What is inclusion polymorphism ?
   iii) What are static property ?
   iv) What are events ?
   v) Explain method overriding in brief.

3. A) Answer **any two** of the following : **6**
   i) Explain the features of .Net Platform.
   ii) What is use of JFT ? Explain in brief.
   iii) Explain file modes available in C#.

   B) Write a C# program to demonstrate implementation of two interfaces by one class. Assume one interface is related with purchase and other with sales. **4**

4. Answer **any two** of the following : **10**
   i) Explain with example binary reader and binary writer.
   ii) Write a program to demonstrate thread handling in C#.
   iii) Explain inheritance with example.

5. Answer **any two** of the following : **10**
   i) What is the difference between throw and throws ? Explain with example.
   ii) What is sealed classes ? Write a program to demonstrate sealed class.
   iii) What is interfaces ? Write a C# program to implement derived interfaces.

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SLR-N – 196

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
PHYSICS (Special Paper – X)
Solid State Physics

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50

Time : 3.00 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*

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

3) Draw a neat labeled diagram ***where*** *necessary.*

4) Use of log table and calculator is ***allowed****.*

1. Select the correct answer from given alternatives : **10**

I) Crystalline solids are _____ in nature.

a) Isotropic b) Anisotropic c) Cubic d) Amorphous

II) Packing fraction of diamond is

a) 0.52 b) 0.74 c) 0.68 d) 0.75

III) Diffraction of X-rays from the crystal is the phenomenon of

a) Refraction b) Reflection c) Scattering d) Interference

IV) Temperature coefficient of metal (TCR) is

a) Positive
b) Negative
c) Inversely proportional to temperature
d) Zero

V) The temperature at which ferromagnetic material converts into paramagnetic is called as

a) Neel temperature b) Curie temperature
c) Critical temperature d) Transition temperature

VI) Metals bellow transition temperature in superconducting state behaves like

a) Paramagnetic material b) Diamagnetic material
c) Ferromagnetic material d) Antiferromagnetic material

P.T.O.

VII) First super conductor is discovered by

a) Scientist Onnes

b) Scientist H. Kammerligh Onnes

c) Bardeen and Cooper

d) Scientist Bardeen, Cooper and Schrieffer

VIII) According to Wiedemann-Franz law the term $\frac{K}{\sigma}$ is

a) Constant

b) $(6.7 \text{ to } 7.5) \times 10^{10}$

c) 6×10^{11}

d) 7×10^{9}

IX) The direct or Bravis lattices in three dimensions are _____ and classified in seven groups.

a) five b) fourteen c) seven d) thirty two

X) The density of energy levels in a energy band of metal is

a) Maximum

b) Constant

c) Increases with increase in size of the metal

d) Decreases with increase in size of the metal

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

1) Define the term co-ordination number and write the co-ordination number of BCC and FCC.

2) Define the term fermi energy level.

3) Define the term packing fraction.

4) What is super conductor ?

5) Define the term primitive cell and non-primitive cell.

6) Draw a plane in cubic system whose Miller Indices are <222>.

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

   1) Explain how the free electrons are distributed in metal at different temperature as per Fermi-Dirac distribution function.

   2) Distinguish metal, semiconductor and insulator from each other on the basis of band theory.

   3) What is Meissner effect ?

   B) What is reciprocal lattice ? Deduce the relation between direct and reciprocal lattice. **4**

4. Write a short notes on **any two** of the following : **10**

   1) Hall effect

   2) Hysteresis

   3) Type I and type II super conductors.

5. Solve **any one** of the following : **10**

   1) Discuss Kronig-Penney model of metal.

   2) Write on seven crystal systems. Derive an expression between lattice parameter, interplaner distance and Miller Indices.

SLR-N – 197

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
CHEMISTRY (Special Paper No. X)
Inorganic Chemistry

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) The high spin CO(III) complexes are _____ in nature.
   a) Antiferromagnetic b) Diamagnetic
   c) Paramagnetic d) All of these

2) Usually _____ is extracellular in biological process.
   a) Na^+ b) K^+
   c) Ca^{+2} d) Mg^{+2}

3) Uranium 238 is _____
   a) Non radioactive element b) Man-made element
   c) Transuranic element d) Fertile nuclear fuel

4) For dimer, degree of polymerisation is _____
   a) 1 b) 2
   c) 3 d) 4

5) According to MOT $[Ni(NH_3)_6]^{+2}$ is paramagnetic with _____ unpaired electrons.
   a) zero b) one
   c) three d) two

P.T.O.

6) The principle of atomic bomb is _____

a) Nuclear fusion

b) Natural radioactivity

c) Chain reaction

d) Uncontrolled chain reaction

7) Sodium pump transport _____ ion in to cell.

a) Na b) K

c) Ca d) Mg

8) Polymer backbone is _____ of atoms in polymer.

a) Pool b) Frame work

c) Union d) Gathering

9) In octahedral complex each t_2g electron is stabilized by _____

a) – 6 Dq b) – 4 Dq

c) + 6 Dq d) + 4Dq

10) When the size of metallic and semiconducting material is reduced to nanoscale is a change in _____ property.

a) Structural b) Electrical

c) Optical d) All of these

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

1) What are nuclear fusion reactions ?

2) Distinguish between high spin and low spin complexes.

3) Define polymerisation and degree of polymerisation.

4) What is the function of Haemoglobin ?

5) Draw neat labelled diagram showing splitting of 'd' orbitals in octahedral complex.

6) Give the properties of nano particles.

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

   1) Give the properties of silicones.

   2) Give the important merits and demerits of MOT.

   3) What is artificial radioactivity ?

   B) Discuss the binding ability of Haemoglobin and Myoglobin at different oxygen concentrations. **4**

4. Answer **any two** of the following : **10**

   1) Draw molecular orbital diagram for $[CO(NH_3)_6]^{+3}$ and comment on its magnetic behaviour.

   2) Mention various applications of radio-isotopes as tracers. How will you account the all positions in PCl_5 occupied by Cl are not equivalent ?

   3) What are metalloporphyrins ? Explain the structure of haemoglobin.

5. Answer **any two** of the following : **10**

   1) Discuss the crystal field splitting of 'd' orbitals in tetrahedral complex with suitable example.

   2) Explain in brief use of uranium and Thorium for generation of electricity.

   3) What are the phosphonitritic polymers ? Describe their preparation, properties and uses.

SLR-N – 198

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
BOTANY (Special Paper – X)
Gymnosperms and Palaeobotany

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) In Zamia the stem is _____ shaped.
a) Conical b) Cylindrical c) Turnip d) Rhizomatic

2) The pollination in Zamia is _____
a) entomophilous b) hydrophilous
c) anemophilous d) none of these

3) Gnetum ula is a _____
a) herb b) shrub c) linas d) tree

4) In Gnetum the phyllotaxy is _____ type.
a) whorled b) alternate
c) opposite d) decussate and opposite

5) Mostly fossils are found in _____
a) sedimentary rock b) igneous rock
c) metamorphic rock d) soil

6) _____ era is called age of gymnosperms.
a) Palaeozoic b) Mesozoic c) Cenozoic d) Pre-cambrian

7) Impression is a negative of _____
a) cast b) nodule c) compression d) amber

P.T.O.

8) The phyllotaxy of Annularia is _____
   a) Whorled and stelate b) Whorled and eccentric
   c) Alternate d) Opposite

9) In Cycadeoidea the flowers are _____
   a) male b) female c) bisexual d) neutral

10) Microfossils play important role in _____
   a) Oil formation b) Oil deposition
   c) Oil degradation d) Oil exploration

2. Answer **any five** of the following : **10**
   1) Give systematic position of Zamia.
   2) What is anomalous secondary growth ?
   3) Define fossil.
   4) Enlist periods of Palaeozoic era.
   5) What is carbon dating ?
   6) Define form genera.

3. A) Answer **any two** of the following : **6**
      1) Describe in brief male strobili of Gnetum.
      2) Describe T. S. of Zamia rachis.
      3) Classification of Calamite with form genera.

   B) What is geological time scale ? Give fossil flora of Mesozoic era with environmental conditions. **4**

4. Answer **any two** of the following : **10**
   1) Describe the structure of female cone with ovule of Zamia.
   2) What are fossils ? Describe impression and compression type of fossils.
   3) What is fossilization ? Describe process and theories of fossilization.

5. Answer **any two** of the following : **10**
   1) Give angiospermic affinities of Gnetum.
   2) Internal structures of Lyginopteris oldhamia.
   3) What are microfossils ? Explain role of microfossils in oil exploration.

_____

SLR-N – 199

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – X)
Biostatistics, Bioinformatics, Medical Zoology and Evolutionary Genetics

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 appropriate answer from **each** of the following and rewrite the sentence : **10**

1) The use of statistics in biology is called _____
   a) Numerical Biology b) Biomeasurement
   c) Biostatistics d) Bioinformatics

2) _____ is defined as sum of all the values derived by the total number of values.
   a) Median b) Mean c) Variable d) Mode

3) _____ is not related with the measurement of central tendency.
   a) Mean b) Mode
   c) Median d) Standard deviation

4) The another term used for the Biostatistics is _____
   a) Biometry b) Biophysics
   c) Bioinformatics d) Biographics

5) In statistical table the lower limit of Ist class should be _____

a) Ten b) Zero

c) Either zero or multiplied of five d) Five

6) Acquired Immuno Deficiency Syndrome (AIDS) in human society is caused by _____

a) Human Immuno Virus b) Rabbis Virus

c) Entamoeba Hystolytica d) Tryphanosoma

7) _____ is pathogenic agent of malaria.

a) Entamoeba proteus b) H.V. Virus

c) Plasmodium Volvox d) Entamoeba hystolytica

8) In a perfect negative co-relation the value of r is _____

a) – 1 b) + 1 c) 0 d) 0.5

9) Monitor is _____ device in bioinformatics.

a) Storage b) Print c) Input d) Output

10) The term used in population genetics to refer the statistical drift overtime of gene frequencies is called _____

a) Gene drift b) Gene net

c) Gene bridge d) Gene pool

2. Write short note on **any five** : **10**

i) Genetic drift

ii) Tabulation

iii) Standard error

iv) Streptococcus bacterium

v) Rickettsiae

vi) Elephantasis.

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

   i) Describe the types of co-relation.

   ii) Give an account of pathogenicity of rabis virus.

   iii) Write an account of chicken guinea virus.

   B) Describe the search engines used in the bioinformatics. **4**

4. Answer **any two** of the following : **10**

   i) Describe mean and mode.

   ii) Give an account of plasmodium vivox and its pathogenicity.

   iii) Describe the Hardy-Weinberg law of genetic equilibrium.

5. Answer **any one** of the following : **10**

   i) What is bioinformatics ? Describe the three levels of bioinformatics in the structural biology.

   ii) Define histogram. Plot a histogram from the given data :

Class	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
Frequency	8	12	14	16	10	8	4

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SLR-N – 20

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
GEOGRAPHY (Paper – I) (Old)
Physical Geography – Geomorphology

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. : *1) Figures to the **right** indicate **full** marks.*
*2) **All** questions are **compulsory**.*
*3) Draw **neat** diagrams **wherever** necessary.*
*4) **Use** of stencils is **allowed**.*

1. Select the proper answer from the given below and rewrite the sentence : **10**

   1) The science which studies the evolution of landforms is known as _____

      hydrology, geomorphology, climatology, pedology

   2) Recently _____ has been included as a part of physical geography.

      hydrosphere, lithosphere, biosphere, atmosphere

   3) The 'Binary Stars' hypothesis was postulated by _____

      James Jeans, Kant, Laplace, Russell

   4) The intermediate layer of the earth consists of mainly _____

      Si + Al, Si + Ma, Na + Fe, Ni + Na

   5) _____ waves provide authentic information about the Earth's interior structure.

      electromagnetic, seismic, sea, sound

   6) The main reason of faulting is _____ force.

      gravitational, tidal, tensional, erosional

   7) Most of the young mountain systems of the world have _____ as a reason of origin.

      faulting, folding, deposition, erosion

P.T.O.

8) In case of a distant earthquake, _____ waves are the last to reach to the observer.

P, S, L, Sound

9) _____ is an example of active volcano.

Visuvious, Aniakchak, Katmai, Stromboli

10) _____ rocks are also called as stratified rocks.

Ignious, Metamorphic, Sedimentary, Inorganic

2. Write in short (**any 5**) : **10**

1) Define the term geomorphology.
2) Classify the epirogenic movements.
3) What is the 'crust' of the earth ?
4) What is an 'anticline' ?
5) Name any two types of ignious rocks.
6) Define the term 'Niffe'.

3. A) Write in brief (**any two**) : **6**

1) State the types of folds.
2) Describe the causes of metamorphism.
3) Explain the brief the Chamberlin's theory of earth's origin.

B) Write in short the effects of volcanic activities. **4**

4. Write short answers (**any two**) : **10**

1) Explain the importance of sedimentary rocks.
2) State the nature of geomorphology.
3) Write in short the interior structure of the earth.

5. Write short answers (**any two**) : **10**

1) Classify the movements of the earth.
2) Describe the causes of earthquakes.
3) State the composition of 'core' zone of the earth.

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SLR-N – 200

Seat No.	

B.Sc. III (Semester – V) Examination, 2014
MATHEMATICS (Special Paper – X)
Abstract Algebra

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 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**

i) (z, –) is not a group of integers since it does not satisfy property
a) closed b) associative c) identity d) none of these

ii) Order of symmetric group S_5 is
a) 60 b) 120 c) 5 d) 15

iii) A relation ~ is symmetric if for q, p $\in$ s
a) $p \sim q \Rightarrow p \sim p$ b) $p \sim q \Rightarrow q \sim p$
c) $p \not\sim q \Rightarrow q \not\sim p$ d) $p \sim q \Rightarrow p \sim q$

iv) Congruence modulo n is defined as
a) p = q (mod n) b) p – q (mod n)
c) n / (p – q) d) none of these

v) A finite group of prime order is
a) cyclic b) not cyclic
c) symmetric d) none of these

vi) In a finite group G if $a \in G$ then
a) 0(a) divides 0(G) b) 0(G) divides 0(a)
c) 0(a) is multiple of 0(G) d) none of these

P.T.O.

vii) An onto homomorphism from G to G' is called

a) monomorphism b) epimorphism

c) endomorphism d) automorphism

viii) The characteristic of the ring 6z is

a) zero b) infinite c) six d) none of these

ix) Let $f : R \to S$ be a ring homomorphism. Then f is one-to-one iff ker f =

a) $\{0_R\}$ b) $\{0_S\}$ c) $\{1_R\}$ d) $\{1_S\}$

x) Which is true ?

a) Field $\subset$ Integral domain $\subset$ Ring

b) Integral domain $\subset$ field $\subset$ Ring

c) Ring $\subset$ Integral domain $\subset$ field

d) None of these

2. Answer **any five** : **10**

1) Prove that identity of group is unique.

2) Check whether perpendicular relation in set of lines is an equivalence relation.

3) Whether cycle (1 3 4) (2 5 7) is even or odd permutation.

4) Show that function $f : R \to S$ is one-one. Where for $x \in R$, f(x) = logx.

5) Find the zero divisors of $(z_6, \oplus, \odot)$.

6) Define division ring.

3. Attempt **any two** : **6**

A) 1) Prove that intersection of any two normal subgroup of a group is a normal subgroup.

2) If $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$, $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$. Check whether $\alpha\beta, \beta\alpha$ are equal.

3) Define left Ideal, Right Ideal, Ideal.

B) State and prove Lagrange's theorem. **4**

4. Attempt **any two** : **10**

   1) Show that every quotient group of abelian group is abelian group.

   2) Show that G = {0, 1, 2, 3, 4, 5} and $+_6$ is addition modulo 6 is binary operation then (G, $+_6$) is abelian group.

   3) If R is ring $\forall a, b \in R$ then

      Prove that : i) $a \cdot 0 = 0 \cdot a = 0$

      ii) a(–b) = –(ab) = (–a) b.

5. Attempt **any one** of the following : **10**

   1) Show that the set of members of $a + b\sqrt{2}$ with a, b as rational number is a field.

   2) State and prove fundamental theorem of homomorphism of group.

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SLR-N – 201

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
STATISTICS
Sampling Techniques (Special Paper – X)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) A sample consists of

a) All units of the population b) 50% units of the population

c) Any fraction of the population d) None of these

ii) Probability of selection varies at each subsequent draw in

a) Sampling without replacement b) Sampling with replacement

c) Both a) and b) d) Neither a) nor b)

iii) If the items are destroyed under investigation, we have to go for

a) Complete enumeration b) Sampling studies

c) Both a) and b) d) Neither a) nor b)

iv) If all the observations in a set of observations are same, the variance of the set of values is

a) Zero b) One

c) Infinity d) Same as observations in the set

v) 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 these

P.T.O.

vi) Stratified sampling comes under the category of

a) Unrestricted sampling b) Purposive sampling

c) Restricted sampling d) None of these

vii) Which of the following advantages 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) Which of the following statement is correct ?

a) Systematic sample is superior than stratified random sampling

b) Simple random sample is inferior than systematic sample

c) Stratified random sample is better than systematic sample

d) None of these

ix) 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 these

x) A population is perfectly homogeneous in respect of a characteristic, what size of sample would you prefer ?

a) A large sample b) A small sample

c) A single item d) None of these

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

i) Explain random sampling.

ii) Explain non random sampling.

iii) Give real life situations where systematic sampling is appropriate.

iv) Give concept of auxiliary variable.

v) Define ratio estimators of population mean.

vi) Explain the technique of drawing a sample using systematic sampling.

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

   i) Explain Neyman's allocation and proportional allocation.

   ii) Explain multi stage sampling.

   iii) Give real life situations where cluster sampling is appropriate.

   B) Give comments regarding bias in estimation. **4**

4. Attempt **any two** of the following : **10**

   i) Obtain an unbiased estimator of population mean and derive its standard error in case of proportional allocation.

   ii) What is sampling for proportion ? Obtain an unbiased estimator for population proportion.

   iii) Describe cluster sampling. A population consists of N clusters of M elements each. A sample of n clusters is drawn from it by method of SRS. Show that sample mean is unbiased estimator of population mean.

5. 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) Obtain an unbiased estimator of population total and derive its standard error in case of systematic sampling.

   iii) State the characteristics of a good questionnaire.

SLR-N – 202

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY
Geomorphology (Special Paper – X)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 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 diagram* ***wherever*** *necessary.*

1. Fill in the blanks with correct option given below : **10**

1) A high land between two streams is known as _____
   a) Divide b) Spit c) Subtract d) Mouth

2) Which one of the following is aggradational work ?
   a) Weathering b) Erosion c) Flow d) Deposition

3) The doctrine of uniformitarianism is proposed by _____
   a) Hutton b) King c) Penk d) L. C. King

4) Which one of the following is indicative of rejuvenation ?
   a) Incised meander b) Point bar
   c) Curved bar d) Ox-bow lake

5) Relief from mean-sea-level is _____ relief.
   a) Relative b) Initial c) Absolute d) High

6) Slope angle is 0° to 0.5° can be classified as _____ slope.
   a) Level b) High c) Gentle d) Great

7) Valley in valley feature is also known as _____
   a) Valley floor b) Hanging valley
   c) Valley foot d) River terrace

8) Five key factors of _____ formation are parent material, climate, organism, slope and time.
   a) Rock b) Soil c) Hill d) Mineral

9) In the process of landslide, _____ is basic cause.

a) Flow b) Gravity c) Tree d) Heat

10) During landslide _____ acts as lubricant.

a) Air b) Water c) Soil d) Heat

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

i) Flow

ii) Creep

iii) Slide

iv) Role of water in landslide

v) Effect of shape of material in landslide

vi) Pot holes.

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

i) Meander

ii) Point bar

iii) Terrace.

B) Describe the formation of ox-bow lake. **4**

4. Answer **any two** of the following : **10**

i) River terrace

ii) Land forms in fault region

iii) Geomorphology and engineering work.

5. Answer **any two** of the following : **10**

i) Landforms of rejuvenation

ii) Subsidence

iii) Geometric properties of slope.

SLR-N – 203

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
Industrial Microbiology
MICROBIOLOGY (Special Paper – X)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences by selecting correct answers from given alternatives : **10**

   1) The reduced substrates allow growth of _____ organisms.
      a) aerobic b) anaerobic
      c) facultative d) microaerophilic

   2) The milk protein casein often found as _____ complex.
      a) Ca-casein b) Na-casein c) Fe-casein d) Cu-casein

   3) The formation of gas cells is associated with _____ fermentation.
      a) Idli b) Curd c) Bread d) Wine

   4) The table wine contains _____ % of alcohol.
      a) below 9 b) above 9 c) 9 d) 9.15

   5) In production of champagne _____ is added to base wine.
      a) glucose b) sucrose c) maltose d) fructose

   6) In beer production, terpenes are derived from _____
      a) hops b) malt c) adjuncts d) water

   7) _____ is widely used filter aid.
      a) silica b) kaolin c) alum d) kieselguhr

   8) Glucans are recovered by using _____ solvent.
      a) methanol b) ethanol c) ethylene d) acetone

P.T.O.

9) Sham test is done to defeat the presence of _____
   a) mutagen b) carcinogen c) allergen d) pyrogen

10) _____ process is used for solvent recovery.
   a) evaporation b) filtration c) distillation d) centrifugation

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

   i) List out factors that make food as a substrate.

   ii) Define wine.

   iii) What is GMP ?

   iv) What is cheddaring ?

   v) Describe test for toxicity.

   vi) What is quality control ?

   vii) Describe the step of selection of grapes.

3. A) Answer the following in brief (**any two**) : **6**

   i) Describe water activity and O.R. potential of food.

   ii) Give an account of Idli fermentation.

   iii) Describe test for carcinogenicity.

   B) Describe production of sherry. **4**

4. Answer **any two** of the following : **10**

   i) Describe the process of cheese production.

   ii) Give an account of methods used for concentration of product.

   iii) Give an account of computer applications in fermentation technology.

5. Answer **any two** of the following : **10**

   i) Give an account of beer production.

   ii) Describe industrial production of streptomycin.

   iii) Describe test for sterility.

_____

SLR-N – 204

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
ELECTRONICS (Special Paper – X)
Fundamentals of Communication

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 1) Figures to **right** indicate full marks.*
*2) Draw neat diagrams **wherever** necessary.*
*3) Use of **log table** and **calculator** is allowed.*
*4) **All** questions are **compulsory** and carry **equal** marks.*

1. Select the correct alternatives for the following : **10**

1) Two way communication system is also known as _____ system.
a) Simplex b) Duplex c) Complex d) Multiplex

2) The amplitude of an audio signal is 10V and that of carrier is 50V, percentage of modulation index is _____
a) 0.2% b) 5% c) 20% d) 50%

3) The output of frequency modulator is _____
a) Periodically varying b) Randomly varying
c) Constant d) None

4) Current distribution in half wave dipole antenna is _____
a) Uniform b) Non uniform
c) Both a) and b) d) None

5) Line of sight communication is done by _____ wave.
a) Ground b) Sky c) Direct d) Micro

6) The band width of TV signal for 625 line scanning is _____
a) 4.5 MHz b) 5.5 MHz c) 10 MHz d) 3 MHz

7) A carbon microphone is variable _____
a) Resister type b) Capacitor type
c) Inductor type d) Carbon type

P.T.O.

8) Normal speed of dialing from telephone is _____
   a) 10 pulses /s b) 20 pulses /s c) 1 pulses /s d) None

9) A superheterodyne receiver with IF of 450 KHz tuned to signal of 1200 KHz, local oscillator frequency is _____
   a) 750 KHz b) 1650 KHz
   c) 2700 KHz d) None

10) Power in side band is _____ the total power.
   a) $\frac{1}{2}$ b) 1/3
   c) 2/3 d) 1/4

2. Answer **any five** of the following : **10**
   i) What is noise figure ?
   ii) Define FM and its modulation index.
   iii) What is skip distance ? Give its formulae.
   iv) Why interlaced scanning is preferred in TV communication ?
   v) What is principle of telephone communication ?
   vi) Define virtual height.

3. A) Answer **any two** of the following : **6**
   i) Explain principle of antenna.
   ii) Explain horizontal blanking standard.
   iii) Explain in brief digital communication system with block diagram.

   B) What are the types of radio waves ? Explain ground wave propagation. **4**

4. Answer **any two** of the following : **10**
   1) Explain DTMF dialer used in telephone handset.
   2) Explain with neat block diagram AM superheterodyne receiver.
   3) Distinguish between AM and FM.

5. Answer **any one** of the following : **10**
   1) Explain amplitude modulation and derive mathematical expression for AM modulated wave.
   2) Explain antenna parameters needed to establish halfwave dipole antenna.

_____

SLR-N – 205

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
COMPUTER SCIENCE (Special Paper – X)
Core Java

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) Java source code are compiled and converted to _____
   a) Object code b) Assembly code
   c) Binary code d) Byte code

2) _____ is character encoding schema used for char type in Java.
   a) TSCII b) ASCII c) UNICODE d) EBCDIC

3) Super keyword can be used to _____
   a) Call super class constructor
   b) Access super class method
   c) Both a) and b)
   d) None of these

4) _____ type exception caused when referring to members of null object.
   a) IO Exception b) Number format
   c) Arithmetic Exception d) Null pointer exception

5) Is the following way of commenting correct in Java.
   /* comment 1/* comment 2*/*/
   a) True b) False

6) Java provides an alternative approach for multiple inheritance is _____
   a) Class b) Extends c) Interface d) Implements

7) _____ is an extention of Java source file.
   a) .exe b) .obj c) .class d) .java

P.T.O.

8) _____ is a base class of all classes.
   a) Event b) Object c) Throwable d) Input output

9) _____ class is not a member class of java.io package.
   a) String b) String Reader c) String Writer d) File

10) Java has goto statement
   a) True b) False

2. Attempt **any five** questions from the following : **10**
   1) What is an abstract class ?
   2) What is class ?
   3) Why does java not supporting operator overloading ?
   4) What is native method ?
   5) Define file class.
   6) What is collection ?

3. A) Attempt **any two** of the following : **6**
      1) Explain structure of java program.
      2) Data types in Java.
      3) Explain FileOutputStream class.

   B) Write a program to print fibonnaci series for first 10 numbers. (e.g. 0, 1, 1, 2, 3, 5, ...) **4**

4. Attempt **any two** questions from the following : **10**
   1) Write a program to copy content of one file into another file.
   2) Write a program to demonstrate multiple catch statements.
   3) Write a program to implement final keyword.

5. Attempt **any two** questions from the following : **10**
   1) What is constructor ? Explain different types of constructor.
   2) Explain 'super' keyword with suitable example.
   3) Explain thread syncronisation in detail.

_____

SLR-N – 206

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
PHYSICS (Special Paper – XI)
Classical Mechanics and Spectroscopy

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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**

i) When a force system keeps a body at rest, the subject is _____
   a) Dynamics b) Kinematics
   c) Statics d) Kinetics

ii) All frames of reference rotating with respect to a fixed frame are _____
   a) Inertial b) Non-inertial
   c) Located to a point d) Located at infinity

iii) 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

iv) To explain the observed doublet fine structure of spectral lines, the concept introduced is of _____
   a) Orbital motion of electron
   b) Spin motion of electron
   c) Magnetic field produced at the electron
   d) Spatial quantization

v) Raman shift for Stoke's line is _____

a) Zero b) Positive

c) Negative d) Both b) and c)

vi) The ratio of magnetic moment to the mechanical moment of orbital motion of electron is _____

a) $\frac{e}{2m}$ b) $2.\frac{e}{2m}$ c) $2.\frac{e}{m}$ d) e/m

vii) If the total torque acting on a particle is zero, then its _____

a) Angular momentum is conserved b) Linear momentum is conserved

c) Total energy is conserved d) Spin momentum is conserved

viii) In a cyclone in the southern hemisphere the wind whirls in the _____ direction.

a) Clockwise b) Anticlockwise

c) Opposite d) In same

ix) Zero point energy of a molecule is _____

a) Zero b) $\frac{1}{2}h\nu_o$ c) $h\nu_o$ d) One

x) Capacity of a subshell to hold electrons is _____

a) $(2l + 1)$ b) $2(2l + 1)$ c) $2n^2$ d) n^2

2. Attempt **any five** : **10**

i) Write any four characteristic properties of Raman lines.

ii) Give electronic configuration of potassium $(_{19}K)$.

iii) Draw Zeeman splitting of sodium D-lines with necessary energy level diagram.

iv) Define inertial and non inertial frames of reference.

v) What are constraints ?

vi) Explain in brief the concept of centre of mass.

3. A) Attempt **any two** : **6**

   i) State and prove the conservation theorem for linear momentum of a particle.

   ii) What do you mean by real force and pseudo force ? Give their examples.

   iii) The frequency of strong yellow line in the spectrum of sodium is 5.09×10^{14} Sec^{-1}. Calculate the wavelength of light in nanometer.

   B) Write a note on stark effect in hydrogen. **4**

4. Attempt **any two** : **10**

   i) State and prove the theorem of energy conservation of a particle.

   ii) Explain electron spin orbit interaction.

   iii) Explain when a molecular bond can be formed and also types of molecular bonds.

5. Attempt **any one** : **10**

   i) Obtain an expression for vibrational energy levels of a diatomic molecule and hence discuss pure vibrational spectra.

   ii) State D'Alembert's principle. Obtain Lagrange's equations from D'Alembert's principle.

SLR-N – 207

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
CHEMISTRY (Special Paper – XI)
Organic Chemistry

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 chart supplied by university is **allowed**.*

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

i) In IR spectroscopy, for water molecule the number of fundamental modes of vibrations is calculated by using formula _____

a) 3N – 6 b) 3N – 12
c) 3N – 5 d) 3N

ii) _____ is a magnetic nucleus.

a) $_1H^2$ b) $_1H^1$
c) $_6C^{12}$ d) $_7N^{14}$

iii) A mass spectrum is obtained by plotting _____ and _____ on X and Y axes respectively.

a) Charge, abundance of ions
b) Mass, charge on ions
c) Mass, abundance of ions
d) $\frac{\text{mass}}{\text{charge}}$, abundance of ions

iv) In chair conformation of cyclohexane, all C – H bonds are _____

a) Eclipsed b) Partially eclipsed
c) Staggered d) Skew

P.T.O.

v) _____ method is used to prepare a secondary alcohol from a ketone.

a) MPV reduction

b) Oppenauer oxidation

c) Hofmann rearrangement

d) Wittig reaction

vi) Ethyl acetoacetate on hydrolysis with dilute HCl forms _____

a) Acetoacetic acid

b) Acetic acid

c) Succinic acid

d) Adipic acid

vii) In boat conformation of cyclohexane, the flagpole hydrogens are on _____

a) C_1 and C_3 b) C_1 and C_4

c) C_2 and C_3 d) C_1 and C_5

viii) Wagner Meerwein rearrangement involves the rearrangement of a _____ intermediate.

a) Carbene b) Nitrene

c) Carbanion d) Carbocation

ix) The proton NMR spectrum of 2-bromopropane has _____

a) Two signals; a doublet and a multiplate

b) Two signals; a singlet and a multiplate

c) Three signals; a singlet and two doublets

d) Three signals; a doublet and two triplets

x) Diethyl malonate is the diethyl ester of _____ acid.

a) Maleic

b) Malic

c) Malonic

d) Acetoacetic

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

i) State and explain Hooke's law.

ii) Which molecule is used as the internal reference compound in proton NMR spectroscopy ? Why ?

iii) Explain looking of conformation in tertiary butyl cyclohexane.

iv) On the basis of Baeyer's strain theory explain the stability order in cyclopropane, cyclobutane and cyclopentane.

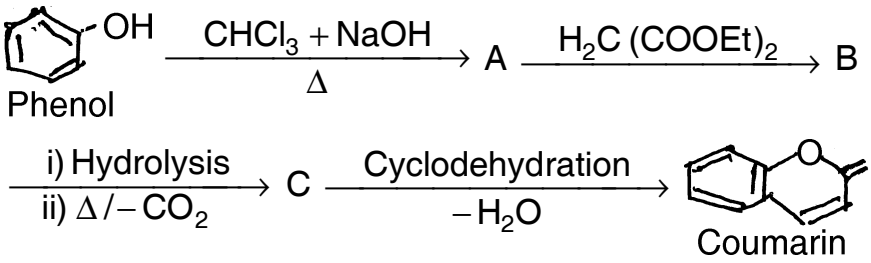
v) What are phosphorus yildes ? Write resonance structures of a phosphorus yilde.

vi) What is reactive methylene group ? Explain.

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

i) Explain the formation of molecular ion and fragment ion with examples.

ii) Identify A, B and C and complete the following reaction :



iii) Write a note on functional group region of IR spectrum.

B) What are the conformations of methyl cyclohexane ? Comment on their stability. **4**

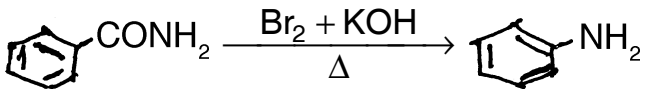
4. Answer **any two** of the following : **10**

i) Explain the acidity of methylene hydrogens of ethyl acetoacetate, starting from ethyl acetoacetate how will you synthesize the following :

a) 2-methyl ethyl acetoacetate

b) Succinic acid ?

ii) Explain the mechanism of following transformation :



and name this reaction.

iii) Explain the spin-spin splitting of PMR signals of ethyl alcohol under high resolution.

5. Answer **any two** of the following : **10**

i) Assign a structure consistent with the following spectral data :

Molecular formula	:	$C_9H_{10}O$
IR	:	1745, 1225, 749, 697 cm^{-1}
PMR	:	1.96 δ (t, 3 H)
		5.00 δ (q, 2 H)
		7.22 δ (s, 5 H)

ii) How will you synthesize the following compounds from diethyl malonate

a) Pentanoic acid

b) Glutaric acid

c) Malonyl urea ?

iii) How will you distinguish between following pairs of compounds with the help of IR spectroscopy ?

a) Ethyl amine and acetamide

b) Propanal and propanone ?

TABLE – 1

Characteristic Infrared Absorptions of Functional Groups

	GROUP		FREQUENCY RANGE cm^{-1}	INTENSITY
A.	Alkyl			
	C – H (stretching)		2853–2962	(m – s)
	Isopropyl – $CH(CH_3)_2$		1380 – 1385	(s)
		and	1365 – 1370	(s)
	tert – Butyl – $C(CH_3)_3$		1385 – 1395	(m)
			and – 1365	(s)
B.	Alkenyl			
	C – H (stretching)		3010 – 3095	(m)
	C = C (stretching)		1620 – 1680	(v)
	R – CH = CH_2		985 – 1000	(s)
		and	905 – 920	(s)
	$R_2C = CH_2$	(out of plane	880 – 900	(s)
	cis – RCH = CHR	C–H bendings)	675 – 730	(s)
	trans – RCH = CHR		960 – 975	(s)
C.	Alkynyl			
	≡ C – H (stretching)		– 3300	(s)
	C ≡ C (stretching)		2100 – 2260	(v)
D.	Aromatic			
	Ar – H (stretching)		– 3030	(v)
	Aromatic substitution type (C–H out-of-plane bendings)			
	Monosubstituted		690 – 710	(very s)
		and	730 – 770	(very s)
	o. – Disubstituted		735 – 770	(s)
	m – Disubstituted		680 – 725	(s)
		and	750 – 810	(very s)
	p – Disubstituted		800 – 840	(very s)
E.	Alcohols, Phenols, Carboxylic Acids			
	OH (alcohols, phenols, dilute solutions)		3590 – 3650	(sharp v)
	OH (alcohols, phenols, hydrogen bonded)		3200 – 3550	(broad s)
	OH (carboxylic acids, hydrogen bonded)		2500 – 3000	(broad v)
F.	Aldehydes, Ketones, Esters and Carboxylic Acids			
	C = O stretch – 1720 { stre 2700 – 2900		1630 – 1780	(s)
	aldehydes		1690 – 1740	(s)
	ketones		1680 – 1750	(s)
	esters		1735 – 1750	(s)
	carboxylic acids		1710 – 1780	(s)
	amides		1630 – 1690	(s)
G.	Amines			
	N – H		3300 – 3500	(m)
H.	Nitriles			
	C ≡ N		2220 – 2260	(m)

TABLE – 2

Approximate Proton Chemical Shifts in NMR

TYPE OF PROTON	CHEMICAL SHIFT, DELTA, PPM (δ)
1° Alkyl, RCH_3	0.8 – 1.0
2° Alkyl, RCH_2R	1.2 – 1.4
3° Alkyl R_3CH	1.4 – 1.7
Allylic, $R_2C=C-CH_3$ (R)	1.6 – 1.9
Benzylic, $ArCH_3$	2.2 – 2.5
Alkyl chloride RCH_2Cl	3.6 – 3.8
Alkyl bromide, RCH_2Br	3.4 – 3.6
Alkyl iodide, RCH_2I	3.1 – 3.3
Ether, $ROCH_2R$	3.3 – 3.9
Alcohol, $HOCH_2R$	3.3 – 4.0
Ketone, $RCCH_3$ (O)	2.1 – 2.6
Aldehyde, RCH (O)	9.5 – 9.6
Vinylic, $R_2C=CH_2$	4.6 – 5.0
Vinylic $R_2C=CH$ (R)	5.2 – 5.7
Aromatic, ArH	6.0 – 9.5
Acetylenic, $RC \equiv CH$	2.5 – 3.1
Alcohol hydroxyl, ROH	0.5 – 6.0[a]
Carboxylic, RCOH (O)	10 – 1.3[a]
Phenolic, ArOH	4.5 – 7.7[a]
Amino R– NH_2	1.0 – 5.0
Ester $R-C(=O)-O-CH_2-R$	4 to 4.5
$N-CH_3$	2.3

[a] The chemical shifts of these groups vary in different solvents and with temperature and concentration.

TABLE – 3

U.V. Absorption rules for diene chromosphores

1) Parent	215 nm
2) Each extra conjugation	30 nm
3) Homoannular	39 nm
4) Exocylic double bond	05 nm
5) Each alkyl (R) substituent directly attached to double bonded carbon	05 nm

U.V. Absorption rules for Enone System

1) Parent	215 nm
2) Each extra conjugation	30 nm
3) Homoannular	39 nm
4) Substituents	
a) Alkyl group at α	10 nm
b) Alkyl group at β	12 nm
c) Alkyl group at γ, δ	18 nm

– OH, – OR, Cl, Br 5 (nm)
– SR, (30 nm)
– NR_2 (60 nm)

	α	β	γ
Cl	15	12	
OH, OR	35	30	
SR		85	
NR_2		95	
O		75	
Acyl	6	6	6

SLR-N – 208

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
BOTANY
Genetics (Special Paper – XI)

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *question carries* ***equal*** *marks.*
3) Draw neat labelled diagrams ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternative. **10**

1) _____ is known as 'Father of Genetics'.

a) Charl's Darwin b) Gregar Mendel

c) J. H. Morgan d) Bateson W.

2) _____ plant was selected for Mendelian experiment.

a) Raphanus Sativa b) Nicotiana tabacum

c) Pisum Sativum d) Oryza Sativa

3) The phenomenon of inheritance of two or more genes located on same chromosome togetherlly is known as _____

a) Linkage b) Recombination

c) Crossing over d) Linked genes

4) The crossing over of two non-sister chromatids is called _____

a) Synapsis b) Bivalent

c) Chiasma d) Trivalent

5) The phenotypic ratio 9 : 3 : 4 is produced due to effect of _____

a) Complimentary genes b) Inhibitory genes

c) Dominant epistatis d) Supplementary genes

P.T.O.

6) The blood group was discovered by _____ in 1900.

a) Bateson b) East

c) Weiner d) Landsteiner

7) The diploid number of chromosomes in Man is _____

a) 23 b) 46 c) 22 d) 44

8) A condition in which the male and female gamets of the same plant fail to fuse with one another is known as _____

a) Self-incompatibility b) Self-compatibility

c) Self-sterrility and fertility d) Self-fertility

9) The chromosomal aberration, the loss of one or more genes from one chromosome is called _____

a) Delition b) Duplication

c) Inversion d) Translocation

10) The progeny produced in F_1 generation which is always _____

a) Recessive b) Dominant

c) Dominant and Recessive d) None of these

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

i) Define gene.

ii) What is dihybrid ratio ?

iii) What are the autosomes ?

iv) What is the multiple alleles ?

v) Define polyploidy.

vi) Who discovered the Genic balance theory of sex determination in Drosophila ?

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

   i) What is inhibitory gene interaction ? Explain with suitable example.

   ii) Explain cytoplasmic inheritance with respect to Mitochondrion.

   iii) What are the characters of polyploids ?

   B) Describe the eye colour in Drosophila. **4**

4. Answer **any two** of the following : **10**

   i) Describe the Mendels Law of Independent assortment with suitable example.

   ii) What are the types of linkage ? Describe in brief incomplete linkage.

   iii) Describe the balance concept of sex determination in drosophila.

5. Answer **any two** of the following : **10**

   i) Explain in brief Hardy and Weinberg Law.

   ii) What is gene interaction ? Describe the complementary gene interaction with suitable example.

   iii) Define chromosomal aberration and describe types of chromosomal aberration.

SLR-N – 209

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY
Special Paper – XI : Comparative Anatomy of Chordates

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 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) Gills of _____ have filiform gill lamellae.
   a) Cartilage fish b) Bony fish
   c) Ascidian tadpole d) Frog tadpole

2) Focal length of lens of eye is controlled by _____
   a) Ciliary muscles b) Vitreous humour
   c) Iris muscles d) Pupil

3) In _____ roof of cerebral hemishere is poorly developed and is almost non-nervous.
   a) Fishes b) Mammals c) Birds d) Human beings

4) Horns of cattle are derivatives of _____ of integument in vertebrates.
   a) Epidermis b) Dermis
   c) Keratin d) Connective tissue

5) Heart of _____ show highly reduced sinus venosus.
   a) Cartilage fishes b) Bony fishes
   c) Amphibians d) Reptiles

6) Stomach of ruminant mammals shows _____ chambers.
   a) two b) three c) four d) five

7) _____ possesses one pair of nepric tubules per segment.
   a) Pronephros b) mesonephros c) metanephros d) Opisthonephros

8) Sinus venosus is on the way of disappearance in _____ group of vertebrates.
   a) Avian b) Reptilian c) Mammalian d) Amphibian

9) Crop in bird is modification of _____
   a) Oesophagus b) Stomach c) Ileum d) Duodenum

10) Lungs of pigeon are provided with _____ air sacs.
   a) two b) six c) nine d) ten

2. Answer **any five** of the following : **10**
   1) Mesonephros kidney
   2) Foregut in birds
   3) Reptilian heart
   4) Synsacrum
   5) Brain of scoliodon
   6) Mucus glands in amphibia.

3. A) Answer **any two** of the following : **6**
   1) Describe the internal ear of scoliodon.
   2) Ventricles in vertebrates brain.
   3) Air sacs in birds.

   B) Write the answer : **4**
   1) Alimentary canal of frog.

4. Answer **any two** of the following : **10**
   1) Explain evolutionary changes in brain of vertebrates.
   2) Give an account on soft derivatives of vertebrates.
   3) Describe the aortic arches in vertebrates.

5. Answer **any one** of the following : **10**
   1) Explain the structure of pelvic girdle of frog and compare it with that of reptiles.
   2) Describe heart of Reptelia that you have studied an compared with that of birds heart.

_____

SLR-N – 210

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
MATHEMATICS (Special Paper – XI)
Complex Analysis

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) What is the real part of function ze^z is _____

a) $e^x(x \cos y - y \sin y)$ b) $e^x(x \cos y + y \sin y)$

c) $e^x(x \sin y + y \cos y)$ d) $e^x(x \sin y - y \cos y)$

2) The families are orthogonal the product of slope is _____

a) 1 b) – 1 c) 0 d) None of these

3) If f(z) = u + iv is analytic function the C.R. equations are _____

a) $\frac{u_x}{u_y} = 1, \frac{v_x}{v_y} = -1$ b) $\frac{u_x}{v_x} = 1, \frac{u_y}{v_y} = -1$

c) $\frac{u_x}{v_y} = 1, \frac{u_y}{v_x} = -1$ d) $\frac{u_x}{v_y} = -1, \frac{u_y}{v_x} = 1$

4) If z = z(t) on the interval $a \leq t \leq b$. An arc L is said to be differentiable if _____

a) $z'(t)$ exists and not continuous

b) $z'(t)$ exists and continuous

c) $z'(t)$ does not exists but continuous

d) None of these

5) Find $\int_L \frac{dz}{z-a}$ where L represent the circle $|z-a| = r$ is _____

a) πi b) $-\pi i$ c) $2\pi i$ d) $-2\pi i$

6) If P(x, y), Q(x, y), $\frac{\partial P}{\partial y}, \frac{\partial Q}{\partial x}$ are all continuous function within domain D and C is any closed contour in D then $\int_C (Pdx + Qdy) =$ _____

a) $\iint_D \left(\frac{\partial P}{\partial y} - \frac{\partial Q}{\partial x}\right) dx\, dy$

b) $\iint_D \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right) dx\, dy$

c) $\iint_D \left(\frac{\partial Q}{\partial x} + \frac{\partial P}{\partial y}\right) dx\, dy$

d) $\iint_D \left(\frac{\partial P}{\partial x} - \frac{\partial Q}{\partial y}\right) dx\, dy$

7) If $\lim_{z\to a} (z-a) f(z) = A$ and if C is the arc $\theta_1 \le \theta \le \theta_2$ of the circle $|z-a| = r$ then $\lim_{r\to 0} \int_C f(z)dz =$ _____

a) $iA(\theta_2 - \theta_1)$ b) $iA(\theta_1 - \theta_2)$

c) $iA(\theta_1 + \theta_2)$ d) $-iA(\theta_1 + \theta_2)$

8) Consider the function $\frac{1}{z-a}$ for the residue at infinity is _____

a) 1 b) $2\pi i$ c) –1 d) $-2\pi i$

9) The residue of $\frac{z^2}{(z-1)^2(z-2)}$ at z = 1 is _____

a) –3 b) 3 c) –1 d) 1

10) Expansion of $f(z) = \frac{1}{(z+1)(z+3)}$ for $|z| < 1$ is

a) $\frac{1}{3}+\frac{4}{9}z+\frac{13}{27}z^2+....$ b) $\frac{1}{3}-\frac{4}{9}z+\frac{13}{27}z^2-....$

c) $\frac{1}{3}-\frac{4}{9}z-\frac{13}{27}z^2-....$ d) None of these

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

1) Show that the function $u = x^3 - 3xy^2$ is harmonic and find the corresponding analytic function.

2) Show that an analytic function with constant modulus is constant.

3) Find the residue of $\frac{1}{(z^2+1)^3}$ at $z = i$.

4) Evaluate the residue of $\frac{z^2}{(z-1)(z-2)(z-3)}$ and sum of residue.

5) Show that when $0 < |z| < 4$ then $\frac{1}{4z-z^2} = \sum_{n=0}^{\infty} \frac{z^{n-1}}{4^{n+1}}$

6) Obtain the expansion $f(z) = \frac{1}{(z+1)(z+3)}$ series valied for $1 < |z| < 3$.

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

1) Show that $\left|\int_L f(z)dz\right| \leq \int_L |f(z)||dz|$.

2) Find the residue of $\frac{z^2-2z}{(z+1)^2(z^2+4)}$.

3) Prove that $\int_0^{2\pi} \frac{d\theta}{a+b\cos\theta} = \frac{2\pi}{\sqrt{a^2-b^2}}$, $a > b > 0$.

B) Explain the Milne-Thomson's method for constructing the regular function. **4**

4. Attempt **any two** of the following : **10**

   1) State and prove Cauchy's residue theorem.

   2) Evaluate $\int_L \bar{z}\, dz$ the line from z = 0 to z = 2i also the line from z = 2i to z = 4+ 2i.

   3) If a function f(z) = u (x, y) + iv (x, y) is analytic and its partial derivative u_x, u_y, v_x, v_y are satisfy then prove that $u_x = v_y$ and $u_y = -v_x$.

5. Attempt **any one** of the following : **10**

   1) a) Prove that the polar form of Cauchy Riemann equations $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}$ and

   $\frac{\partial v}{\partial r} = -\frac{1}{r}\frac{\partial u}{\partial \theta}$ where $r = \sqrt{x^2 + y^2}$, $\theta = \tan^{-1} y/x$.

   b) Find the analytic function of which the real part is $e^{-x}\{(x^2 - y^2)\cos y + 2xy \sin y\}$.

   2) a) State and prove Cauchy's fundamental theorem.

   b) Show that $\int_0^{\pi} \frac{1+2\cos\theta}{5+3\cos\theta}\, d\theta = 0$.

SLR-N – 211

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
STATISTICS (Special Paper – XI)
Probability Distributions and Stochastic Process

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Use*** *of scientific calculators is* ***allowed.***
3) ***Use*** *of statistical tables is* ***allowed****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the most correct alternative : **10**

i) Markov property is based up on _____
   a) Probability b) Expectation
   c) Conditional probability d) Cdf

ii) A r.v. X is truncated above b then P(X > b) = _____
   a) 1 b) 0
   c) 0.5 d) 0.25

iii) The distribution of age of students admitted in medical college can be considered as _____ distribution.
   a) uniform b) normal
   c) truncated d) none of these

iv) Consider a sequence of tosses of a fair coin. At time n(i.e. after n tosses) the state of the process is number of heads minus number of tails in n tosses.
   Then $P\left[X_n = 3 \mid X_{n-1} = 1\right]$=_____
   a) 0 b) 0.5
   c) 1 d) none of these

v) If X ~ N (2, 3) then $y = e^x$ is _____
   a) $N(e^2, e^3)$ b) N (l_n 2, l_n 3)
   c) Cauchy (0, 1) d) Lognormal (2, 3)

P.T.O.

vi) If X ~ lognormal (5, 4) then mode = _____

a) e^1 b) e^2

c) e^3 d) e^4

vii) If X_i (i = 1, 2, 3, 4, 5) are iid standard Cauchy rvs. then $X_1 + X_2$ follows _____ distribution.

a) t b) uniform

c) Cauchy d) none of these

viii) For Laplace distribution the curve is symmetric about _____

a) mean b) median

c) mode d) all of these

ix) If (X, Y) ~ BN (0, 0, 1, 1, 1) then mgf is _____

a) $e^{t_1^2 + t_2^2}$ b) $e^{(t_1 + t_2)^2}$

c) $e^{\frac{1}{2}(t_1 + t_2)^2}$ d) none of these

x) If X ~ Laplace (μ , λ) then _____

a) $\mu > 1$ b) $\mu \leq 0$

c) $-\infty < \mu < \infty$ d) $0 \leq \mu < \infty$

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

a) Define transient state of a M.C.

b) If $P = \begin{bmatrix} 0 & 1 \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ is the one step TPM of a M.C., find two step TPM.

c) If (X, Y) ~ BN (0, 0, 1, 1, ρ) and V(Y | X) = $e^{0.36}$ find ρ.

d) If X ~ Laplace (μ , λ) write the expression for CDF.

e) State the relationship between Cauchy and students t distribution.

f) If X ~ P (λ) then state the expression for V(X) ; if it is truncated at X = 0.

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

   i) Let $X \sim N(2, 3)$ find $v(e^X)$.

   ii) The r.v. X has Laplace distribution with pdf proportional to $e^{-5|x|}$, find the parameters of the distribution.

   iii) If $(X, Y) \sim$ B.N. $(3, 1, 16, 25, 0.6)$ find $P(3 < 4 < 7)$.

   B) If X is a standard Cauchy r.v. then find the distribution of X^{-1}. **4**

4. Answer **any two** of the following : **10**

   A) If a r. v. X follows exponential distribution with parameter θ and if it is truncated below 10 find the pdf of this truncated r.v. X.

   B) State the mgf of Laplace (μ, λ) distribution and hence find β_1.

   C) If $(X, Y) \sim BN(0, 0, 1, 1, \rho)$ find mgf.

5. Answer **any two** of the following : **10**

   A) If $X \sim$ lognormal (μ, σ^2) find $P(X \leq x)$.

   B) Two brands of certain product are available. Of those who buy Brand 1, 65% will buy it next time and remaining will buy Brand 2.

   Of those who buy Brand 2, 68% will buy it next time and remaining will buy Brand 1.

   Out of those using this product currently 30% are using Brand 1.

   Write down the one step TPM and initial probability distribution of this M.C. and find the percentage of those who will buy Brand 1 next time.

   C) Find mean and variance of truncated binomial distribution, truncated at $X = 0$.

SLR-N – 212

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – XI)
ENVIRONMENTAL GEOLOGY

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. *: 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 options given below it : **10**

1) Earth solid material falls down under influence of gravity in _____ hazard.

a) Tsunami b) Flood

c) Volcano d) Cyclone

2) Water rush downstreams in the process of _____ hazard.

a) Volcanic b) Flood

c) Subsidence d) Tsunami

3) Air carries volcanic _____ and causes hazard.

a) Ash b) Bombs

c) Lava d) Mud

4) Natural dam burst upstreams on cause _____ hazard downstreams.

a) Volcanic b) Tsunami

c) Subsidence d) Flood

5) Removal of vegetation may cause _____

a) Flood b) Tsunami

c) Subsidence d) Volcanic eruption

P.T.O.

6) _____ is common hazard if proper care is not taken in coal mine.

a) Tsunami b) Salination

c) Fire d) Cyclone

7) Non-scientific under ground mining may cause _____

a) Flood b) Subsidence

c) Siltation d) Volcanic hazard

8) Retaining wall stops hazard of _____

a) Subsidence b) Siltation

c) Flood d) Landslide

9) Building collapse may cause due to _____ as foundation is dislocated.

a) Ash of volcano b) Gases of volcano

c) Fire d) Subsidence

10) The agent which plays main role in the generation of environmental instability by process of weathering is _____

a) Heat b) Water

c) Tsunami d) Ice

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

i) Role of wind in volcanic hazard.

ii) Effects of mud flow from volcano

iii) Effect of siltation on dam and related hazard.

iv) Relation of rain and flood.

v) Relation of carrying capacity of river with flood.

vi) Volcanic ash hazard.

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

   i) Bolting of rocks on slopes.

   ii) Meshing of slopes.

   iii) Artificial levees.

   B) Role of check dams in flood controll. **4**

4. Answer **any two** of the following : **10**

   i) Describe the role of time in landslide.

   ii) Describe effects of over-exploitation and related geological hazard of ground water.

   iii) Effects of cyclones and precautions taken to controll hazard.

5. Answer **any two** of the following : **10**

   i) Describe the role of organisms in the landslide.

   ii) Describe role of man in causing mining hazard.

   iii) Describe cause, effects and precautionary measures of Tsunami geological hazard.

SLR-N – 213

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
MICROBIOLOGY
Agricultural Microbiology (Special Paper – XI)

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) Oily spots of pomegranate is caused by member of _____
   a) Bacillus b) Xanthomonas
   c) Pseudomonas d) Erwinia

   ii) Bordeaux mixture contain _____ , lime and water.
   a) Calcium sulphate b) Silver nitrate
   c) Copper sulphate d) Magnesium sulphate

   iii) _____ are the free living aerobic, nonphotosynthetic nitrogen fixing bacteria.
   a) Azotobacter b) Azolla
   c) Rhizobium d) Nostoc

   iv) The percentage of CO_2 in the atmosphere is _____
   a) 0.03% b) 5%
   c) 21% d) 0.2%

   v) The termination step in nitrogen cycle is _____
   a) Nitrogen fixation b) Denitrification
   c) Nitrification d) Ammonification

   vi) Green house effect is caused due to _____
   a) Less amount of CO_2 in atmosphere b) Less amount of ozone in atmosphere
   c) High amount of CO_2 in atmosphere d) Acid rain

vii) The term 'ecosystem' was first introduced by _____
   a) Aurther Stanely b) Rachel Carson
   c) E. P. Odum d) Aurther Tansely

viii) _____ is the symbiotic N_2 fixer.
   a) Azotobacter b) Frankia
   c) Penicillium d) Bacillus

ix) A manure containing cow dung and crop debris is called _____
   a) Compost b) Organic green manure
   c) Farm yard manure d) Vermicompost

x) The Cyanobacteria members generally present in soil are _____
   a) Nostoc and anabaena b) Rhizobium
   c) Chlamydomonas d) Azoto bacter

2. Answer **any five** of the following : **10**
   i) What is ecosystem ?
   ii) What is Canker ?
   iii) Define 'Pesticide'.
   iv) What are the sources of sulphur in atmosphere ?
   v) What is soft rot ?
   vi) Define 'Town Compost'.

3. A) Answer **any two** of the following : **6**
   i) Give mechanism of cellulose degradation.
   ii) Give significance of Green Manure.
   iii) Explain structure and properties of soil.

   B) Write short note on Modes of transmission of plant diseases : **4**

4. Answer **any two** of the following : **10**
   i) Explain use of antibiotics for control of plant diseases.
   ii) Write an essay on 'Carbon Cycle'.
   iii) Write an essay on 'FYM'.

5. Answer **any two** of the following : **10**
   i) Write an essay on 'Nitrogen Cycle'.
   ii) Explain the production and significance of vermicompost.
   iii) Explain use of Bordeaux mixture for control of plant diseases.

_____

SLR-N – 214

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
ELECTRONICS (Special Paper – XI)
Microcontroller and Interfacing

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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.*
4) ***Use*** *of log tables and calculators are* ***allowed.***

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

i) To configure any port of 89V51 microcontroller in input mode _____must be written into respective latch.
a) FF H b) OOH c) AO H d) AAH

ii) Mode 0 of the timer of 89V51 is _____ bit timer/counter mode.
a) 13 b) 11 c) 16 d) 12

iii) Following instruction may be executed to start the timer 1.
a) SETB TF1 b) SETB TR1
c) SETB TR0 d) None of these

iv) The microcontroller 89V51 has _____ facility of serial communication.
a) SPI b) USART c) I2C d) UART

v) The interrupt _____ has highest priority.
a) External 0 b) External 1
c) Timer 0 d) Timer 1

vi) In I/O mapped I/O mode of interfacing _____ bit address is used to produce chip select signal.

a) 8 b) 16 c) 12 d) 10

vii) In BSR mode of 8255 the bit of _____ is either set or reset.

a) Port B b) Port A c) Port C d) All of these

viii) The pin number 6 of an analog to digital convertor ADC 0804 is _____

a) Power supply b) Analog ground

c) Analog input d) None of these

ix) The need of expansion of I/O Port can be fulfilled by interfacing of _____ to the microcontroller 89V51.

a) 74244 b) 8255 c) 8212 d) 74138

x) The control signal PSEN, demonstrate the reading of _____ memory.

a) Program b) Data

c) Internal d) None of these

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

i) Write instructions for 89V51 microcontroller to set P1.3, clear P3.2, set P0.3 and clear P2.0.

ii) How the Ports of 89V51 microcontroller can be configured in input mode ?

iii) Compare IO mapped IO mode with memory mapped IO mode of interfacing.

iv) Give control word format of 8255 PPI.

v) Draw circuit diagram for interfacing of LED to the microcontroller 89V51.

vi) Draw circuit diagram for interfacing of opto coupler to the microcontroller 89V51.

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

i) Write a note on BSR mode of 8255.

ii) Give pin description of 16×2 LCD.

iii) Draw circuit diagram for interfacing of RAM 6264 to microcontroller 89V51.

B) Describe with the help of both hardware and software, the interfacing of an ADC 0804 to microcontroller 89V51. **4**

4. Attempt **any two** of the following : **10**

   i) Draw architecture of timers of 89V51 microcontroller and explain modes of the timers.

   ii) Describe the interfacing of 7-segment display to microcontroller.

   iii) What do you mean by expansion of I/O ports ? Describe interfacing of 8255 to microcontroller 89V51.

5. Answer **any one** of the following : **10**

   A) i) Describe TMOD register. Design the control word to configure the Timer 1 in Mode-2 Timer mode and Timer 0 in mode - 1 counter mode.

   ii) Describe the interfacing 16 × 2LCD to microcontroller. Write steps involved to display character on LCD.

   OR

   B) i) Describe, with hardware and software, the interfacing of electromagnetic relay to microcontroller.

   ii) Draw the circuit diagram for interfacing of stepper motor to microcontroller 89V51 and write program to rotate the motor in either clockwise or anticlock direction.

SLR-N – 215

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
COMPUTER SCIENCE (Special Paper No – XI)
Operating System – I

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carry* ***equal*** *marks.*
3) Calculator is not ***allowed****.*

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

1) Demand paging is a _____ system.
   a) Page replacement b) Cup scheduling
   c) Disk scheduling d) Job scheduling

2) MVT suffers from _____
   a) External fragmentation b) Internal fragmentation
   c) Both a) and b) d) None of these

3) The maximum number of process involved in any deadlock can be _____
   a) One b) Two c) Three d) Four

4) Bankers algorithm is a _____
   a) Deadlock avoidance algorithm b) Deadlock detection algorithm
   c) Deadlock preventation algorithm d) None of these

5) The integer value of a binary semaphore can be range between _____
   a) 0 and 1 b) 0 and 256
   c) – 256 to 256 d) unrestricted domain

6) The solution to the critical section problem must satisfy _____
   a) Mutual exclusion b) Bounded watting
   c) Process d) All of these

7) The simplest algorithms is _____
   a) SJF b) FCFS
   c) Preemptive SJF d) None of these

P.T.O.

8) A uniprocessor system can be _____ process.
   a) 2 b) 1 c) Any number d) Maximum

9) Providing mechanism for deadlock handling is done by _____
   a) The user program b) Any file stored on disk
   c) Any operating system program d) Any program in execution.

10) _____ is an example of distributed system.
   a) Clustered system b) Client server system
   c) Multiprocessor system d) None of these

2. Answer **any five** of the following : **10**
   1) What is pure demand paging ?
   2) What are types of operating system services ?
   3) What is scheduling ?
   4) What is semaphore ?
   5) What is fragmention ?
   6) Types of operations on process.

3. A) Answer **any two** of the following : **6**
      1) Explain system calls.
      2) Explain monolithic system.
      3) Explain multiprogramed operating system.
   B) Write note on CPU schedules. **4**

4. Answer **any two** of the following : **10**
   1) What are different types of schedules ? Discuss each in brief.
   2) Explain virtual memory.
   3) What are operating system ? Explain it's types.

5. Answer **any two** of the following : **10**
   1) Write note on FCFS.
   2) Explain application of operating system.
   3) What is deadlock ? Explain deadlock detection and recovery.

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SLR-N – 216

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
ELECTRODYNAMICS
Physics (Special Paper – XII)

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 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* ***whenever*** *necessary.*
4) ***use*** *of calculator or log table is* ***allowed****.*

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

i) To get a solution for Laplace's equations we have to use _____ of the problem.

a) the symmetry

b) the boundary conditions

c) the symmetry and the boundary conditions

d) None of the above

ii) The trajectory of a charged particle in mutually perpendicular crossed electric and magnetic fields is _____

a) cycloid b) circle

c) elipse d) helix

iii) Self inductance is measured in _____

a) Ohm b) Farad

c) Weber d) Henry

iv) Generation of motional emf is the principle of _____

a) photovoltaic cell b) generator

c) battery d) voltaic cell

P.T.O.

v) Mathematical formulations of emperical laws in electricity and magnetism are known as _____

a) Maxwell's equations

b) Faradays equations

c) Laplace's equations

d) Lorentz equations

vi) The equation of continuity is in accordance with the law of conservation of _____

a) energy b) momentum

c) charge d) mass

vii) The nature of electromagnetic waves is _____

a) transverse

b) longitudinal

c) stationary

d) both transverse and longitudinal

viii) The wave propagation vector is complex quantity in _____

a) vacuum b) dielectrics

c) conductors d) both vacuum and dielectrics

ix) The normal component of magnetic induction at the interface of two media is _____

a) continuous b) discontinuous

c) zero d) always continuous

x) Static charge can _____

a) radiate b) not radiate

c) radiate at some condition d) nothing can be said

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

1) State Faraday's law of electromagnetic induction.

2) What is transformer ?

3) Write down the equation of continuity.

4) State Poynting's theorem.

5) State the relation between frequency of em wave and total power radiated by electric dipole.

6) Define surface current density $(\overline{K})$.

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

1) Obtain the relation $\frac{\varepsilon_2}{\varepsilon_1} = \frac{N_2}{N_1}$ for transformer, where ε_1 is back emf in primary.

2) Sketch the graphical representation of plane electromagnetic wave with usual notations.

3) Explain in short retarded time and retarded potential.

B) The reflection coefficient for normal incidence of em wave at glass-air interface is 0.04. Hence find the transmission coefficient. **4**

4. Answer **any two** of the following : **10**

1) State and explain Ampere's law.

2) Discuss the orthogonality of $\overline{E}$, $\overline{H}$ and $\overline{K}$ vectors of EM wave.

3) Write note on total internal reflection.

5. Answer **any one** of the following : **10**

1) Obtain the solution of Laplace's equation in spherical co-ordinate system, when particle is independent of azimuthal co-ordinate.

2) State Maxwell's equations for vacuum and explain the physical significance of each equation.

SLR-N – 217

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
CHEMISTRY (Special Paper – XII)
Analytical and Industrial Physical Chemistry

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) For the determination of cell constant _____ electrolyte is used.
a) NaCl b) KCl c) NH_4Cl d) NaOH

2) In anodic oxidation of Aluminium _____ acid is used.
a) nitric b) sulphuric c) hydrochloric d) all of these

3) The potential of hydrogen electrode is _____
a) 1.0 V b) 0.0 V c) 1.018 V d) 1.10 V

4) Beer's law is valid only for _____ solutions.
a) dilute b) concentrated
c) moderate d) all the three

5) Transmittance is the reciprocal of _____
a) molar absorptivity b) opacity
c) extinction coefficient d) none of these

6) In chromium plating _____ is used as an anode.
a) Cr b) Pt c) Pb d) Ni

7) An increase of 1°C in temperature, increases the conductance value by about _____
a) 25% b) 0.25% c) 2.5% d) 1%

8) The negative logarithm of H^+ ions is defined as _____ of the solution.
a) pH b) pOH c) pKa d) pKb

P.T.O.

9) _____ used as reference electrode in potentiometric titrations.
   a) calomel electrode b) hydrogen electrode
   c) glass electrode d) quinhydrone electrode

10) In flame photometry _____ is used as monochromator.
   a) prism b) slit c) grating d) all of these

2. Answer **any two** of the following : **10**
   i) Mention various components of a flame.
   ii) Represent the nature of graph for conductometric titration between weak acid and weak base.
   iii) Define molar extinction coefficient.
   iv) Give the construction and electrode reaction of quinhydrone electrode.
   v) Mention any two limitations of flame photometry.
   vi) State Lambert's law.

3. A) Answer **any two** of the following : **6**
   i) What are the factors affecting the temperature of the flame ?
   ii) Discuss the role of brighteners in electroplating.
   iii) What is conductivity water ? How it is prepared ?

   B) Discuss the applications of flame photometry in qualitative analysis. **4**

4. Answer **any two** of the following : **10**
   i) Explain the electroplating of chromium in detail.
   ii) Write a note on different types of conductivity cells used in conductance measurement.
   iii) Explain the construction and working of single cell photoelectric colorimeter.

5. Answer **any two** of the following : **10**
   i) Discuss the classical and analytical methods for locating end points in potentiometric titrations.
   ii) Give the construction and working of glass electrode. How it is used in the determination of pH of the solution ?
   iii) Discuss basic principles of electroplating.

_____

SLR-N – 218

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
BOTANY
Special Paper – XII : Plant Biochemistry

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *i) Figures to the **right** indicate **full** marks.*
*ii) **Draw** neat labelled diagrams **wherever** necessary.*

1. Rewrite the sentence by choosing proper answer : **10**

i) Cellulose is a polymer of _____
   a) Glucose b) Fructose c) Ribose d) Xylose

ii) Lactose is formed of _____
   a) Glucose and Galactose b) Glucose and Fructose
   c) Fructose and Xylose d) Galactose and Fructose

iii) _____ is a rich source of starch.
   a) Potato b) Soybean c) Sunflower d) Safflower

iv) _____ forms a protective water-proof coating on fruit and leaf epidermis.
   a) Lipids b) Proteins c) Carbohydrates d) Nucleic acids

v) Fatty acid with one double bond are called _____ fatty acids.
   a) Monoenoic b) Dienoic c) Trienoic d) Tetraenoic

vi) The term lipid was first used by _____
   a) Bloor b) Hatch c) Kreb d) Calvin

vii) Amino acid containing one amino groups and two carboxylic groups is designated as _____ acid.
   a) Monoamino mono carboxylic b) Diamino mono carboxylic
   c) Monoamino dicarboxylic d) Diamino dicarboxylic

viii) _____ is a sulfur containing amino acid.
   a) Valine b) Leucine c) Alanine d) Cysteine

P.T.O.

ix) Alfa helical structure of proteins was proposed by _____

a) Pauling and Corey b) Hans Kreb

c) Calvin d) Bloor

x) _____ acts as a transport vehicle of aminoacids during protein synthesis.

a) t-RNA b) m-RNA c) r-RNA d) DNA

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

i) Give an outline of classification of carbohydrates.

ii) Explain any two functions of proteins.

iii) What is beta oxidation ?

iv) What are proteins ? Enlist structural types of proteins.

v) Mention any two properties of maltose.

vi) What is the role of m-RNA in protein synthesis ?

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

i) Mention any three properties of monosaccharides.

ii) What is Zwitter ion ?

iii) What are saturated fatty acids ? Write structure of any one saturated fatty acid you have studied.

B) Explain in brief the biosynthesis aspartic acid. **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 enantiomerism with suitable example.

5. Answer **any two** of the following : **10**

i) Mention any three physical and two chemical properties of amino acids.

ii) Explain in brief the reactions involved in fatty acid biosynthesis.

iii) What are disaccharides ? Give an account of reactions of sucrose synthesis and degradation.

_____

SLR-N – 219

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – XII)
Developmental Biology

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 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. Select appropriate answer from each of the following and rewrite the sentences : **10**

i) Polar body is _____ similar to mature ovum.
   a) Morphologically b) Physically
   c) Genetically d) Chemically

ii) During fertilization _____ of sperm dissolves membranes of egg.
   a) Nucleus b) Plasma membrane
   c) Acrosome d) Middle piece

iii) Microlecithal egg found in _____
   a) Chick b) Amphioxus c) Insect d) Frog

iv) During embryonic development of amphioxus archenteron is develops into _____
   a) Notochord b) Nerve cord
   c) Alimentary canal d) Coelom

v) During embryonic development of chick beating of heart starts at _____ hours of incubation.
   a) 24 b) 48 c) 29 d) 72

vi) Broader end of hen's egg shows presence of _____
   a) Air space b) Coelom c) Archentero d) Blastocoel

vii) _____ works as organizer during early embryonic development.
   a) Nerve cord b) Somites c) Blastopore d) Gut

P.T.O.

viii) _____ store nitrogenous waste during embryonic development of chick.

a) Yolksac b) Amnion c) Chorion d) Allantoic

ix) All six tissue barriers found in _____ type of placenta.

a) Endo-chorial b) Epithelio-chorial

c) Haemo chorial d) Haemo-endothelial

x) Somites of chick embryo develop into _____

a) Endoskeleton b) Kidney

c) Lungs d) Gut

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

1) Cleidoic egg
2) Yolk sac placenta
3) Amphimixis
4) Functions of amnion
5) Microlecithal egg
6) Shell of hen's egg.

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

1) Egg of amphioxus
2) Isolecithal egg
3) Deciduous placenta.

B) Hen's egg. **4**

4. Answer **any two** of the following : **10**

1) Types of cleavage according to the fate of egg.
2) Cortical reaction
3) Cleavage in amphioxus.

5. Answer **any one** of the following : **10**

1) Describe the process of gastrulation in chick.
2) What is cloning ? Describe cloning technique and note on its significance.

_____

SLR-N – 22

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
GEOGRAPHY (Paper – II) (Old)
Physical Geography – Climatology

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 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 sentence : **10**

1) The W.M.O. has suggested a standard period of _____ years for calculating the climatic averages.

a) 11 b) 21 c) 31 d) 41

2) _____ reflects the radio waves back to the earth's surface.

a) Ionosphere b) Troposphere c) Stratosphere d) Ozonosphere

3) Nitrogen (N_2) contains the _____% volume of the atmospheric gases.

a) 20.94 b) 78.08 c) 0.03 d) 0.93

4) The lines joining the places of equal atmospheric _____ are called as isobars.

a) Pressure b) Temperature c) Rainfall d) Humidity

5) The sun rays take _____ to reach the earth's surface.

a) 2 min. 20 sec. b) 4 min. 20 sec.
c) 6 min. 20 sec. d) 8 min. 20 sec.

6) _____ is the warmest months in north hemisphere.

a) January b) July c) October d) December

7) Anti-trade winds are also called as _____

a) Monsoons b) Cyclones c) Easterlies d) Westerlies

8) In Japan tropical cyclones are called as _____

a) Typhoons b) Hurricanes c) Tornadoes d) EL Nino

P.T.O.

9) At 50°s latitudes westerlies blow with very high velocity, which are known as _____

a) Monsoon b) Cyclones

c) Roaring fourties d) Furious fifties

10) The ice capped ground reflects _____ % of solar radiation back to space.

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

2. Answer in short (**any 5**) : **10**

1) State various elements of weather.
2) Define climatology.
3) What is solar-constant ?
4) What is Doldrum ?
5) Define Isotherms.
6) What is a cyclone ?

3. A) Write brief answer (**any two**) : **6**

1) Describe low pressure belts on the earth.
2) Write a note on 'Dust Particles' in the atmosphere.
3) Describe various gases in the atmosphere.

B) Draw a figure of 'structure of atmosphere'. **4**

4. Write short answer (**any two**) : **10**

1) Explain the nature and scope of climatology.
2) Describe vertical distribution of temperature.
3) Write a note on Westerlies.

5. Write short answers (**any two**) : **10**

1) Write a note on composition of Atmosphere.
2) Describe pressure belts on the globe.
3) State various elements that affect on the distribution of temperature and explain one of them in detail.

_____

SLR-N – 221

Seat No.	

B.Sc. (Part – III) (Semester – V) Examination, 2014
STATISTICS (Special Paper – XII)
Operations Research and Applied Statistics

Day and Date : Saturday, 8-11-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 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 constraints are strict equations
   b) The constraints are inequalities of $\leq$ type
   c) The constraints are inequalities of $\geq$ type
   d) The decision variables are unrestricted in sign

ii) Given a system of *m* simultaneous linear equations in n unknown *(m < n)*, the number of basic variables will be
   a) $n - m$ b) n c) m d) $n + m$

iii) The transportation problem is balanced, if
   a) Total demand and total supply are equal and the number of sources equals the number of destinations
   b) Total demand equals total supply irrespective of the number of sources and destinations
   c) Number of sources matches with the number of destinations
   d) None of the routes is prohibited

iv) The initial solution of a transportation problem obtained by
   a) North-West corner rule would invariably be optimum
   b) Least cost method does not provide the least cost solution to a T.P.
   c) VAM would invariably be very near to optimum solution
   d) MODI method is infeasible

v) In assignment problem involving four workers and three jobs, total number of assignments possible are

a) 4 b) 3 c) 7 d) 12

vi) The assignment problem is a special case of transportation problem in which number of origins

a) Equals the number of destinations

b) Is greater than the number of destinations

c) Is less than the number of destinations

d) Is less than or equal to 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 critical path analysis, CPM is

a) Event oriented b) Probabilistic in nature

c) Deterministic in nature d) Dynamic in nature

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 or equal to 2

c) Greater than or equal to 2 d) Less than 2

x) 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) pP_a b) $(1 - p)P_a$

c) PnP_a d) None of these

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

i) Define a L.P.P.

ii) Define a slack variable.

iii) What is an unbalanced transportation problem ?

iv) Define pessimistic time in a PERT.

v) What is a balanced assignment problem ?

vi) Define producer's risk.

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

i) Convert the following L.P.P. in its standard form

Maximize $z = 3x_1 + 2x_2$

subject to :

$2x_1 + x_2 \leq 2$, $3x_1 + 4x_2 \geq 12$, and $x_1, x_2 \geq 0$.

ii) Give the mathematical form of a transportation problem.

iii) Define critical activities and critical path.

B) The following assignment problem shows the costs of assigning five jobs to five persons. Determine the optimum assignment schedule. **4**

Job

		1	2	3	4	5
	A	8	4	2	6	1
	B	0	9	5	5	4
Person	**C**	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

4. Answer **any two** of the following : **10**

i) Write a procedure of simplex method of solving a LPP.

ii) Explain North-West corner method.

iii) Write a procedure of single sampling plan.

5. Answer **any two** of the following : **10**

i) Solve the following LPP by Graphical method.

Maximize $z = 3x_1 + 4x_2$

subject to :

$4x_1 + 2x_2 \leq 80$, $2x_1 + 5x_2 \leq 180$, and $x_1, x_2 \geq 0$.

ii) In a single sampling plan if N = 10000, n = 89, 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.

SLR-N – 222

Seat No.	

B.Sc. (Part – III) (Sem. – V) Examination, 2014
GEOLOGY (Special Paper – XII)
Hydrogeology and Remote Sensing

Day and Date : Saturday, 8-11-2014 Max. Marks : 50

Time : 3.00 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*** *necessary.*

1. Write the correct answer from the given options : **10**

1) Water with in the ground moves downward in the _____ zone under the action of gravity.
   a) Undersaturated b) Saturated
   c) Percolation d) Weathered

2) Values of specific yield depend on _____
   a) Arain size and shape of sediments
   b) Compaction of sediments
   c) Distribution of pores
   d) a + b + c

3) _____ sedimentary deposit have high porosity.
   a) Poorly sorted b) Well sorted
   c) Well cemented d) Impervious

4) The water level in a well penetrating a confined aquifer is the elevation of _____ surface.
   a) Piezometric b) Porometric
   c) Hydrometric d) Geometric

5) In _____ water table is undulating form and sloping.
   a) Horizonal lava flows b) Horizontal sandstones
   c) Alluvium deposits d) Limestone

6) Forest areas are seen as _____ texture on the air photographs.
   a) Granular b) Linear c) Wavy d) Spotted

P.T.O.

7) _____ depends on quantity of reflected electromagnetic energy.
   a) Pattern b) Shadow c) Tone d) Texture

8) Multi-spectral scanner records the remote sensing data in _____ bands.
   a) 2 b) 7 c) 3 d) 4

9) _____ is the linear feature on an image which express the structural feature.
   a) Lineament b) Lineation c) Fold limb d) Foliation

10) Water bodies appear as _____ tone on the black and white air photographs.
   a) White b) Black
   c) Lighter gray d) White and lighter gray

2. Write **any five** of the following : **10**
   a) Artesian springs
   b) Depression springs
   c) Storage capacity
   d) Lense stereoscope
   e) Pattern
   f) Passive sensor.

3. A) Attempt **any two** of the following : **6**
   a) Groundwater basins
   b) Storage capacity
   c) False colour composite

   B) Importance of remote sensing in geology. **4**

4. Describe **any two** of the following : **10**
   a) Overlap and their types
   b) Types of air photographs based on orientation of camera axis
   c) Concept of remote sensing.

5. Explain **any two** of the following : **10**
   a) Relationship between rock texture and porosity
   b) Volcanic rocks and limestones as geological aquifers
   c) Permeability and secondary structures.

_____

SLR-N – 223

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
MICROBIOLOGY (Special Paper – XII)
Immunology

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) Individual with _____ blood group is the universal blood donor.

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

ii) _____ is involved in alternative pathway of complement activation.

a) Factor B b) C_4
c) C_1 d) C_2

iii) _____ are involved in antibody production.

a) Monocytes b) Neutrophils
c) Lymphocytes d) Basophils

iv) Mast cell _____

a) release histamine b) are phagocytic
c) circulate in liver d) are found in thymus

v) Which of the following vaccine is NOT included in the National Immunization programme of India ?

a) Diphtheria b) Tuberculosis
c) Poliomyelitis d) Rabies

P.T.O.

vi) Cytokines are _____

a) Limphokines b) Monokines

c) Regulate IR d) All of these

vii) Auto antibodies against acetyl-choline receptors are produced in _____

a) Myasthenia gravis b) Pernicious anaemia

c) Good pasture's syndrome d) Rhematoid arthritis

viii) Anaphylaxis is an example of _____ hypersensitivity reaction.

a) Type IV b) Type III

c) Type II d) Type I

ix) The MHC is a collection of genes located on chromosome no. _____ in humans.

a) 14 b) 17

c) 6 d) 21

x) _____ is a secondary lymphoid organ.

a) MALT b) Spleen

c) Lymph node d) All of these

2. Answer in **one** or **two** sentences (**any five**) : **10**

i) What is complement ?

ii) Define hypersensitivity.

iii) Major histocompatibility complex.

iv) β-lymphocyte.

v) Define Monoclonal antibodies.

vi) What is isograft ?

3. A) Write in brief (**any two**) : **6**

   i) Give an account of activation of complement by classical pathway.

   ii) Write on HLA typing.

   iii) Rh blood group system.

   B) Explain anaphylaxis, a type of immediate hypersensitivity. **4**

4. Answer **any two** : **10**

   i) What is cell mediated immunity ? Give an account on cells involved and their role.

   ii) Enlist blood transfusion reaction.

   iii) Differentiate between conventional and new generation vaccines.

5. Answer **any two** : **10**

   i) Write application of monoclonal antibodies.

   ii) What is transplant ? Discuss with mechanism and prevention of graft rejection.

   iii) Write in brief on Autoimmunity with two examples.

SLR-N – 224

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
ELECTRONICS
Power Electronics (Special Paper – XII)

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 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.*
4) ***Use*** *of logarithmic table and calculator is allowed.*

1. Select the correct alternative for the following : **10**

1) Power MOSFET is a _____ controlled device.
   a) Voltage b) Current
   c) Field d) Both a) and b)

2) Reverse recovery current depends on _____
   a) Temperature b) Storage charge
   c) Peak inverse voltage d) Forward current

3) If the firing angle of SCR is α then conduction angle is _____
   a) $90 - \alpha$ b) $90 + \alpha$ c) $180 + \alpha$ d) $180 - \alpha$

4) Diac is a _____ device.
   a) Bidirectional b) Unidirectional
   c) Bipolar d) Both a) and b)

5) Series connection of SCR's is used to improve _____ ratings.
   a) Current b) Voltage
   c) Both a) and b) d) None of these

P.T.O.

6) A freewheeling diode is used in controlled rectifier circuit in case of _____

a) Resistive load b) Inductive load

c) Capacitive load d) None of these

7) If the duty cycle of chopper circuit is exactly 50%, it is considered to be a

a) Sine wave b) Low duty cycle

c) High duty cycle d) Square wave

8) _____ can be used as a static switch.

a) Triac b) SCR

c) Both a) and b) d) None of these

9) Over current protection in power device in provided by _____

a) Heat sink b) Cooling

c) Fuses d) increase in resistance

10) The series inverter uses _____ type of commutation.

a) Class A b) Class B

c) Class C d) Class D

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

i) Sketch the equivalent circuit of IGBT.

ii) State typical applications of inverter.

iii) Compare Natural and Forced Commutation.

iv) Explain principle of phase control.

v) What is chopper ?

vi) Explain dv/dt ratings of SCR.

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

   i) Explain in brief working of step down chopper.

   ii) Explain construction and working of PUT.

   iii) Explain class C type commutation method for SCR.

   B) Draw the two transistor model of SCR and explain it. **4**

4. Answer **any two** of the following : **10**

   i) Write a short note on UPS.

   ii) Explain Triac characteristics.

   iii) Describe single phase full wave controlled rectifier with resistive load.

5. Answer **any one** of the following : **10**

   I) Give classification on inverters. Explain principle and working of series inverter.

   II) Give brief account of SCR's connected in parallel. Describe construction and switching characteristics of power BJT.

SLR-N – 225

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
COMPUTER SCIENCE (Special Paper – XII)
Data Communications and Networking – I

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) _____ layer allows a process to add checkpoints or synchronization points.
a) Application b) Session c) Data link d) Physical

2) Over head bits are added to data in case of _____
a) CRC b) Parity check
c) Noise d) None of the above

3) Period is expressed in _____
a) Volts b) Hz c) bps d) Seconds

4) In data gram subnet each packet is routed independently.
a) True b) False

5) _____ topology, each node is directly connected to its adjacent neighbours.
a) Bus b) Ring c) Mesh d) Star

6) _____ signals are continuous in nature.
a) Analog b) Digital
c) Mixed d) None of the above

7) The de facto standards apply because of
a) Regulation b) Choice
c) Agreement d) Conventions

P.T.O.

8) _____ transmits each signal on a different frequency.

a) TDMA b) CDMA c) TDM d) FDMA

9) _____ method reduces the chance of collision and improves efficiency.

a) 1 – persistent b) Non-persistent

c) p – persistent d) None of the above

10) Link state routing uses the technique of

a) Flooding b) Next hop

c) Random numbers d) Timely delivery

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

1) What is meant by synchronous communication ?

2) What is meant by flooding ?

3) Mention the various services of data link layer.

4) Write any two characteristics of data communications system.

5) What is noise ? Mention the types of noise.

6) What is meant by optimality principle ?

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

1) Explain co-axial cable in detail.

2) Which are various network criteria ?

3) Which are the major steps of link state routing ?

B) Explain CSMA/CD in detail. **4**

4. Answer **any two** of the following : **10**

1) Communication satellite.

2) What is network topology ? Explain any one in detail.

3) Explain packet switching in detail.

5. Answer **any two** of the following : **10**

1) Explain various congestion prevention policies.

2) Explain RS-232-C in detail.

3) Explain various design issues for layers.

_____

SLR-N – 226

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
ENGLISH COMPULSORY
Countdown : English Skills for Success

Day and Date : Saturday, 1-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1.A) Rewrite the following bits by choosing the right options : **6**

1) Self-esteem is essential for_____ development.
   a) morbid b) unhealthy c) healthy d) slow

2) Haldane says that our approach to the problem of disease is even less _____
   a) irrational b) rational
   c) rationale d) rationing

3) In the absence of his wife and sons, Rahim Khan called _____ Nuru and Bundu.
   a) bulls b) goats c) cows d) sparrows

4) Madonna, in Italian means _____
   a) my lady b) my gentleman
   c) my sister d) my don

5) William Word = Worth saw a _____ of golden Daffodils.
   a) bunch b) stretch c) herd d) crowd

6) Rahim Khan drenched in the rain and caught a _____
   a) headache b) backache c) fever d) cold

P.T.O.

B) Select the correct idiom according to the meaning expressed in the statement. **2**

1) This job is <u>perfect for</u> you.
   a) right up for street
   b) out of this world
   c) to your heart's content

2) The problem <u>got out of control.</u>
   a) got out of hand
   b) got off to a flying start
   c) got off on the wrong foot

C) Tick the **right** combinations of words in the following : **2**

1) hardly work / hard work

2) contradictory / statement / opposite statement

2. Answer **any five** of the following questions in short : **10**

1) Write any two results of low esteem.

2) What is scientific point of view ?

3) Why couldn't Rahim Khan marry Radha ?

4) What is the importance of self-esteem in the modern economic set-up ?

5) How were diseases considered during the pre-Christian period ?

6) How did Rahim Khan express his anger at his family ?

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

1) Throw light on the description of Daffodils by W. Wordsworth.

2) Why is the refugee mother considered to be superior to Madonna ?

3) What happened to the poet when he lay an couch in a vacant or pensive mood in "The Daffodils" ?

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

1) You have failed the B.Sc. II year examination. How will you manage the stress of this failure ?

2) Your cousin has come to stay with you for 2 months. How will you help him adopt himself to your family ?

3) Your exams are round the corner and you are not fully prepared. How will you manage time and prepare yourself for success.

4. A) Write a description of a person you met at an art exhibition. Give details of the personality traits of the person. **10**

OR

B) Describe a famous TV anchor person you have seen and heard frequently. Depict the features of his / her personality in detail.

5. Read the passage below and summarize it. **10**

Gopal had never seen snow before except in photographs where it lay like the skin of some dead white beast on the ground. He had not realized that it danced with the joy and beauty of a ballet dancer. Its touch upon him was hesitant as a child's. And Gopal raced under each flake trying to catch it in his mouth. He felt that each flake was alive as it playfully evaded him and sat on his hair or his coat. One enterprising fellow made his way onto the back of his neck. And it rested there for quite a time. Gopal ran around happily trying to swallow as many snow flakes as he could. It wasn't easy. Some flakes bumped into his nose and others onto his jaw. It was exciting. He dashed about having a miraculous new drink. He snapped at a Flake, leaping up for it and his teeth clicked on themselves. A flake fell on his eye and stung. Never the less, Gopal enjoyed himself a lot.

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SLR-N – 227

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XIII)
Nuclear Physics

Day and Date : Monday, 3-11-2014 Max. Marks : 50

Time : 11.00 am. to 1.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** diagram **wherever** necessary.*
*4) **Use** of calculator or log-table is **allowed**.*

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

i) Betatron accelerates _____ ions.

a) positive b) negative c) neutral d) no any

ii) When α particles strikes on screen coated with ZnS, then flash of light is produced. This principle is used in

a) GM counter b) Bubble chamber

c) Scintillation counter d) Cenkov counter

iii) The radius of nucleus is directly proportional to _____ of atomic mass number.

a) Square root b) Cube root c) Cube d) Square

iv) In exothermic nuclear reaction the Q value should be

a) positive b) negative c) zero d) infinity

v) The splitting of nucleus into nuclides is known as

a) nuclear fusion b) nuclear fission

c) nuclear emulsion d) stripping reaction

P.T.O.

vi) Leptons are

a) bosons b) hydrons c) fermions d) nurons

vii) In accelator in which two Dee's are used is called

a) Synchro-cyclotron b) Cyclotron

c) Betutron d) Synchrotron

viii) The time at which GM tube unable to count pulse is called

a) dead time b) recovery time

c) resolving time d) mean time

ix) The minimum energy required to break the nucleus into its constituent particles is called

a) binding energy b) activation energy

c) fusion energy d) nuclear energy

x) In every fission reaction on an average _____ nutrons are emitted.

a) 0.5 b) 1.5 c) 2.5 d) 3.5

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

i) State betatron condition.

ii) State principle of bubble chamber.

iii) What do you mean by nuclear spin ?

iv) What is stripping reaction ?

v) Write four factor formula for nuclear reactor.

vi) What is quarks ?

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

   i) Write note on reactor materials.

   ii) Obtain equation for radius of nucleus.

   iii) Give properties of any one elementary particles.

   B) Calculate Q value of given nuclear reaction : **4**

   $_7N^{14} + _2He^4 \rightarrow _8O^{17} + _1H^1 + Q$

   Given : Mass of N^{14} = 14.00753 amu

   Mass of He^4 = 4.00387 amu

   Mass of O^{17} = 17.00450 amu

   Mass of $_1H^1$ = 1.00814 amu.

4. Attempt **any two** of the following : **10**

   i) Explain peaceful uses of nuclear radiations.

   ii) Explain electrical quadrapole moment.

   iii) Write note on chain reaction.

5. Attempt **any one** of the following : **10**

   i) Explain construction and working of cyclotron. What are the limitations of cyclotron ?

   ii) Explain construction and working of GM counter. Hence explain Geiger-Plateau region.

SLR-N – 229

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
BOTANY (Special Paper – XIII)
Microbiology and Plant Pathology

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 : **10**

1) Sterilization by steam under pressure is carried out at the temperature _____ to 147°C.
   a) 108 b) 109 c) 110 d) 112

2) The first person to see and describe Microbes was a _____ microscopist.
   a) German b) Dutch c) French d) African

3) India is the _____ largest alcohol producers in the world.
   a) first b) second c) third d) fourth

4) Shoyu is meatly flavoured vegetable sauce consumed in _____
   a) Japan b) Australia c) India d) Sri Lanka

5) There are about _____ antibiotics discovered at this stage.
   a) 5501 b) 5502 c) 5500 d) 5503

6) India has vast potential for biopesticides production over _____ tones per year.
   a) 1,00,000 b) 2,00,000 c) 3,00,000 d) 4,00,000

7) Disease can be identified by the visual signs shown by the diseased plants is called as _____
   a) Disease cycle b) Control measures
   c) Symptoms d) None of these

8) Anthracnose of bean is a _____ disease.
   a) Viral b) Bacterial c) Fungal d) Mycoplasma

9) The causal organism of grain smut of jowar is _____ sps.
   a) Sphacelotheca b) Cercospora
   c) Albugo d) Xanthomonas

10) White rust of crucifer disease is control by _____
   a) Blitox-53 b) Blitox-52 c) Blitox-51 d) Blitox-50

2. Answer **any five** of the following : **(5×2=10)**

I) Define natural culture media.

II) What is microbiology ?

III) Give the uses of acetic acid and lactic acid.

IV) Explain the symptoms of bangadi disease of potato.

V) Give the control measures of downy mildew of bajra.

VI) Define antibiotics.

3. A) Answer **any two** of the following : **(2×3=6)**

I) Explain the streak plate method of pure culture.

II) Give the characteristic features of mycoplasma as microbes.

III) Explain the disease cycle and control measures of leaf curl of chilli.

B) Explain the classification of plant diseases based on crops infected. **4**

4. Answer **any two** of the following : **(2×5=10)**

I) What is sterilization ? Give the method of sterilization by moist heat.

II) Describe the method of preparation of Shoyu by fermentation process.

III) Explain the symptoms, causal organism and control measures of little leaf of brinjal.

5. Answer **any two** of the following : **(2×5=10)**

I) Explain the classification of culture media based on chemical composition.

II) Describe the production of cheese by microbial fermentation from milk.

III) Explain the symptoms, causal organism and control measures of white rust of crucifer.

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SLR-N – 230

Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2014
ZOOLOGY (Special Paper – XIII)
Physiology

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 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.*

1. Select the appropriate answer from each of the following and rewrite the sentence. **10**

1) In gastric digestion the proteins are digested by _____ enzyme.
a) lipase b) amylase c) pepsin d) renin

2) _____ vitamin causes the ricket disease in human.
a) B b) C c) D d) K

3) The conversion of glucose into glycogen is called as _____
a) glycolysis b) glycogenolysis
c) glycogenesis d) gluconeogenesis

4) Increased CO_2 concentration in blood strogly affects on O_2 carring capacity of Hb. This effect is known as _____
a) Hambarger's effect b) Haldane effect
c) Bohr effect d) Tender effect

5) _____ instrument is used taking ECG.
a) Kymograph b) Electrocardiograph
c) Ultra Sonography d) X-ray

6) Sliding fillament theory of muscle contraction firstly proposed by _____
a) H. E. Huxley and J. Hanson b) Watson and Crick
c) de. Duve and Robertson d) Singerand and Nicolson

7) _____ is the structural and functional unit of nervous system.
   a) Nephron b) Ganglion c) Neuron d) Nissil granule

8) The Malpighian bodies of nephrons are located in _____ part of kidney.
   a) medula b) pelvis c) cortex d) calyx

9) _____ is a water soluble vitamin.
   a) Vitamin – A b) Vitamin – D c) Vitamin – K d) Vitamin – C

10) _____ is the waste product produced in ornithine cycle.
   a) Ammonia b) Creatine c) Urea d) Creatinine

2. Write short notes on (**any five**). **10**
   1) Define the mechanical digestion in stomach.
   2) Draw neat labelled diagram of Malpighian body.
   3) Roles of Vitamin C.
   4) Roles of pepsin enzyme in protein digestion.
   5) State location and roles of Sinu-auricular node.
   6) Depolarization.

3. A) Attempt **any two** : **6**
   1) Functions of bile.
   2) Draw neat labelled diagram of Ornithin cycle.
   3) Natural sources of Vitamin A.

   B) Describe the process of ultra-filtration in Bowman's capsule of nephron. **4**

4. Solve **any two** : **10**
   1) Chloride shift
   2) Protein as a nutritional element
   3) Composition of urine.

5. Answer **any one** of the following : **10**
   1) What is synapse ? Describe synaptic transmission.
   2) What is respiration ? Describe transport of gases.

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SLR-N – 231

Seat No.	

B.Sc. III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XIII)
Metric Spaces

Day and Date : Monday, 3-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 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**

i) If $x = \{a_n\}_{n=1}^{\infty} \in l^2$ and $T_x = \left\{\frac{a_n}{3}\right\}_{n=1}^{\infty}$ then T is

a) a contraction on l^2 b) not contraction on l^2

c) Homeomorphism d) None of these

ii) The diameter of any subset A of IRd is equal to 1 if

a) A contains at least two points

b) At least A contains one point

c) A contains no points

d) None of these

iii) Let M be a metric space and f and g are real-valued functions which are continuous at a $\in$ M then f/g is continuous at a if

a) $g(a) \neq 0$ b) $f(a) \neq 0$ c) $f(a) = 0$ d) $g(x) \neq 0 ; x \neq a$

iv) If M is the closed interval [0, 1] with absolute value metric then $B\left[\frac{1}{4}; \frac{1}{2}\right]$ is

a) $\left[0, \frac{3}{4}\right]$ b) $\left[0, \frac{3}{2}\right]$ c) $\left[0, \frac{1}{2}\right]$ d) $\left\{\frac{1}{2}\right\}$

v) Finite intersection of open sets of metric space is

a) open b) closed c) open and closed d) none of these

P.T.O.

vi) If $a \in \mathbb{R}d$ then the set {a} is

a) both open and closed in $\mathbb{R}d$

b) only open in $\mathbb{R}d$

c) only closed in $\mathbb{R}d$

d) None of these

vii) If $f(x) = x^2$, $(-1 \leq x \leq 1)$ then f attains maximum value at

a) $x = 1$ b) $x = 0$ c) $x = -\frac{1}{2}$ d) $x = \frac{1}{2}$

viii) A family $\mathfrak{L}$ of subsets of M is said to have F.I.P. If

a) $\bigcap_{F_i \in \mathfrak{F}} F_i = \phi$ b) $\bigcap_{F_i \in \mathfrak{F}} F_i \neq \phi$

c) $\bigcup_{F_i \in \mathfrak{F}} F_i \neq \phi$ d) None of these

ix) If M is any set then the family $\mathfrak{I}$ of subsets A of M is said to form a covering of M if

a) $M \subset \bigcup_{A \in \mathfrak{F}} A$ b) $M \supset \bigcup_{A \in \mathfrak{F}} A$

c) $M \subset \bigcup_{A \in \mathfrak{F}} A'$ d) None

x) For metric < M, ρ>; the map $T : M \to M$ is a contraction on M if

a) $\rho(Tx, Ty) \leq \alpha.\rho(x, y); 0 < \alpha \leq 1$

b) $\rho(Tx, Ty) \leq \alpha.\rho(x, y); 0 \leq \alpha < 1$

c) $\rho(Tx, Ty) \geq \alpha.\rho(x, y); 0 \leq \alpha < 1$

d) None

2. Attempt **any five :** **10**

1) If $\lim_{x \to 1} \sqrt{x+3} = 2$ then find $\delta > 0$.

2) If ρ and σ are metrices for M and if k > 1 such that

$$\frac{1}{k}\sigma(x, y) \leq \rho(x, y) \leq k.\sigma(x, y); (x, y \in M)$$

then prove that ρ and σ are equivalent metrices.

3) Let M be a metric space and $A \subset B \subset M$. If A is dense in B and B is dense in M then prove that A is dense in M.

4) Let $< M, \rho >$ be a metric space then show that convergent sequence has unique limit.

5) If T is a contraction on M then show that T is contineous on M.

6) Define compact metric space with example.

3. A) Attempt **any two :** **6**

1) In a metric space $< M, \rho >$ prove that any intersection of closed sets is closed.

2) Define d:$\mathbb{R} \times \mathbb{R} \to [0, \infty]$ by

$d(x, x) = 0, (x \in \mathbb{R})$

and $d(x, y) = 1; (x \neq y, x, y \in \mathbb{R})$

Then show that d is metric on $\mathbb{R}$.

3) Let A be the subset of metric space $< M, \rho >$. If $< A, \rho >$ is compact then prove that A is closed subset of $< M, \rho >$.

B) If T:[0, 1] $\to$ [0, 1] and if there is a real number α with $0 \leq \alpha < 1$ such that $|T'(x)| \leq \alpha$; $(0 \leq x \leq 1)$ where T' is derivative of T. Prove that T is a contraction on [0, 1]. **4**

4. Attempt **any two :** **10**

1) Let G be an open subset of metric space M then prove that $G' = M - G$ is closed.

2) Prove that every closed subset of a compact metric space is compact.

3) Let $< M, \rho >$ be a metric space. If $\{S_n\}_{n=1}^{\infty}$ is a convergent sequence of points of M then prove that $\{S_n\}_{n=1}^{\infty}$ is a Cauchy-sequence. Is the converse true ? Justify.

5. Attempt **any one :** **10**

1) If M is compact metric space then prove that M has Heine-Borel property.

2) Let $< M_1, \rho_1 >$ and $< M_2, \rho_2)$ are metric spaces and $f : M_1 \to M_2$ then prove that f is continuous on M_1 if and only if $f^{-1}(G)$ is open in M_1 whenever G is open in M_2.

SLR-N – 233

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
GEOLOGY (Paper – XIII)
Crystallography, Principles of Stratigraphy and Earth's History

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 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 diagrams ***wherever*** *necessary.*

1.Fill in the blanks with correct option given in the bracket : **10**

1) The process of formation of crystals is known as _____
(Weathering, Mineralization, Crystallization, Petrology)

2) Flat surfaces of crystals is called as _____
(Edge, Face, Solid angle, Cleavage)

3) Two faces of crystals intersects to form _____
(Edge, Face, Solid angle, Cleavage)

4) More than two faces intersects to form _____
(Edge, Face, Solid angle, Cleavage)

5) _____ deals with mutual relationship and succession of rocks.
(Stratigraphy, Petrology, Geology, Mineralogy)

6) Stratigraphic principle 'Faunal Succession' deals with the study of _____for correlation of rocks.
(Rocks, Minerals, Strata, Fossils)

7) In stratigraphic principle 'order of superposition', _____ of rocks is considered.
(Fossils, Chronological order, Palaeontology Thickness)

P.T.O.

8) In 'Uniformitarianism' principle of stratigraphy _____ is important.
(Fossils, Evolution of plants, Evolution of animals, Evolution of earth's surface)

9) Matching the rock formations of distant areas deposited at the same stage of the earth's evolutionary history, is the main aim of _____ of rock formations.
(Time unit, Correlation, Colour, Classification)

10) Major subdivision in the geological timescale is _____
(Eon, Era, Period, Age)

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

1) Describe the process of formation of crystal.
2) Define crystal. Draw cube.
3) Define stratigraphy.
4) Describe the scope of stratigraphy.
5) What is system ? Mention its corresponding time unit. Give their examples.
6) What is an Index Fossil ?

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

1) What is role of an index fossil in the stratigraphy ? Give example.
2) What is uniformitarianism ? Give example.
3) Draw and describe Dodecahedron.

B) Draw and describe Hexagonal prisms of first and second orders. **4**

4. Answer **any two** of the following : **10**

1) Describe the stratigraphic principles order of superposition and 'use of fossils'.
2) Describe non palaeontological criteria for correlation.
3) Describe elements of symmetry of isometric and Hexagonal normal symmetry classes.

5. Explain **any two** of the following : **10**

1) Describe cyrstallographic axes and axial planes with examples.
2) Describe palaeontological criteria for correlation of rock formations.
3) Describe the geological timescale.

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SLR-N – 234

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
MICROBIOLOGY
Microbial Genetics (Special Paper – XIII)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Rewrite the sentences by choosing correct answers from given alternatives : **10**

i) The folded fiber model for E-Coli chromosome was proposed by _____
   a) Woriel b) John Cairns
   c) Chase d) Pittijohn and Hetcht

ii) If prematuar chain termination is occurred during translation, then mutation is called as _____
   a) Silent mutation b) Sense mutation
   c) Nonsense mutation d) Neutral mutation

iii) _____ is a region to which RNA polymerase bind and initiate transcription.
   a) Operator b) Promoter c) Regulator d) Terminator

iv) _____ are the enzymes that recognize specific base sequences in DNA and cleave ds. DNA within or adjacent to these sequences.
   a) Exonuclease b) DNA polymerase
   c) Replicase d) Restriction endonuclease

v) Mutations arising from the insertion or deletion of nucleotides are called as _____
   a) Basepair substitution b) Spontaneous mutation
   c) Frame shift mutation d) Suppressor mutation

vi) 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

vii) _____ plasmid induce crown gall tumor in plants.
   a) pBR-322 b) pUC c) Ti d) PEG

P.T.O.

viii) A probe is used in _____ stage of genetic engineering.
a) Cleaving DNA b) Recombining DNA
c) Cloning d) Screening

ix) Mutations that do not bring any phenotypic changes are called _____ mutation.
a) Silent b) Lethal c) Non-sense d) Transition

x) Nucleic acid in gel are usually visualized by staining with _____ intercalating dye.
a) Ethidium bromide b) Coomassie blue
c) Methylene blue d) Janus green

2. Answer **any five** of the following : **10**
1) Some important mile stones in genetic engineering.
2) Cloning organisms
3) Palindromes
4) Insertion vectors in recombinant DNA technology
5) Cosmids
6) E-Coli chromosome
7) Phenotypic lag.

3. A) Answer **any two** of the following : **6**
i) Draw a neat labelled diagram of pBR322.
ii) Give in brief applications of protein engineering.
iii) Explain Cis-Trans test.

B) Describe in detail effect of mutation on phenotype. **4**

4. Answer **any two** of the following : **10**
a) Give brief account of DNA finger printing
b) Write briefly on 'Transcription'.
c) Explain in detail genetic engineering.

5. Answer **any two** of the following : **10**
i) Discuss in detail effect of mutation on translation process.
ii) Explain in brief mutation in bacteriophages.
iii) Discuss with suitable example properties of vectors used in cloning of DNA.

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SLR-N – 235

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
ELECTRONICS (Special Paper – XIII)
Sensors and Instrumentation

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 p.m. to 1.00 p.m.

Instructions *: 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 for the following : **10**

i) _____ thermocouple gives the highest output. (Under identical values of cold and hot junction temperatures)

a) Chromel – Constantan b) Iron – constantan
c) Platinum – Platinum rhodium d) Nickel – nimo

ii) In capacitive transducer, capacitance is varied by changing _____

a) Material of the plate
b) Distance between the plates
c) Area of plates
d) Specific resistance

iii) The turn on and turn off times of LCD are of the order of few _____

a) s b) ms c) μs d) ns

iv) Load cell uses _____ as transducer.

a) strain gauge b) capacitor
c) inductor d) none of these

v) Shielding is used to block _____

a) electrostatic fields b) magnetic fields
c) EMI d) all of the above

P.T.O.

vi) The chassis of an instrument is connected to the earth ground to _____

a) get proper current in the load

b) get proper voltage across the load

c) eliminate leakage path

d) disconnect load from the circuit

vii) The smallest change in a measured variable to which an instrument will respond is _____

a) sensitivity b) resolution c) error d) precision

viii) The delay line is used in an analog CRO to introduce delay in the _____

a) vertical path to compensate for the delay in the horizontal path

b) horizontal path to compensate for the delay in the vertical path

c) sweep generator

d) triggering

ix) In most of digital multimeter (DMM), 1 is displayed at MSB position to indicate _____

a) over range b) 1 V

c) short circuit d) none of the above

x) In function generator for the generation of triangular wave _____ circuit is used.

a) Integrator b) Differentiator

c) Shaping circuit d) Schmitt trigger

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

i) State any four points to be considered while selecting a transducer for any application.

ii) Distinguish between RTD and thermistor.

iii) Compare active and passive transducers.

iv) State the concept of signal conditioning in brief.

v) Define accuracy and precision.

vi) Draw block diagram of digital tachometer.

3. A) Answer **any two** of the following : **6**
   i) Write a note on solenoid.
   ii) Write a note on Hall effect sensor.
   iii) How pH meter works ?

   B) Given expected voltage value across a resistor is 80 V. The measurement is 79 V. Calculate, **4**
   i) The absolute error
   ii) The percentage error
   iii) The relative accuracy
   iv) The percentage accuracy.

4. Answer **any two** of the following : **10**
   i) Explain the working of LVDT with neat diagram.
   ii) Write a note on bridge amplifier.
   iii) Explain the working of digital storage oscilloscope with the help of block diagram.

5. Answer **any one** of the following : **10**
   i) Describe working of ECG with suitable block diagram. Give its uses.
   ii) a) Give principle and construction, explain working of piezoelectric transducer.
   b) Design and draw the circuit diagram of instrumentation amplifier for gain $A_V = 1000$.

SLR-N – 236

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE
Web Technology (Special Paper – XIII)

Day and Date : Monday, 3-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carries* ***equal*** *marks.*

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

1) _____ symbol specifies beginning of query string.
a) # b) % c) $ d) ?

2) Text Box control support _____ event in Asp.Net.
a) Textchanged b) Checkedchanged
c) Command d) All of these

3) _____ property is used to specify default value of input control while binding the Required Field Validator control.
a) Text b) Initial value
c) Error message d) Control to Validate

4) _____ control provides a convenient way to display advertisements on Asp.Net web page.
a) AdRotator b) Calendar c) TextBox d) Banner

5) _____ property is get or set to post the current page to given URL when any button is clicked.
a) Text b) Validation group
c) Post Back URL d) Link

6) We can add more than one web.config files.
a) True b) False

7) In Asp.Net, the <Authorization> section contains _____ of the following elements.
a) <allow> b) <deny> c) both a) and b) d) none of these

P.T.O.

8) _____ is small amount of data that is stored in text file on client side.
   a) Cookies b) Session c) Both d) None of these

9) Hotspot is property of _____ control.
   a) Image b) AdRotator c) ImageButton d) ImageMap

10) For efficient working of master page there is no need to add <asp.ContentPlace Holder> control.
   a) True b) False

2. Answer the following (**any 5**) : **10**
   a) FTP
   b) LoginView control
   c) Web page life cycle
   d) Self page posting
   e) CheckBox and RadioButton control
   f) Validation summary control.

3. a) Answer the following (**any 2**) : **6**
      i) Explain programmatically assigning the master page.
      ii) Explain compare validator control with example.
      iii) Explain global .usax file in detail.
   b) Explain APP_Global Resources with example. **4**

4. Answer the following (**any 2**) : **10**
   a) Explain dynamic compilation of Asp.Net page.
   b) Explain button class with example.
   c) Explain SOAP and WSDL in detail.

5. Answer the following (**any 2**) : **10**
   a) Explain application state in detail.
   b) What is need of master page ? Explain how to create master pages.
   c) Explain regular expression validation and RangeValidator control with example.

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SLR-N – 238

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
CHEMISTRY (Special Paper – XIV)
Inorganic Chemistry

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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. Select the correct alternative for the following and rewrite the sentences : **10**

1) Monazite sand is a mixture of _____of Ce-earths.
   a) Orthophosphates b) Sulphates
   c) Carbonates d) Fluorocarbonates

2) The band gap in silicon is _____ eV.
   a) 0.68 b) 1.06 c) 1.25 d) 0.29

3) In P_4O_{10} molecule, the P – O – P bond angle is _____
   a) 101.5° b) 116.5° c) 123.5° d) 127.5°

4) Corrosion is an electrochemical process that involves anodic _____ of the metals.
   a) Dissolution b) Association
   c) Coagulation d) Adsorption

5) Nickel carbonyl has _____structure.
   a) Octahedral b) Square planer
   c) Trigonal pyramidal d) Tetrahedral

P.T.O.

6) $^{239}_{92}U \rightarrow {}^{239}_{93}Np +$ _____

a) $^{1}_{0}n$ b) $^{0}_{-1}e$ c) $^{4}_{2}He$ d) $^{1}_{1}H$

7) The composition of superconductor prepared by G. Bednorz and A.Muller is _____

a) H_g

b) $Y\ Ba_2\ Cu_3\ O_{7-x}$

c) $La_{2-x}\ Ba_x\ Cu\ O_{4-y}$

d) $Ac_{2-x}\ B_x Cu\ O_{7-y}$

8) The phenomenon of passivity was discovered by _____

a) Keir b) Nernest

c) Evans d) Faraday

9) The name of $B\ (C_6H_{11})_2\ H$ is _____

a) Cyclohexylborane b) Dicyclohexylborane

c) Hydrocycloborane d) Benzoborane

10) SO_2 molecule contains _____ bond pairs.

a) One b) Four c) Two d) Five

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

1) What are transuranic elements ? Mention its applications.

2) What are semiconductors ? Give their different types.

3) Draw the structure of diborane.

4) How the passive metal is revert to its original active state ?

5) What is synergistic effect ? Explain with suitable example.

6) Give the IUPAC names of the elements with atomic number 103 and 109.

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

   i) Explain the chemical vapour deposition method for preparation of ceramic superconductors.

   ii) Distinguish between diborane and ethane.

   iii) Discuss substitutive system for nomenclature of organometallic compounds.

   B) Explain the factors affecting the corrosion of metals. **4**

4. Answer **any two** of the following : **10**

   i) How the lanthanides can be separated ? Discuss ion exchange method.

   ii) Discuss the structure of $YBa_2 Cu_3O_{7-x}$ ceramic superconductor. Give its properties and applications.

   iii) Explain the structure and bonding in SO_3 molecule.

5. Answer **any two** of the following : **10**

   i) Comment on structure of borazine.

   ii) What are extrinsic semiconductors ? Discuss their types.

   iii) How the transuranic elements are prepared ? Discuss heavy ion bombardment method with suitable examples.

SLR-N – 239

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
BOTANY (Special Paper – XIV)
Systematics of Angiosperms

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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. Rewrite the following sentences, choosing the correct alternative : **10**

1) According to Engler and Prantl the angiosperms are derived from a hypothetical group of plants called _____

a) Gymnosperm b) Bryophytes

c) Protangiosperms d) None of these

2) _____ has proposed the Gnetalian theory of origin of angiosperms.

a) Wettstein b) Just

c) Eames d) Takhtajan

3) _____ flower is primitive.

a) Epigynous b) Hypogynous

c) Perigynous d) None of these

4) The sporangial initial cell is called as _____

a) Peripheral cell b) Antipodal cell

c) Secondary nucleus d) Archesporial cell

P.T.O.

5) In monosporic embryo sac the egg apparatus is made up of _____ cells.

a) One b) Two

c) Three d) Four

6) The flowers pollinated by birds are called as _____

a) Malcophelous b) Ornithophelous

c) Entemophelous d) Hydrophelous

7) Double fertilization is characteristic feature of _____

a) Bryophyta b) Pteridophyta

c) Gymnosperms d) Angiosperms

8) In orchids the seeds are dispersed by _____

a) Water b) Wind

c) Animal d) None of these

9) Callistemon rigidus belongs to family _____

a) Ranuncalaceae b) Rutaceae

c) Fabaceae d) Myrtaceae

10) In a typical anther there are _____ microsporangia.

a) Two b) Three

c) Four d) Five

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

i) Define the flower and give its typical structure.

ii) Give the primitive characters of flower.

iii) Write note on flower primordia.

iv) Describe tapatum and its functions.

v) Describe the circinotropous ovule.

vi) Give the economic importance of cucurbitaceae.

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

   i) Give the salient features of Engler and Prantl's system of classification.

   ii) Role of anatomy in relation with taxonomy.

   iii) Write on water dispersal mechanism in fruit.

   B) Describe the process of double fertilization with its significance. **4**

4. Answer **any two** of the following : **10**

   i) Illustrate an account of origin of angiosperms, with any one theory of angiosperms which you have studied.

   ii) What is meant by megasporogenesis ? Add a note on development of typical female gametophyte.

   iii) Assign any of the given plants to their respective family giving reasons and add its economic use :

   a) Citrus aurantifolia

   b) Sesbania sasban

5. Answer **any two** of the following : **10**

   i) Give merits and demerits of Engler and Prantl's system of classification.

   ii) Describe the development of embryo in capsella.

   iii) Give the distinguishing characters of any one of the following families. Give its botanical name and economic importance

   a) Cucurbitaceae b) Poaceae

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Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
ZOOLOGY
Animal Diversity – I (Paper – I) (Old)

Day and Date : Monday, 10-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences choosing correct alternative given below : **10**

1) Branch of biology that deals with classification of organisms is called _____
   a) Morphology b) Anatomy c) Taxonomy d) Histology

2) In paramoecium _____ number of nuclei are present.
   a) One b) Two c) Three d) Four

3) Water current leave the body of sycon through _____
   a) Ostia b) Osculum c) Prosopyle d) Apopyle

4) The totipotent cells in the body of Hydra are _____
   a) Epithelial cells b) Interstial cells
   c) Stinging cells d) Muscular cells

5) In Tapeworm proglotids are formed by _____ region.
   a) Neck b) Scolex c) Sucker d) Strobila

6) In earthworm the spermathecae are the organs of _____ system.
   a) Male reproductive b) Female reproductive
   c) Excretory d) Respiratory

7) In earthworm gizzard is present in _____ segment.
   a) 8^{th} b) 9^{th} c) 7^{th} d) 6^{th}

8) In earthworm _____ is the respiratory organ.
   a) Spermatheca b) Setae c) Nephridia d) Body wall

P.T.O.

9) The cyclosis in paramoecium is related with _____

a) Respiration b) Excretion

c) Reproduction d) Digestion and absorption

10) In sycon incurrent canal opens in radial canal through _____

a) Ostia b) Osculum c) Apopyle d) Prosopyle

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

i) Habit and habitat of hydra.

ii) Neck of tapeworm.

iii) Cytopyge of paramoecium.

iv) Pinacocyte of sycon.

v) Give the classes of phylum-coelenterata.

vi) Spermatheca of earthworm.

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

i) Budding in hydra

ii) Scolex of tapeworm

iii) Binary fission in paramoecium.

B) Salient features of phylumoporiferra. **4**

4. Answer **any two** of the following : **10**

i) Choanocyte cell of sycon.

ii) Parasitic adaptations in tapeworm.

iii) Contractile vacuole of paramoecium.

5. Answer **any one** of the following : **10**

i) Explain the male reproductive system of earthworm.

ii) Describe the different types of locomotion in hydra.

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SLR-N – 240

Seat No.	

B.Sc. (Part – III) (Sem. – VI) Examination, 2014
ZOOLOGY (Special Paper – XIV)
Endocrinology, Environmental Biology and Toxicology

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 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.*

1. Select the appropriate answer from **each** of the following and rewrite the sentence. **10**

1) Thyroid gland is said to be _____ in shaped.
   a) Bean b) Pear c) Butterfly d) Crescent

2) Calcium and phosphates levels in the blood are regulated by _____
   a) Aldosterone b) Cortisol c) ACTH d) PTH and Calcitonin

3) _____ hormone primarily responsible for glucose storage as glycogen.
   a) GH b) TSH c) Insulin d) Cortisol

4) Adrenaline is _____
   a) Produced by adrenal cortex
   b) Also called epinephrine
   c) Released when the parasympathetic nervous system stimulated
   d) Produced by islets of Langerhans

5) GnRH is _____
   a) Secreted by endometrium
   b) Released by thyroid
   c) Released by thymus
   d) Released by the hypothalamus, stimulate production of FSH and LH

6) Conservation within the natural habitat is _____
   a) in situ conservation b) ex situ conservation
   c) in wax conservation d) ex wax conservation

P.T.O.

7) Short term exposure to a toxic chemical producer a effect which is _____
   a) Chronic b) Sub chronic c) Acute d) Sub vital

8) _____ habitat characterised by running water.
   a) Lentic b) Lotic c) Arborial d) Scavenger

9) In molluscan, mytilus, adaptation for attachment to substratum is _____
   a) Cement gland b) Muscular plough foot
   c) Pedal disc d) Byssus thread

10) _____ is a heavy metal toxicant.
   a) Cadmium b) Pyrethroid c) Ekalux d) Endosulfan

2. Answer **any five** of the following : **10**
   a) Bioaccumulation
   b) Osteoporosis
   c) Prostaglandins
   d) Parathormone
   e) Pesticide toxicants
   f) CRH

3. A) Answer **any two** of the following : **6**
      a) Heavy metal action
      b) Waste water recycling
      c) Disorders of Adrenal gland.
   B) Applications of toxicology. **4**

4. Answer **any two** of the following : **10**
   i) Faunal adaptation of deciduous forest
   ii) Disorders of insulin imbalance
   iii) Biological indicators of pollution.

5. Answer **any one** of the following : **10**
   i) Discuss the histology and role of hormones of thyroid gland.
   ii) Describe the characteristics and faunal adaptations of animal in fresh water habitat.

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SLR-N – 241

Seat No.	

B.Sc. III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XIV)
Linear Algebra

Day and Date : Wednesday, 5-11-2014 Max Marks : 50

Time : 11.00 a.m. to 1.00 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 dimension of C as a real vector Space is

a) 0 b) 1 c) 2 d) none of these

2) A subset S of V is orthonormal iff

a) S consist of entirely unit vectors

b) S is orthogonal

c) Both a) and b)

d) none of these.

3) Let V is vector space and S is subset of V then S is orthonormal iff

a) $< v_i, v_j > = 0$ b) $< v_i, v_j > = 1$

c) $<v_i\ v_j > = \delta ij$ d) none of these.

4) The vector space Mnxn (F) has dimension

a) n b) n^2 c) $\frac{n(n+1)}{2}$ d) None of these

5) Two finite dimensional vector Space over same field are isormorphic iff they have

a) different dimension b) zero dimension

c) same dimension d) none of these

P.T.O.

6) Let T : U $\rightarrow$ v be homomorphism then the set defined by [u $\in$ V / T (u) = O_v} is called

a) Range of T b) Kernel of T

c) Subspace of T d) None of these.

7) The Vector V_1 V_2 - -V_n in a vector Space V(F) are said to be Linearly independent if $\sum_{i=1}^{n} \alpha_i V_i = 0$ $\alpha_i \in F$ implies.

a) all $\alpha i = 0$ b) at least one $\alpha i \neq 0$

c) all $\alpha i \neq 0$ d) none of these.

8) In an inner product Space the norm is defined by

a) $|| v || = (v_1\ v)$ b) $|| v || = \sqrt{(v_1 v)}$

c) $|| v || = (v_1\ v)^2$ d) $|| v || = | v |$

9) T : $P_1(R) \rightarrow R^2$ is linear transformation defined by T (a+bX) = (a_1 a+b) Then $[T]_{\beta}^{\gamma}$ =

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.

10) T : $R^3 \rightarrow R^2$ is Linear transformation defined by T (a_1, a_2, a_3) = ($a_1 - a_2$, $2a_3$) then R(T)=

a) R^3 b) R^2 c) R d) none of these.

2. Solve **any five**. **10**

1) In any vector Space (–a)x = –(ax) = a(–x) for each a$\in$ F and x$\in$ V.

2) Determine whether the first polynormial can be exceed as a linear combination of the other two.

$x^3 - 3x + 5$, $x^3 + 2x^2 - x + 1$, $x^3 + 3x^2 - 1$.

3) Let V and W be Vector Space over a field F and Let T, U : V $\rightarrow$ W be linear then for all a $\in$ F, aT + U is Linear.

4) Define T : $V_3 \rightarrow V_2$ by rule transformation of $T(x_1\ x_2\ x_3) = (x_1 - x_2, x_1 + x_3)$ to show that T is linear.

5) Let $\{v_1\ v_2 \ldots v_k\}$ be the orthogonal sets in V and $a_1, a_2, \ldots a_k$ are Scalar's then

prove that $\| \sum a_i\ v_i \|^2 = \sum_{i=1}^{k} | ai |^2 \| vi \|^2$

6) Let v be an inner product space then x, y, z $\in$ v then show that

$< x, y+z> = < x, y > + < x, z >$.

3. Solve **any two**. **6**

1) Let v be vector space Let $T_1\ U_1, U_2 \in$ L (V) Then $T(U_1\ U_2) = (TU_1)\ U_2$.

2) Let v being inner product space over F for all x, y $\in$ v show that $| < x, y > | \leq \| \mathbf{x} \| \| y \|$.

3) T : $R_2 \rightarrow R_2$ is Linear Transformation T (1,0) = (1,4) T(1,1) = (2,5) what is T (2,3) ?

4) Show that $\| x + y \|^2 + \| x - y \|^2 = 2 \| x \|^2 + 2 \| y \|^2 \ \forall x, y \in R$. **4**

4. Solve **any two.** **10**

1) Let W be a finite dimensional sub Space of an inner product Space V and let y$\in$ v then there exist unique vector u$\in$ w and z $\in$ $w^{\perp}$ such that y = u + z further more if $\{v_1\ v_2 \ldots v_k\}$ is an orthonormal basis for w then

$u = \sum_{i=1}^{K} < y, vi > vi$.

2) Prove that the set {(1,0,0, – 1) (0,1,0, – 1) (0,0,1,1) (0,0,0,1)} is Linearly independent.

3) If $P_1(R) \rightarrow R^2$ be a Linear transformation defined by T (a+bx) = (a_1a+b) find T^{-1}.

5. Solve **any one**. **10**

1) In R^4 Let W_1 = (10 10) W_2 = (1111) W_3 = (0121) then $\{w_1\ w_2\ w_3\}$ is linearly independent by using Gram- Schmidt method to compute V_1,V_2, V_3 also obtain orthonormal set.

2) State and prove rank - nullity theorem.

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SLR-N – 242

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
STATISTICS
Design of Experiments (Special Paper – XIV)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

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

i) Replication in an experiment means
   a) The number of blocks
   b) Total number of treatments
   c) The number of times a treatment occurs in an experiment
   d) None of these

ii) If a model is such that it provides an exact test about the treatments, then it is called
   a) Unspecified model
   b) Incompletely specified model
   c) Completely specified model
   d) None of these

iii) Which of the following is a contrast among three treatments ?
   a) $T_1 + 2T_2 - T_3$ b) $T_1 - 2T_2 + T_3$
   c) $-2T_1 + 2T_2 + 2T_3$ d) None of these

iv) In a Completely Randomized Design (CRD) with t treatments and n experimental units, error degrees of freedom is equal to
   a) n – t b) n – t – 1
   c) t – n d) None of these

P.T.O.

v) A Randomized Block Design (RBD) has
   a) One way classification
   b) Two way classification
   c) Three way classification
   d) None of these

vi) A Latin Square Design (LSD) is a
   a) Non restrictional design
   b) One restrictional design
   c) Three restrictional design
   d) Two restrictional design

vii) If different effects are confounded in different blocks, it is said to be
   a) Complete confounding b) Partial confounding
   c) Balanced confounding d) None of these

viii) A split plot design can be extended to
   a) Double split only b) Triple split only
   c) Multiple split d) None of these

ix) If in a Latin square design with five treatments, a treatment is added, the increase in error degrees of freedom will be
   a) 4 b) 6 c) 8 d) None of these

x) Name the design in which main effect is confounded is
   a) Latin square design b) Cross over design
   c) Split plot design d) None of the above

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

i) Explain the principles of randomization.

ii) Define factorial experiments.

iii) Define main effects in 2^2 factorial experiment.

iv) What do you mean by confounding in factorial experiment ?

v) Define efficiency of a design.

vi) Explain layout of the experiment.

3. A) Answer **any two** of the following : **6**
   i) Explain the principles of replication.
   ii) Give real life situations where Randomized Block Design (RBD) is used.
   iii) Give layout of Completely Randomized Design (CRD).

   B) What is CRD ? Give its mathematical model and analysis of variance table. **4**

4. Attempt **any two** of the following : **10**
   i) Give the layout, mathematical model and analysis of variance table for Latin Square Design (LSD).
   ii) Obtain expressions for the estimator of one missing observation in case of RBD.
   iii) What is split plot design ? Give its layout and mathematical model.

5. Answer **any two** of the following : **10**
   i) Explain the concept of total confounding and partial confounding. Distinguish between them.
   ii) Give the mathematical model and analysis of variance table for 2^2 factorial experiment arranged in RBD.
   iii) Discuss Yate's procedure of obtaining main effects and interactions in 2^3 factorial experiment.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
GEOLOGY (Special Paper XIV)
Precambrian Stratigraphy of India

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 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 diagrams ***wherever*** *needed.*

1. Fill in the blanks with correct answer given in the options : **10**

1) Primitive gneisses of Indian peninsula are of _____ age than the Dharwar gneiss.
   a) Same age b) Older age
   c) Younger age d) Similar age

2) Oldest sedimentary strata of Indian peninsula are produced from _____ rocks.
   a) Dharwar b) Primitive gneiss
   c) Peninsular gneiss d) Granite

3) Oldest sediments of Dharwars are metamorphosed to form _____
   a) Gneiss and Schist b) Granites
   c) Gneiss d) Schist

4) Dharwar rocks are present below_____
   a) Angular unconformity b) Disconformity
   c) Eparchaean unconformity d) Nonconformity

5) Rocks of _____ are containing Mg, Fe and sometimes copper.
   a) Cuddapah b) Delhi
   c) Rajasthan d) Dharwar

6) Above an unconformity, the basement of Aravallis of Rajasthan are made of _____rocks generally.
   a) Limestone b) Calc-gneiss
   c) Quartzites d) Breccia

7) Diamond bearing horizons occur in _____Vindhyan rocks of M.P.
   a) Upper b) Middle
   c) Lower d) Basement

8) Clospect granites are _____
   a) Gneissic b) Coare grained
   c) Schists d) Medium grained

9) Rocks of Cuddapahs show _____fossils.
   a) No b) Less c) More d) Trilobite

10) Charnockites are _____bearing granites.
   a) Augite b) Hypersthene
   c) Gold d) Clay

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

1) Sargur Schist comples.

2) Structure of Cuddapahs.

3) Lithology of upper Aravallis of Rajasthan.

4) Economic deposits of Aravallis.

5) Mansar formation.

6) Economic importance of Cuddapahs.

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

   i) Equivalents of Vindhyan

   ii) Bhima group

   iii) Bundelkhand Gneisses

   B) Explain Peninsular gneiss complex. **4**

4. Answer **any two** of the following : **10**

   i) Iron ore series of Jharkhand.

   ii) Delhi group

   iii) Comparison of Dharwars and Cuddapah with respect to their, age, lithology and paleontological characters.

5. Answer **any two** of the following : **10**

   i) Saucer and Sakoli of m.p.

   ii) Upper Vindhyan supergroup

   iii) Kurnool and Badami group

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Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2014

MICROBIOLOGY (Special Paper – XIV)
Microbial Biochemistry

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 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 selecting correct alternatives given below : **10**

I) Isoleucine tRNA synthetase activate _____ in addition to isoleucine.
   a) alanine b) citucline
   c) β-alanine d) valine

II) _____ is isoenzyme.
   a) malate dehydrogenase b) lactate synthase
   c) lactate dehydrogenase d) malate synthase

III) _____ is allosteric protein.
   a) Albumin b) Gelatin
   c) Globulin d) Haemoglobin

IV) Pre cursor for purine synthesis is _____
   a) inosinic acid b) citric acid
   c) pyruvic acid d) inositol

V) In catabolite repression _____ catabolite of glucose play important role.
   a) ATP b) AMP
   c) C-AMP d) ADP

VI) Isocitrate-lyase and malate synthase enzymes are present in _____
   a) mesosome b) glyoxysomes
   c) cytoplasm d) carboxysomes

P.T.O.

VII) Bioluminescent organisms are generally found in _____ environment.
a) marine b) sallted
c) acidic d) basic

VIII) _____ group is added to methionine during formulation reaction.
a) C = O b) CHO
c) CH_3 d) COOH

IX) GOGAT play role in assimilation of _____
a) carbon b) phoshate
c) sulphate d) ammonia

X) _____ is precursor for biosynthesis of peptidoglycon.
a) glucose b) sucrose
c) maltose d) fructose

2. Answer **any five** of the following : **10**
i) What is translation ?
ii) Give role of termination factors.
iii) What is transcription ?
iv) Write on processing of polypeptide chain.
v) What are carboxysomes ?
vi) Write or vibozyme.

3. A) Answer **any two** of the following : **6**
i) Isolation and purification of enzyme on the basis of biological affinity.
ii) Proxymity and orientation model.
iii) Whole cell immobilization.

B) Isolation and purification of enzyme on the basis of solubility. **4**

4. Write answers **any two** of the following : **10**
i) ED pathway
ii) Tryptophan operon
iii) Enzyme kinetics.

5. Write answers **any two** of the following : **10**
i) PP pathway.
ii) Arabinose operon.
iii) Catabolite repression.

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SLR-N – 245

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
ELECTRONICS
Advanced Communication (Special Paper – XIV)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 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 diagram* ***wherever*** *necessary.*
4) ***Use*** *of log table and calculator is* ***allowed****.*

1. Select the correct alternatives for the following : **10**

i) Total internal reflection takes place if light ray strikes the interface at an angle _____ critical angle.
a) Less than b) Greater than c) Equal to d) Both a) and b)

ii) Photodiode operates with _____
a) Forward bias b) Reverse bias
c) Neither a) nor b) d) Either a) or b)

iii) A circular orbit around the equator with 24 hours period is called _____
a) Elliptical orbit b) Geostationary orbit
c) Polar orbit d) Transfer orbit

iv) A common up converter and down converter IF is _____ MHz.
a) 36 b) 40 c) 70 d) 500

v) Cellular system user _____ operation.
a) Simplex b) Half duplex c) Full duplex d) Triplex

vi) Receive channel 22 is 870.66 MHz receive channel 23 is _____ MHz.
a) 870.36 b) 870.63 c) 870.96 d) 870.69

vii) Signal propagation in a wave guide is by _____
a) Electrons b) Electric and magnetic field
c) Holes d) Air pressure

P.T.O.

viii) The most common radar display is the _____

a) Scan b) Color circuit

c) LCD d) Plan Position Indicator

ix) The basic modulator and demodulator in PSK are _____

a) PLL's b) Balanced modulator

c) Shift registers d) Linear summer

x) The fastest LAN topology is _____

a) Ring b) Bus

c) Star d) Tree

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

i) State any four applications of optical fiber.

ii) What is Apogee and Perigee in elliptical orbit in satellite communication ?

iii) Give function of MTSO.

iv) What is principle of working of radar ?

v) Give applications of internet.

vi) What is transmission lines ?

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

i) Explain working transmitter circuit in OFC system.

ii) Give the applications of satellite communication system and explain any one.

iii) Explain working principle of Gunn diode.

B) What is computer networks and explain LAN and WAN. **4**

4. Answer **any two** of the following : **10**

i) With the help of block diagram explain QAM.

ii) Explain function of transponder in satellite communication system.

iii) With block diagram explain optical fiber communication system.

5. Answer **any one** of the following : **10**

i) With neat block diagram explain working of pulsed radar system.

ii) Explain with block diagram basic cellular system.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE
Advanced Java (Special Paper – XIV)

Day and Date : Wednesday, 5-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Choose correct alternative : **10**

I) To compile a Java servlet program, the _____ file must be in the class path.

a) Tomcat RootDir/servlet.jar
b) Tomcat RootDir/common/servlet-api.jar
c) Tomcat RootDir/common/lib/servlet-api.jar
d) Tomcat RootDir/common/bin/servlet-api.jar

II) _____ are used to get web-browser to hold small amount of state associated with users web-browsing.

a) cookies b) httpServletRequest
c) httpServletResponse d) servlet

III) The bridge acts as a translator between Jdbc cells and the odbc clients _____

a) True b) False

IV) Which method is called first by an applet ?

a) start() b) run() c) init() d) paint()

V) In URL query string, the _____ symbol denotes a space character.

a) ? b) = c) & d) +

VI) The event handling interfaces are in _____ package.

a) java.util.*; b) java.awt.event.*;
c) java.applet.*; d) java.event.*;

P.T.O.

VII) The POST method can append the values in the URL

a) True b) False

VIII) A JSP file ends with _____

a) .java b) .html c) .servlet d) .jsp

IX) _____ is a return type of execute update() method.

a) int b) string c) boolean d) result set

X) The default layout for an applet is _____

a) Border Layout b) Grid Layout

c) Flow Layout d) Action Layout

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

I) What are the types of EJB ?

II) What is JDBC API ?

III) What is deployment descriptor ?

IV) What is jar ?

V) List out Event listeners.

VI) Write syntax of check-box creation.

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

I) What is servlet container ?

II) Explain scriptlet tag.

III) Write advantages of JavaBean.

B) Write a program to take a value from a textbox and display it into another textbox using button. **4**

4. Answer **any two** of the following : **10**

I) Explain servlet life cycle with example.

II) Write a program to delete data from table.

III) Write a program to manage cookies using JSP.

5. Answer **any two** of the following : **10**

I) Explain JSP Exception with example.

II) Explain layout managers with example.

III) Write note on type-1 driver.

_____

SLR-N – 247

Seat No.	

B.Sc. III (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XV)
Quantum Mechanics and Astrophysics

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Use of calculator or log table is ***allowed****.*
4) ***Neat*** *diagram should be drawn* ***wherever*** *necessary.*

1. Select correct alternative : **10**

i) The total probability of wave function ψ is always equal to
   a) zero b) one
   c) minus one d) infinity

ii) The energy operator is given by
   a) $\hat{E} = -i\hbar\nabla$ b) $\hat{E} = -i\hbar\frac{\partial}{\partial t}$ c) $\hat{E} = i\hbar\nabla$ d) $\hat{E} = i\hbar\frac{\partial}{\partial t}$

iii) The minimum energy of particle confined to one dimensional rigid box is obtained by substituting 'n' equal to
   a) One b) Zero
   c) Half d) Two

iv) In potential barrier R+T is always equal to
   a) one b) zero
   c) infinity d) minus one

v) The Hamiltonian operator is given by
   a) $\hat{H} = -i\hbar\nabla$ b) $\hat{H} = i\hbar\frac{\partial}{\partial t}$
   c) $\hat{H} = \frac{-\hbar^2}{2m}\nabla^2 + V(r)$ d) $\hat{H} = \frac{-\hbar^2}{2m}\nabla^2 - V(r)$

P.T.O.

vi) The magnitude of total angular momentum is L =

a) $\sqrt{l(l+1)}\,\hbar$ b) $l(l+1)$ c) $\sqrt{l(l+1)}\,\frac{\hbar}{2\pi}$ d) $\sqrt{l(l+1)}\,h$

vii) Big-Bang theory was strongly supported by

a) Hubble b) George Gamow
c) Fred Hoyle d) A.A. Friedman

viii) The state of universe when all the matter in the universe is concentrated in a small region is called

a) Nucleus b) Big-bang c) Ylem d) Primary

ix) A star in the process of formation is called as

a) Protostar b) Red giant
c) White dwarf d) Supernova

x) Majority of sunspots occur

a) in polar region b) near equator
c) far from equator d) both a and b

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

i) What are requirements of wave functions ψ ?

ii) What is tunnel effect ?

iii) What is an operator ?

iv) Mention different tests of cosmological theories.

v) What is nuclear fusion reaction ?

vi) Classify the planets in the solar system.

3. A) Attempt **any two** of the following. **6**

i) Explain physical significance of wave function ψ.

ii) Write a note on proton-proton cycle.

iii) Explain planetary properties of mars.

B) Derive Schrodinger's time independent wave equation for a particle. **4**

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

   i) Write a note on milky way galaxy.

   ii) Explain the formation of protostar and its evolution to form a normal star.

   iii) Discuss early history of planets in the solar system. Explain the planetary properties of mars.

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

   i) What is linear harmonic oscillator ? Derive an expression for energy levels.

   ii) By separation of variables in spherical polar Co-ordinates $\psi(r, \theta, \phi) = R(r) \cdot \Theta(\theta)\phi(\phi)$, derive equations for radial and angular parts from Schrodinger's equation for hydrogen atom.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
CHEMISTRY (Special Paper – XV)
Organic Chemistry

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

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

i) Ethambutol is used as _____
   a) Antitubercular agent b) CNS drug
   c) Antidiabetic d) Anti-inflammatory agent

ii) Among the following which is non-reducing sugar ?
   a) Glucose b) Fructose
   c) Maltose d) Sucrose

iii) The dye which requires binding material during dyeing is known as _____
   a) Azo dye b) Mordant dye
   c) Reactive dye d) Disperse dye

iv) Starch is a _____
   a) Trisaccharide b) Amylose
   c) Amylopectin d) Amylose and amylopectin

v) Indole acetic acid is used as a _____
   a) Fungicide b) Insecticide
   c) Herbicide d) None of these

P.T.O.

vi) Oxidation of pyrrole using chromic acid gives _____

a) Maleicimide b) Succinimide

c) Formic acid d) Acetic acid

vii) Nitration of quinoline with a mixture of cone HNO_3 and H_2SO_4 yields _____

a) 8-nitroquinoline b) 5-nitroquinoline

c) 6-nitroquinoline d) Mixture of a) and b)

viii) The chemicals used to control weeds are called as _____

a) Insecticides b) Micronutrients

c) Herbicides d) Hormones

ix) Ibuprofen is an _____ drug.

a) Anti-bacterial b) Antibiotic

c) Anti-diabetic d) Anti-inflammatory

x) Thyroxine is _____ in nature.

a) Acidic b) Basic

c) Phenolic d) All three a), b), c)

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

i) How pyridine is synthesized from

a) Acetylene and HCN

b) Piperidine.

ii) Draw structures of sucrose and maltose.

iii) Give two qualities of good dye.

iv) Why pyridine is more basic than pyrrole ?

v) Give synthesis of monochrotophos.

vi) What are CNS drugs ?

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

   i) Give synthesis of adrenaline.

   ii) Give synthesis of orange – IV.

   iii) What are antimalerials ? Give synthesis of tolbutamide.

   B) What is mutarotation ? Discuss its mechanism. **4**

4. Attempt **any two** of the following : **10**

   i) What are heterocyclic compounds ? Give two methods of preparation and two chemical properties of pyrrole.

   ii) Give synthesis of Vitamin – A.

   iii) What are polysaccharides ? Write sources, structural formulae and uses of following :

   a) Starch

   b) Cellulose.

5. Answer **any two** of the following : **10**

   i) How will you prepare quinoline from aniline ? Give the reactions of quinoline with

   a) Sodamide and

   b) n-butyl lithium.

   ii) Establish open chain structure of D(+) glucose.

   iii) What are dyes ? Give classification of dyes on the basis of chemical composition.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
BOTANY (Special Paper – XV)
Microbial genetics, Plant Breeding and Bio-Statistics

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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. Select and rewrite the following sentences choosing correct option for each sub-questions. **10**

   1) The species of saccharum are _____
      a) Haploid b) Diploid
      c) Triploid d) Complex polyploid

   2) Transformation experiments were initially conducted by _____
      a) C. M. Macleod b) O. T. Avery
      c) M. Mc. Carthy d) Griffith

   3) The diagrammatic representation of grouped frequency distribution of both continuous and discontinuous type is by _____
      a) Pie diagram b) Histogram
      c) Pictogram d) Polygon

   4) The art and science of changing and improving the heredity of plants is _____
      a) Genetical engineering b) Biotechnology
      c) Plant breeding d) All the above

P.T.O.

5) Saccharum sinense and saccharum barberi is originated in _____ parts of India.
   a) Northern b) Southern
   c) Eastern d) Western

6) DNA viruses are _____
   a) Rod shaped b) Tadpole shaped
   c) Helical d) Disc shaped

7) _____ is the common process of sexual reproduction in Bacteria.
   a) Transduction b) Transformation
   c) Conjugation d) Both a) and b)

8) _____ is non-ionizing mutagenic agent used in mutation breeding.
   a) X-ray b) β ray
   c) Gamma ray d) UV-ray

9) _____ are always pure because, they possess only one set of chromosome.
   a) Diploids b) Haploids
   c) Triploids d) Polyploids

10) The data which are collected from the field of enquiry for a specific purpose is called _____
   a) Primary data b) Secondary data
   c) Tertiary data d) Both b) and c)

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

I) What is transduction ?

II) Give any four objectives of plant breeding.

III) Give demerits of pure line selection.

IV) Define arithmetic mean and state its significance.

V) Enlist output devices of computer.

VI) What is selection ? Give its types.

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

   I) Give merits and demerits pure-line selection.

   II) Explain construction of Histogram and state its uses.

   III) Enlist the improved varieties of cotton.

   B) Explain chi-square test in brief and give its applications in the field of biology. **4**

4. Answer **any two** of the following : **10**

   I) Describe the role of polyploidy in plant breeding.

   II) Give an account of various methods of crop improvement.

   III) What are measures of central tendency ? Explain briefly.

5. Answer **any two** of the following : **10**

   I) Describe hybridisation in sugarcane crop.

   II) Give the applications of computer in plant science.

   III) Give an brief account on breeding in self and cross pollinated crops.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
ZOOLOGY
Molecular Biology and Biotechnology (Special Paper – XV)

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Select the appropriate answer from **each** of the following and rewrite the sentences : **10**

i) _____ is the site of protein synthesis.
a) Ribosome b) Nucleus c) Nucleolus d) Lysosome

ii) The operon concept of gene expression in E.Coli is explained by _____
a) Watson b) Jacob and Monod
c) Alwine d) Milstein

iii) Long form of ELISA is _____
a) Enzyme Linked Ionic Assay
b) Enzyme Listed Immuno Assay
c) Enzyme Linked Immuno Sorbent Assay
d) Energy Linked Immuno Sorbent Assay

iv) Initiation codon code for amino acid _____
a) Valine b) Lysine c) Proline d) Methionine

v) Plasmid are ideal vectors for gene cloning as they are _____
a) Freely replicate outside the bacterial cell
b) Self replicate inside the bacterial cell
c) Multiplied by culturing
d) Multiplied by using enzymes

vi) The main application of polymerase chain reaction is _____
a) Making multiple copies of DNA b) DNA damage
c) RNA damage d) Protein synthesis

P.T.O.

vii) Replication of DNA is occurs by _____ method.

a) Quarterly semiconservative b) Circular conservation

c) Conservative d) Semiconservative

viii) Double helicle structure of DNA was proposed by _____

a) Daniell and Davson b) Palade and Golgi

c) Robert Brown d) Watson and Crick

ix) Simplest form of protein is _____

a) Fatty acid b) Amino acid

c) Glycerol d) Glucose

x) Initiation of DNA synthesis requires _____

a) RNA primer b) m-RNA c) t-RNA d) r RNA

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

1) Ambiguous codon
2) DNA probe
3) m-RNA
4) Plasmid
5) Nonsense codons
6) DNA polymerase.

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

1) Transformation
2) ELIZA
3) Northern blotting.

B) Describe southern blotting technique. **4**

4. Answer **any two** of the following : **10**

1) PCR
2) DNA damage
3) Application of hybridoma technology.

5. Answer **any one** of the following : **10**

1) DNA fingerprinting
2) Application of biotechnology in medicine and agriculture.

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Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2014
MATHEMATICS (Special Paper – XV)
Partial Differential Equations

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 partial differential equation derived by eliminating arbitrary constant from $z = ax + by + ab$ is _____
   a) $xp + yq + pq = 0$ b) $z = xp + yq + pq$
   c) $p + q = z$ d) $p + q + pq = 0$

2) One solution of the equation $x^2p + y^2q = z^2$ is _____
   a) $\frac{1}{x} - \frac{1}{z} = c_1$ b) $\frac{1}{x} - y = c_1$
   c) $x - z = c_1$ d) $\log x - \log y = c_1$

3) The solution of $zp = -x$ is _____
   a) $\phi(x, y^2 + z^2) = 0$ b) $\phi(x^2 - y, x^2 + z)$
   c) $\phi(x - y^2, y + z)$ d) $\phi(y, x^2 + z^2) = 0$

4) The partial differential equation obtained by eliminating arbitrary function from $z = f(x^2 + y^2)$ is _____
   a) $xp + yq = 0$ b) $x^2p + y^2q = 0$
   c) $yp - xq = 0$ d) none of these

5) The complete integral of $z = px + qy + p^2 + q^2$ is _____
   a) $z = ax + by + a^2 + b^2$
   b) $z = ax + by - a^2 - b^2$
   c) $z = ax - by + a^2 - b^2$
   d) none of these

P.T.O.

6) The integral which does not contains any arbitrary constants is called _____

a) General integral
b) Singular integral
c) Complete integral
d) None of these

7) The solution is obtained by eliminating arbitrary constant in complete solution is called _____

a) General integral
b) Singular integral
c) Complete integral
d) None of these

8) The solution of $r = a^2t$ is _____

a) $z = \phi_1(y + a^2x) + \phi_2(y - a^2x)$

b) $z = \phi_1(y + a^2x) + \phi_2(y + a^2x)$

c) $z = \phi_1(y + ax) + \phi_2(y - ax)$

d) $z = \phi_1(y + ax) + \phi_2(y + ax)$

9) The particular integral of $(D^2 - 2DD' + D'^2)z = \tan(y + x)$ is _____

a) $\frac{x^3}{3}\tan(x + y)$ b) $\frac{x^2}{2}\tan(y + x)$

c) $\frac{x^2}{2}\tan(y - x)$ d) $\frac{x^2}{2}\tan(x - y)$

10) When f(x, y) is of the form $x^m y^n$ if m < n then $\frac{1}{f(D,D')}$ should be expanded in power of _____

a) $\frac{D}{D'}$ b) $\frac{D'}{D}$

c) D' d) D

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

   1) Form the partial differential equation by eliminating a and b from $z = (x - a)^2 + (y - b)^2$.

   2) Solve : $2p + 3q = 1$.

   3) Find complete integral of $p^2 = qz$.

   4) Solve : $p - 3x^2 = q^2 - y$.

   5) Find particular integral of $4r - 4s + t = 16 \log(x + 2y)$.

   6) Solve : $(D^4 + D'^4)z = 0$.

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

   1) Solve $(D - D'^2)\, z = \cos(x - 3y)$.
   2) Solve by Chorpits method $q = (z + px)^2$.
   3) Form a partial differential equation by eliminating arbitrary function f and F from $z = f(x - at) + F(x + at)$.

   B) Find equation of surface satisfying $4yzp + q + 2y = 0$ and passes through $y^2 + z^2 = 1$, $x + z = 2$. **4**

4. Attempt **any two** of the following : **10**

   1) Find the general integral of p.d.e. $(2xy - 1)p + (z - 2x^2)q = 2(x - yz)$ and also the particular integral which passes through line $x = 1$, $y = 0$.

   2) Find complete integral and singular integral of $x^2p^2 + y^2q^2 = z^2$.

   3) Solve $(D^2 - DD' + D' - 1)z = \cos(x + 2y) + e^y + (xy + 1)$.

5. Attempt **any one** of the following : **10**

   1) Explain Lagrange's method of solving $P_p + Q_q = R$ with usual notation and hence solve : $(mz - ny)p + (nx - lz)q = ly - mx$.

   2) i) Solve : $(D^2 - D'^2 + D - D')z = e^{2x + 3y}$.

      ii) Solve : $px + qy = pq$ by charpits method.

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Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
STATISTICS (Special Paper – XV)
Limit Theorems, Reliability and Queuing Theory

Day and Date : Friday, 7-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 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 appropriate alternative : **10**

1) If X is a random variable with mean 5 and variance 9, then using Chebyscheve's inequality $P[|X-5|>2]$ _____

a) Is less than or equal to $\frac{9}{4}$ b) Is greater than or equal to $\frac{9}{4}$

c) Is greater than or equal to $\frac{1}{4}$ d) Cannot be obtained

2) For validity of Weak Law of Large Numbers (WLLN) _____

a) $V(X_i) < \infty$ b) $\frac{V(\Sigma X_i)}{n^2} \to 0$ as $n \to \infty$

c) Both a) and b) d) Neither a) nor b)

3) A sequence $\{X_n\}$ is said to converge in quadratic mean to a r.v.X if _____

a) $\lim_{n\to\infty} P[|X_n - X| < \in] = 0$ b) $\lim_{n\to\infty} P[(X_n - X^2) < \in] = 0$

c) $\lim_{n\to\infty} E[X_n - X]^2 = 0$ d) None of these

4) If Y_5 is the fifth order statistic of a random sample $X_1, X_2, \ldots, X_n$ with $0 \le X_i \le 10$, then range of Y_5 is

a) $0 \le Y_5 \le 10$ b) $0 \le Y_5 \le 5$

c) $0 \le Y_5 \le n$ d) $-\infty < Y_5 < \infty$

P.T.O.

5) Let $Y_1 \leq Y_2 \leq .... \leq Y_n$ be a order statistic of a random sample $X_1, X_2, ..., X_n$. Let $Z = \min \{ \{ X_1, X_2, ..., X_n\} - \{Y_1\}\}$ then Z is called _____order statistic.

a) First b) Second c) $(n-1)^{st}$ d) n^{th}

6) If $X_n \xrightarrow{P} X, Y_n \xrightarrow{P} Y$ as $n \to \infty$ then ——————as $n \to \infty$.

a) $\frac{X_n + Y_n}{2} \xrightarrow{P} \frac{X+Y}{2}$ b) $2X_n \xrightarrow{P} 2X$

c) $\frac{X_n}{Y_n} \xrightarrow{P} \frac{X}{Y}$ d) All of these

7) Let $Y_1 \leq Y_2 \leq ... \leq Y_{2m+1}$ be an order statistic of a random sample $X_1, X_2, ..., X_{2m+1;}$ from a distribution with pdf f(x) and cdf F(x). Then distribution of sample range can be obtained using _____

a) Distribution of Y_1 b) Distribution of Y_{2m+1}

c) Distribution of Y_m d) Joint distribution of Y_1, Y_{2m+1}

8) A system works if any of its 3 components is working, then it is _____system.

a) Parallel b) Series

c) Combination of parallel and series d) Cannot be decided

9) In usual notations hazard rate is $\lambda(t)$ = _____

a) $\frac{f(t)}{F(t)}$ b) $\frac{f(t)}{1-F(t)}$ c) $\frac{1-f(t)}{F(t)}$ d) $\frac{1-f(t)}{1-F(t)}$

10) In usual notations traffic intensity is given by _____

a) λ b) μ c) $\frac{\lambda}{\mu}$ d) $\frac{\mu}{\lambda}$

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

a) One customer arrives at a counter in a bank after 15 minutes. Staff on the counter takes 10 minutes on an average for serving a customer. Under the assumption of M/M/1:∞/FIFO model, find average queue length Lq.

b) State central limit theorem for iid r.v.S.

c) State the Chebyscheve's inequality for a continuous r.v.X.

d) Define convergence in probability of a sequence of rvS $\{X_n\}$ to a r.v.X

e) Let $Y_1 < Y_2 < Y_3$ be a order statistic of size 3 from exp (1) distribution. Find the distribution of median.

f) Define minimal cut set.

3. A) Attempt **any two** from the following :

i) Let $P[X_n = 0] = 1 - \frac{1}{\theta}$ and $P[X_n = 1] = \frac{1}{\theta}$, test whether weak law of large numbers holds good. **3**

ii) Obtain hazard function when life time distribution is exp (λ). **3**

iii) State essential features of queuing system. **3**

B) Let $Y_1 \leq Y_2 \leq Y_3 \leq Y_4$ be a order statistic of a random sample from U (0, 3) distribution, then find $P(Y_1 \geq M)$ where M = median of U (0, 3) distribution. **4**

4. Attempt **any two** from the following : **10**

A) Decide whether central limit theorem holds if $\{X_n\}$ is a sequence of random variables from $\chi^2_{(1)}$ distribution.

B) State and prove weak law of large numbers for a sequence of iid r.v.S.

C) Suppose $\{X_n\}$ be a sequence of iid geometric (θ) r.v.S. Then show that $\overline{X}_n = \frac{1}{n}\Sigma X_i$ converges to a constant in probability as $n \to \infty$.

5. Attempt **any two** from the following : **10**

A) If number of arrivals are completely random and λ is the average arrival rate; then show that probability distribution of number of arrivals in fixed time interval is given by Poisson distribution.

B) Define order statistic and find the distribution of K^{th} order statistic.

C) Obtain hazard rate for Weibull (α, β) distribution and comment.

SLR-N – 253

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
GEOLOGY (Special Paper – XV)
Phanerozoic Stratigraphy of India

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. *: 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 correct answer from the given options : **10**

1) Chara and Azolla along with other plant remains are found in _____ rocks.
   a) Tichy b) Deccan Trap
   c) Bagh bed d) Kutch

2) Inter-Trappean beds are present in _____
   a) Baghbeds b) Gondwana beds
   c) Lameta beds d) Deccan Trap

3) Economic importance of Gondwana is its _____
   a) Glossopteris b) Gangmopteris
   c) Coal d) Diamond

4) Narmada Valley is location for _____ beds.
   a) Bagh b) Infra Trappean
   c) Laterite d) Coal

5) Vertical extent of Infra-Trappean beds is less as compared to its lateral horizontality which belongs to _____
   a) Deccan Traps b) Lameta
   c) Gondwana d) Bagh

6) Infra-Trappean are _____ beds.
   a) Bagh b) Lameta
   c) Deccan Traps d) Inter-Trappean

P.T.O.

7) Rocks of Kutch are of _____
   a) Jurassic b) Palaeozoic c) Gondwana d) Cretaceous

8) The structure of the Spiti is _____
   a) Plain ground b) Anticlinal c) Inclined d) Geosynclinal

9) All the rocks of _____ are fossiliferous.
   a) Deccan b) Cuddapah c) Laterites d) Spiti

10) Lameta and Bagh beds are present _____ Deccan Traps.
   a) Below b) Above c) Along d) In

2. Answer **any five** of the following : **10**
   1) Fossils of Gondwana
   2) Economic importance of Gondwana
   3) Lithology of Bagh beds
   4) Structure of Bagh beds
   5) Economic importance of Deccan Traps
   6) Structure of Deccan Traps.

3. A) Answer **any two** of the following : **6**
   1) Lithology and Fossils of Deccan Traps
   2) Structure of Gondwana.
   3) Ariyalur Litology.

   B) Trichnopoly formation. **4**

4. Answer **any two** of the following : **10**
   1) Uttatur formation
   2) Haimanta group
   3) Lithology of lower Gondwana.

5. Explain **any two** of the following : **10**
   1) Stratigraphy of Maharashtra.
   2) Siwalik group
   3) Jurassic of kutch.

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SLR-N – 254

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
MICROBIOLOGY (Special Paper – XV)
Environmental Microbiology

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) Oxygen carrying capacity of blood is decreased by _____ air pollutant.
a) PAN b) Ashestos c) CO d) Smog

ii) Incubation time for BOD test is _____ days.
a) 5 b) 7 c) 10 d) 20

iii) Gnotobiotic animals are those which are _____
a) With known organism b) Normal
c) Germ free d) Axenic

iv) Melanoidin pigments are present in _____ waste.
a) Textile b) Sugar
c) Paper and pulp d) Distillery

v) _____ are key elements for eutrophication process.
a) N and S b) C and S c) N and P d) P and C

vi) _____ is the peculiar characteristic of marine bacteria.
a) Pathogenicity b) Fast growth
c) Degradative power d) Attachment tendency

vii) _____ organism is involved in bioleaching process.
a) Thiobacillus ferroxidans b) Micrococcus radiodurans
c) Cytophaga spp. d) Thiobacillus bioledans

P.T.O.

viii) _____ organism acts as indicator of fecal pollution.

a) St. Pneumoniae b) St. fecalis

c) St. Lactis d) Micrococcus leutus

ix) Marine bacteria have need for _____ ions.

a) K^+ b) Na^+ c) Cl^- d) OH^-

x) _____ air pollutant is respiratory irritant.

a) Hydrocarbons b) PAN c) Sulfer oxides d) CO

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

i) Define BOD.

ii) Enlist two sources of Radioactive pollution.

iii) Define Bioremediation.

iv) Classification of lakes on the basis of nutrients.

v) List two organisms involved in bioleaching process.

vi) Characteristics of marine organisms.

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

i) Characteristics of textile industry waste water.

ii) Write on control of eutrophication.

iii) Write note on Bioindicators of fecal pollution.

B) Describe causes and control of depletion of ozone layer. **4**

4. Answer the following (**any two**) : **10**

i) Discuss Routine bacteriological examination of water.

ii) Discuss in short safety measures in microbiology laboratory.

iii) Write on germ free animals and Gnotobiology.

5. Answer the following (**any two**) : **10**

i) Write on Municipal water purification process.

ii) Treatment of dairy industry waste water.

iii) Write different parameters used for characterization of industrial waste water.

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SLR-N – 255

Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2014
ELECTRONICS (Special Paper – XV)
Embedded System Design

Day and Date : Friday, 7-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Draw neat and labelled diagram **wherever** necessary.*
*3) Figures to the **right** indicate **full** marks.*
*4) **Use** of calculators are **allowed**.*

1. Choose correct alternatives : **10**

i) _____ are the essential parts of an embedded system.
   a) Hardware only b) Software only
   c) Hardware and Software d) All of these

ii) As per architecture of an embedded software structure the statement _____ is used to design super loop.
   a) While (1) b) While (10)
   c) While (100) d) All of these

iii) The data range of float variable is _____ bytes.
   a) 2 b) 4 c) 3 d) 1

iv) The base element of the array has index _____
   a) one b) ten c) zero d) none of these

v) The type of function decides the nature of _____ values.
   a) return b) input c) print d) all of these

vi) The _____ is checked to identify the completion of the count.
   a) TF flag b) TI flag c) EI flag d) None of these

vii) For temperature measurement _____ is the suitable sensor.
   a) zener diode b) AD 590 c) AD 595 d) AD 597

P.T.O.

viii) To generate square wave of variable amplitude _____ should be interfaced to microcontroller.

a) DAC b) ADC

c) V to F converter d) F – V converter

ix) Humidity is normally expressed in _____ unit.

a) °C b) °K c) RH% d) Joules

x) Temperature sensor has coefficient 10 mv/°C. The emf produced for temperature 55 °C is _____

a) 550 mv b) 55 mv c) 5.5 v d) 10 mv

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

i) Mention any four applications of an embedded system.

ii) Draw circuit clock for microcontroller 8951.

iii) Give the structure of while ( ) loop of C Language.

iv) What do you mean by humidity ?

v) Mention any five library function.

vi) List the steps involved in programming of the software into target device by using flash magic.

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

i) Describe the structure of Embedded C program.

ii) Write a note on User's defined function.

iii) Write embedded C program to generate square wave.

B) What do you mean by In-system programming ? **4**

4. Answer **any two** of the following : **10**

i) Discuss basic architecture of an embedded system. Mention characteristics of embedded system.

ii) Write a note on loops in C Language.

iii) Write embedded C program to produce delay time using timer.

5. Answer **any one** of the following : **10**

A) Describe in detail the designing of an embedded system for measurement of humidity of the environment.

B) Discuss the steps involved in Keil microvision IDE to develop embedded software for 8951 microcontroller.

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SLR-N – 256

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE
Operating System – II (Special Paper – XV)

Day and Date : Friday, 7-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions are* ***equal*** *marks.*
3) Calculator is ***not allowed****.*

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

1) _____ symbol matches any a single character in filename.

a) ? b) – c) * d) none of these

2) Which is the following command is used to list all background jobs ?

a) list b) jobs c) is d) ps

3) Bourne shell offers a command history features

a) true b) false

4) _____ command is used to compare integer's compare strings and perform logical operation.

a) head b) tail c) ls d) grep

5) In vi _____ command is used to delete current line.

a) dd b) d c) xx d) dw

6) The wildcard character * and ? have the same meaning.

a) true b) false

7) Octal representation of rw_w_ _ r _ _ permissions are _____

a) 624 b) 644 c) 642 d) 654

8) All linux command must always be entered in small case letter

a) true b) false

P.T.O.

9) _____ X-based tool is available for configuring the X-window system.
   a) X-configurator b) XF 86 setup
   c) XF-86 coding d) None of these

10) _____ command is used to add printing jobs to the queue.
   a) lpd b) lpr c) lpq d) lpc

2. Answer **any five** of the following : **10**
   1) What is shell script ?
   2) What is file ? Types of file.
   3) Explain cut command.
   4) Explain rm command.
   5) Explain pwd command.
   6) What is filter ? Which types of filter ?

3. A) Answer **any two** of the following : **6**
   1) Write short note on NFS.
   2) Explain pipe command.
   3) Explain login and logout procedure.

   B) What is redirection ? Explain it. **4**

4. Answer **any two** of the following : **10**
   1) Explain vieditor.
   2) What is shell ? Explain its types.
   3) Explain chmode command.

5. Answer **any two** of the following : **10**
   1) Write a program to display fibonacci series upto 'n' numbers.
   2) Write a program to display number is prime or not.
   3) Explain following linux command.
      a) mv b) cd
      c) more d) mkdir
      e) lpr.

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SLR-N – 257

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XVI)
Electronics and Computer Programming

Day and Date : Saturday, 8-11-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 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 output of non-inverting Op-Amp is _____

a) in phase with input b) out of phase with input

c) out of phase by 90° d) out of phase by 180°

ii) _____ is the ratio of change in input offset current to change in temperature.

a) input offset current drift b) input offset voltage drift

c) slew rate d) common mode input impedance

iii) If R_A is charging resistance and R_B is discharging resistance then in an IC-555 in astable mode time constant of the output waveform is given by _____

a) $(R_A + R_B)\ C$ b) $0.693\ (R_A + R_B)\ C$

c) $0.693\ (R_A + 2R_B)\ C$ d) $\dfrac{1.44}{(R_A + 2R_B)\ C}$

P.T.O.

iv) The IC-555 is a build in _____ circuit.

a) Diff. amp. b) Timer

c) Schmitter trigger d) Adder

v) Conduction angle of SCR is given by _____

a) α b) $(180° - \alpha)$

c) $(90° - \alpha)$ d) $(60° - \alpha)$

vi) In p-n-p-n diode break over voltage is marked by _____

a) A sudden increase in current b) A sudden decrease in current

c) The diode getting burnt off d) None of these

vii) ROM memory is _____ memory.

a) volatile b) hidden

c) permanent d) temporary

viii) Floating point numbers are stored in _____

a) 16 bits b) 32 bits

c) 64 bits d) 8 bits

ix) _____ is group of characters enclosed in double quotes.

a) String b) Character

c) Float d) Real

x) Block comment discard or ignored between _____

a) $\| \& \|$ b) $| * \& |$

c) $| * \& * |$ d) $| \& |$

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

1) Define the term slew rate.

2) Draw functional pin diagram of IC-555.

3) What is meant by TURN-OFF of a SCR ?

4) State the functions of operating system.

5) What is C++ ?

6) Differentiate switch and if-else.

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

   1) Explain operational amplifier as a schmitt trigger.

   2) Explain working of Triac.

   3) Explain the term DOS.

   B) With the neat diagram explain operational amplifier as an integrator. **4**

4. Answer **any two** of the following : **10**

   1) Explain the application of SCR as speed control of DC motor.

   2) Describe in brief lower level and higher level languages.

   3) Explain different types of constants used in C++.

5. Answer **any one** of the following : **10**

   1) Explain block diagram and working of IC-555 and give its one application.

   2) What are the looping structures in C++ ? Give syntax and suitable programs.

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Seat No.	

B.Sc. – III (Sem. – VI) Examination 2014
CHEMISTRY (Special Paper – XVI)
Analytical and Industrial Organic Chemistry

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 11.00 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 and give equations* ***wherever*** *necessary.*

1. Select the most correct alternative from those given below and rewrite the sentence : **10**

i) The sulphated castor oil, used as textile finishing agent is _____
   a) Turkey red oil b) An essential oil
   c) Teepol d) Cinnamon oil

ii) The term used for the repeating units of a polymer is _____
   a) Unit structure b) Condensate
   c) Unit residue d) Monomer

iii) Bakelite is obtained from _____
   a) Ethylene b) Adipic acid
   c) Phenol and formaldehyde d) Styrene

iv) During fermentation of the molasses by the yeast cells _____ gas is evolved.
   a) O_2 b) CO_2
   c) CH_4 d) Cl_2

v) For maximum extraction of juice from sugar cane _____ process is used.
   a) Compound imbibition b) Centrifugal Separation
   c) Seeding d) Refining

P.T.O.

vi) The bleaching of cotton by sodium hypochlorite involves _____ process.

a) Oxidation b) Reduction

c) Hydrolysis d) Decomposition

vii) The monomers for Buna-S rubber are 1,3-butadiene and _____

a) Ethylene glycol b) Propylene

c) Salicylic acid d) Styrene

viii) The chemical reactions occuring in living organisms in presence of enzymes are called as _____ reactions.

a) Redox b) Friedel crafts

c) Biocatalytic d) Oxidative

ix) In paper chromatography, the stationary phase is always _____

a) Solid b) Liquid

c) Gas d) All these

x) Addition of NaCl to conc. solution of sodium stearate precipitates soap due to _____

a) Common ion effect b) Cleaning action

c) Bleaching action d) Selective adsorption

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

i) Define homopolymer. How is polyethylene prepared ?

ii) Explain the principle of column chromatography.

iii) Explain the role of addition of lime in the process of clarification of sugar juice.

iv) What are ampholytic detergents ? Give example.

v) What are zeolites ? Give their uses.

vi) Write a brief note on ‘batch process’ of bleaching of fibres.

3. A) Answer **any two** of the following : **6**
   i) Explain the function of soap as cleaning agent.
   ii) What are microwave assisted reactions ? Give their characteristic features.
   iii) Write a brief note on sizing ingredients.

   B) Explain the terms : **4**
   a) Rectified spirit
   b) Denatured spirit
   c) Absolute alcohol
   d) Power alcohol.

4. Answer **any two** of the following : **10**
   i) What is saponification ? Explain hot process of manufacture of soap.
   ii) Discuss the process of refining of raw sugar.
   iii) Draw the line diagram of gas chromatograph and explain its components.

5. Answer **any two** of the following : **10**
   i) Discuss the process of vulcanisation of rubber.
   ii) Discuss the principle and experimental technique of paper chromatography.
   iii) Explain the process of dyeing of fibres using reactive dyes.

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SLR-N – 259

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
BOTANY
Special Paper – XVI : Molecular Biology and Biotechnology

Day and Date : Saturday, 8-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *i) Figures to the **right** indicate **full** marks.*
*ii) **Draw** neat labelled diagrams **wherever** necessary.*

1. Choose proper answer : **10**

i) Which of the following nitrogen base is absent in DNA ?
a) Uracil b) Thymine c) Cytosine d) Adenine

ii) Destruction of DNA at high temperature is referred to as _____
a) DNA renaturation b) DNA denaturation
c) DNA replication d) DNA sequencing

iii) A typical prokaryotic gene is made up of _____ regions.
a) 2 b) 3 c) 1 d) 4

iv) Operon concept was put forth by _____
a) Jacob and Monad b) Jacob and Wolleman
c) Jacob and Lederberg d) Jacob and Khorana

v) _____ enzyme is considered as biological scissor.
a) Nuclease b) Gyrase c) Ligase d) Polymerase

vi) Which of the following are secondary metabolite ?
a) Carbohydrates b) Lipids
c) Proteins d) Steroids

vii) The technique used for analysis of DNA molecule is termed as _____
a) Northern blotting b) Southern blotting
c) Western blotting d) Eastern blotting

viii) The expression of _____ is easily detected through resistance to toxin.
a) Selectable reporter gene b) Scorable reporter gene
c) Silence d) Marker

ix) Agrobacterium mediated gene transfer is involved in _____ method of gene transfer.

a) Physical b) Chemical c) Biological d) None of these

x) Anther culture gives _____ plants.

a) Haploid b) Diploid c) Triploid d) Tetraploid

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

i) What is micropropagation ?

ii) Enlist nitrogen bases present in DNA.

iii) Explain the role of regulator gene.

iv) Enlist any two physical and any two chemical methods of gene delivery.

v) Enlist the enzymes involved in protoplast isolation.

vi) Write in brief about nomenclature of restriction endonuclease with suitable example.

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

i) Draw the diagram of 'Operon Model' you have studied.

ii) Enlist various enzymes involved in recombinant DNA technology.

iii) Write in brief about DNA libraries.

B) Describe semiconservative method of DNA replication. **4**

4. Answer **any two** of the following : **10**

i) Describe in brief somatic hybridization with respect to protoplast fusion and recovery of hybrid plants.

ii) Describe various steps involved for gene amplication by PCR.

iii) Discuss in brief about gene organization in eukaryotes.

5. Answer **any two** of the following : **10**

i) Write brief account of cell suspension culture.

ii) What are the applications of DNA fingerprinting ?

iii) What are transgenic plants ? Describe the method of development of any one transgenic plant you have studied.

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SLR-N – 26

Seat No.	

B.Sc. – I (Sem. – I) Examination, 2014
ZOOLOGY (Paper – II) (Old)
Cell-Biology and Genetics

Day and Date : Tuesday, 11-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 alternatives. **10**

1) In animals the sex of an individual is controlled by _____
   a) Autosomes b) Vegetative chromosome
   c) Gaint chromosome d) Sex chromosome

2) In electron microscope the image is seen on _____
   a) Fluorescent screen b) Glass slide
   c) Flex seen d) Diaphragm

3) The fluid mosaic model is studied with reference to _____
   a) Golgo complex b) Lysosomes
   c) Plasma membrane d) Endoplasmic reticulum

4) The Golgi apparatus is discovered by _____
   a) De duve b) Camillo Golgi
   c) Singer and Nicolson d) Altman

5) The sickle cell anemia is concerned with _____
   a) WBC b) RBC
   c) Blood serum d) Plasma

6) _____ are also called as suiciadal bags.
   a) Lysosomes b) Mitochondria
   c) Ribosome d) Autosomes

P.T.O.

7) The phenotypic ratio of dihybrid cross is _____
   a) 3 : 1 b) 9 : 3 : 3 : 1 c) 9 : 7 d) 9 : 3 : 4
8) The model of Mendel's experiments was _____
   a) Rose plant b) Pea plant c) Drosophila d) Mice
9) _____ are called as power house of cell.
   a) Mitochondria b) Lysosomes
   c) Golgi complex d) Nucleus
10) A person having _____ blood group is called as universal donor.
   a) O b) AB c) A d) B

2. Write short note on following **(any five)** : **10**
   i) Polytene chromosomes
   ii) Sickle cell anemia
   iii) Functions of lysosomes
   iv) Nucleolus
   v) ZW method of sex determination
   vi) Prokaryotic cell.

3. A) Answer **any two** of the following : **6**
   i) Limitations of Elctronmicroscope
   ii) CO – dominance
   iii) Rh – blood group.

   B) Describe the structure of mitochondria. **4**

4. Answer **any two** of the following : **10**
   i) Phenyl ketoneuric imbecility
   ii) Structure of eukaryotic cell
   iii) Structure and functions of Golgi complex.

5. Answer **any one** of the following : **10**
   i) Describe the ultrastructure and functions of nucleous.
   ii) What are multiple alleles ? Explain the multiple alleles with reference to coat colour in rabbit.

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SLR – N – 261

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XVI)
Graph Theory

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) In Pseudograph _____ are allowed.
   a) only loops b) only multiple edges
   c) both loops and multiple edges d) none of these

2) If G has n vertices and is regular of degree r, then G has _____ edges.
   a) $\frac{r}{2}$ b) $\frac{n}{2}$ c) $\frac{r+n}{2}$ d) $\frac{rn}{2}$

3) A vertex is called as isolated vertex if and only if it has degree _____
   a) 0 b) 1 c) 2 d) 3

4) The vertex connectivity of a cycle C_n $(n \geq 4)$ is _____
   a) 1 b) 2 c) 3 d) 4

5) The wheel graph w_n is a regular graph for n = _____
   a) 1 b) 3 c) 4 d) 10

6) Every tree is _____ graph.
   a) simple b) multi c) pseudo d) none of these

7) Repeated edges is allowed in _____
   a) trail b) path c) cycle d) walk

8) If a plane graph has k components, then n – e + r = _____
   a) K b) K – 1 c) K + 1 d) $K^2 + 1$

P.T.O.

9) $(675)_{10}$ = _____

a) $(2B3)_{16}$ b) $(2A3)_{16}$

c) $(1A3)_{16}$ d) $(3B2)_{16}$

10) The binary number 1110 is equivalent to the hexadecimal number is _____

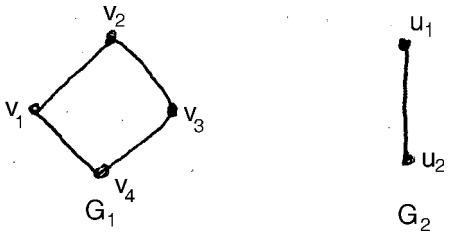
a) E b) F c) B d) C

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

1) Define Platonic graph.

2) Show that C_6 is a bipartite graph.

3) Find the sum of following two graph :



4) Define the term edge connectivity.

5) Convert $(110111.01101)_2$ to hexadecimal number.

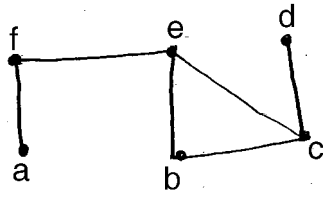
6) What is the value of prefix expression ?

$* - 84 + 6/4^2$.

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

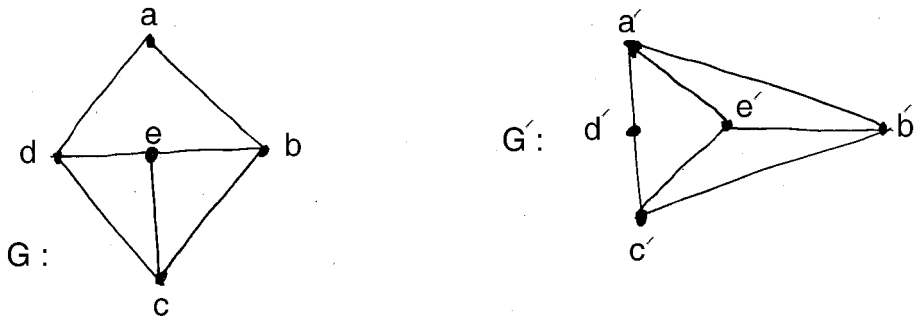
1) Does there exists a 4-regular graph on 6 vertices ? If so construct a graph.

2) Find all spanning trees of the following graph :



3) Convert hexadecimal number 8E47.AB to decimal number.

B) Show that the graph G and G′ are isomorphic : **4**



4. Attempt **any two** of the following : **10**

1) In a non directed graph then prove that the total number of odd degree vertices is even.

2) Write down the graph corresponding to the following incidence matrix :

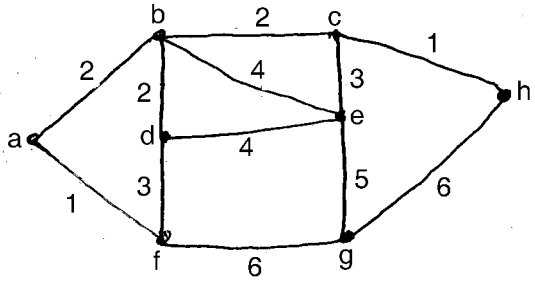
$$\begin{pmatrix} 0 & 0 & 1 & -1 & 1 \\ -1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 \\ 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 1 & 0 \end{pmatrix}$$

3) Convert the decimal number 1248.56 to binary equivalent.

5. Attempt **any one** of the following : **10**

1) Show that a simple graph with n vertices and k components can not have more than $\frac{(n-k)(n-k+1)}{2}$ edges.

2) Apply Dijkstra's algorithm to find the shortest path between the indicated vertices in the given weighted graph.



between a and h.

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Seat No.	

B.Sc. (Part – III) (Sem. – VI) Examination, 2014
STATISTICS (Special Paper – XVI)
C-Programming

Day and Date : Saturday, 8-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Select the most correct alternative : **10**

i) C language came into existence in the year
a) 1960 b) 1967 c) 1970 d) 1972

ii) $\ln x = 10.3 / y + (4 * y + (3 * z) / y + w) / (2 / n)$; which operation will be performed first ?
a) 10.3/y b) 2/n c) $3 * z$ d) $4 * y$

iii) A C variable can start with _____
a) An alphabet b) A number
c) A special symbol d) Both b) and c)

iv) If a is an integer then a = 10% – 3 will return a value _____
a) 3.33 b) 1 c) – 1 d) – 3

v) If x = 15 ; y = (x > 10 ? (x < 5 ? 25 : 50) : 75) ; then y will be _____
a) 5 b) 25 c) 50 d) 75

vi) Which of the following statement is used to take the control to the beginning of the loop, by passing the statement inside the loop which have not been executed in a C – program ?
a) continue b) break
c) goto d) none of these

vii) If Pl is an integer pointer with an initial value, Say 2014, then after the operation Pl = Pl + 1 ;, the value of Pl will be _____
a) 2015 b) 2016 c) 2018 d) 2020

P.T.O.

viii) An array is a group of related data items that has a _____

a) Different names b) Common name

c) Common number d) None of these

ix) If n = stremp (string 1, string 2) ; and n > 0 then _____

a) String 1 is identical to string 2 b) String 1 is above to string 2

c) String 2 is above string 1 d) None of these

x) Which mode is used to open a file for reading purpose ?

a) r b) w c) a d) none of these

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

i) What are the rules for constructing a real constants ?

ii) What do you mean by logical operators and logical expression ?

iii) Explain if statement in C-programming.

iv) Explain gets( ) with illustration.

v) State the different arithmetic operator in compound assignment operator.

vi) Explain passing array elements to a function.

3. A) Attempt **any two** from the following : **6**

i) What will be the statement-wise output of the following program ?

```
# include < stdio.h >
# include < math.h >
main ( )
  {  int a = 5, b, c ;
        b = ++ a ;
        c = a ++ ;
Printf (" \n a = % d, b = % d, c = % d", a,b,c);
  }
```

ii) Explain two-dimensional arrays.

iii) Explain fprintf and fscanf functions.

B) Write a C – program to read an integer and prints it out backwards, using do-while statement. **4**

4. Attempt **any two** from the following : **10**

   i) Explain while statement with illustration.

   ii) State the category of functions and explain any one of them.

   iii) Explain declaring and initializing string variables.

5. Attempt **any two** from the following : **10**

   i) Explain the printf function with illustrations.

   ii) Write a C-program to find factorial of n using function, where n is positive integer.

   iii) The marks obtained by a student in five different subjects are input through the key board. The student gets a division as per the following rules.

   Percentage above or equal to 60 – First division

   Percentage between 50 and 59 – Second division

   Percentage between 40 and 49 – Third division

   Percentage less than 40 – Fail

   Write a C – program to calculate the division obtained by the student, using switch statement.

SLR-N – 263

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
GEOLOGY (Special Paper – XVI)
Economic Geology

Day and Date : Saturday, 08-11-2014 Total Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

N.B. : *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 given in the options : **10**

   1) Contact metasomatism is associated with _____ formation.
   (rock, ore, placer, strata)

   2) Creating awareness of _____ of mineral resources is the key to the economic growth.
   (conservation, consumption, export, import)

   3) The disseminated copper deposits are of _____ origin.
   (hypothermal, epithermal, telethermal, mesothermal)

   4) Flat topography is the requirement for the formation of _____ deposits.
   (rudaceous, arenaceous, coal, residual)

   5) Most of the contact metasomatic deposits are associated with _____
   (batholiths, sill, dyke, laccolith)

P.T.O.

6) _____ is the hydrothermal cavity filling type deposit consisting of more or less regularly spaced short traverse fractures filled with metals.

(ladder vein, stock work, saddle reef, breccia)

7) The association of ore minerals and gangue minerals is known as _____

(crystal, rock, tenor, ore)

8) The concentration of heavy minerals, deposited to inner part of the stream is called as _____

(streak, stock, stack, pay streak)

9) Presence of humid tropical climate is very important factor to _____ formation.

(gold, chromite, silver, bauxite)

10) Major gold resources in India is located at _____ gold fields.

(Panna, Hutti, Jaduguda, Mangalwedha)

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

1) Explain beach placer deposits. Give Indian examples.

2) Define economic geology.

3) Ore and gauge minerals.

4) Tenor of ore.

5) Formation of laterites.

6) Kolar ore deposits.

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

   1) Residual deposits.

   2) Fissure vein deposits.

   3) Contact metasomatism.

   B) Syngenetic ore deposits. Give Indian examples also. **4**

4. Answer **any two** of the following : **10**

   1) Describe late magmatic process of ore formation.

   2) What is mineral resource conservation ? Write the concept of mineral conservation.

   3) Describe oxidation and supergene enrichment process of ore formation.

5. Explain **any two** of the following : **10**

   1) Gossan and crustification.

   2) Laterite and Bauxite.

   3) Ore deposits of Karnataka and Maharashtra.

SLR-N – 264

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
MICROBIOLOGY (Special Paper – XVI)
Medical Microbiology

Day and Date : Saturday, 8-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 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) _____ of the following is NOT a hepatitis B antigen.

a) HBs Ag b) HBc Ag
c) HBe Ag d) HBz Ag

ii) Trimethoprim shows synergistic action with _____

a) Penicillin b) Streptomycin
c) Sulphonamides d) Gentamicin

iii) For confirmation of diagnosis of HIV by western blot test, antibodies must be produced against _____ antigen along with GP120 and GP160.

a) P17 b) GP41
c) P55 d) P24

iv) Hospital acquired infection is mostly caused by _____

a) Mycobacterium Leprae b) Pseudomonas aeruginosa
c) Heliobacter Pylori d) Klebsiella pneumoniae

v) _____ is one of the key enzymes of Heliobacter pylori pathogenesis.

a) Oxidase b) Urease
c) Gelatinase d) Phosphatase

P.T.O.

vi) Which of the following is characteristic biochemical test, positive for pseudomonas aeruginosa ?

a) Urease b) Catalase

c) Phenylalanine deaminase d) Oxidase

vii) _____ antibiotic inhibit cell wall synthesis of bacteria.

a) Rifamycin b) Trimethoprim

c) Tetracycline d) Penicillin

viii) _____ is a vineral disease.

a) Syphilis b) Leprosy

c) Gas gangrene d) Filariasis

ix) Plasmodium reproduces asexually in the _____

a) Mosquito b) Human RBC

c) Stagnant water d) None of these

x) Klebsiella pneumoniae is _____ rods.

a) Gram negative motile b) Gram positive non motile

c) Gram negative non motile d) Gram positive motile

2. Answer in brief/define **any five** of the following : **10**

a) Synthetic drug.

b) Drug inactivation or modification.

c) Kirby-Bauer antibiotic sensitivity testing.

d) CD_4 count.

e) Prevention of malaria.

f) Characters of Mycobacterium leprae.

g) Biomedical waste treatment.

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

   a) Justify - Pseudomonas infections are difficult to treat.

   b) Life cycle of Plasmodium Vivax.

   c) Cholera toxin.

   B) Write in brief on opportunistic infections in HIV/AIDS. **4**

4. Answer **any two** of the following : **10**

   a) Hepatitis A.

   b) Diagnosis and prevention of hospital acquired infection.

   c) Amphotericin and Nystatin.

5. Answer **any two** of the following : **10**

   a) Drugs affecting folic acid biosynthesis.

   b) Fungal Pathogenicity.

   c) Diseases/conditions caused by Herpes simplex virus.

———————

SLR-N – 266

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE (Special Paper – XVI)
Data Communications and Networking – II

Day and Date : Saturday, 8-11-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory****.*
2) ***All*** *questions carries* ***equal*** *marks.*

1. Choose the **correct** alternatives. **10**

1) _____ is a general purpose class for accessing the attributes of a remote resource.

a) Remote execution b) VRL connection
c) Open connection d) None of the above

2) _____ provide flexibility to adapt to changes in network requirements and allow for simplified administration.

a) VPN b) Wi-Fi
c) Virtual LAN d) GPS

3) Message is not changed during transmission, neither accidently nor maliciously is called as _____

a) Confidentiality b) Integrity
c) Authentication d) Non repudiation

4) _____ is based on IEEE 802.11 standard.

a) VPN b) Repeater
c) Wi-Fi d) Virtual LAN

P.T.O.

5) _____ segment is used to disconnect the connection in TCP.

a) SYN b) VRG

c) PSH d) FIN

6) _____ does not provide confidential communication.

a) Digital signature b) Firewall

c) Digital certificate d) Application Gateway

7) The _____ service in IIS allows users to post news messages.

a) FTP b) NNTP

c) HTTP d) SMTP

8) _____ is used to convert message formats from one format to another.

a) Firewall b) VPN

c) Gateways d) Hubs

9) _____ is a web indexing and search system designed for intranet.

a) Dig b) Samba

c) Tux d) CUPS

10) _____ protocol is used to access data on the WWW.

a) FTP b) POP 3

c) SMTP d) HTTP

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

1) What is meant by well known port number ?

2) What is meant by public key cryptography ?

3) Mention the five tools of dig server.

4) Which are the various tasks performed by logon script ?

5) What is meant by passive hub ?

6) What is meant by Digital Signature ?

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

1) How to maintain Network Security in different layers of OSI model ?

2) Explain uses of UDP.

3) Explain piconet in short.

B) Which are the various commands used to manage groups in Linux server ? **4**

4. Answer **any two** of the following : **10**

1) Explain WiFi Network.

2) Explain web server of windows 2003 server.

3) Explain application gateway.

5. Answer **any two** of the following : **10**

a) Explain Samba server in detail.

b) Explain POP 3 protocol in detail.

c) Explain I-phone in detail.

SLR-N – 28

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
BOTANY (Paper – I) (Old)
Microbiology and Cryptogams

Day and Date : Wednesday, 12-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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. Select and rewrite the following sentences choosing correct option. **10**

1) Which of the following organism can live only in living cell ?
a) Bacteria b) Virus c) Fungi d) Both a) and b)

2) Rod shaped bacteria are called _____
a) Bacilli b) Cocci c) Spirilli d) Vibrio

3) Tobacco mosaic virus is made up of _____
a) RNA b) DNA
c) RNA and Protein d) DNA and Carbohydrate

4) Prokaryotic cellular organisation is observed in _____
a) Lichen b) Nostoc
c) Riccia d) Selaginella

5) Male gamete is motile while female gamete is nonmotile in _____
a) Isogamy b) Anisogamy
c) Oogamy d) Planogamy

6) Mucor belongs to sub-division _____
a) Zygomycotina b) Ascomycotina
c) Basidiomycotina d) Deuteromycotina

7) Bryophytes are _____
a) Vascular cryptogams b) Non-vascular cryptogams
c) Vascular phanerogams d) Non-vascular phanerogams

P.T.O.

8) The condition of production of two types dissimilar spores in selaginella is _____
   a) Heterospory b) Homospory
   c) Aplanospory d) Apospory

9) Which of the following Lichen is used as spices ?
   a) Usnea b) Cladonia
   c) Parmelia d) Haematoma

10) Albugo candida causes a disease named _____
   a) Red rust b) White rust
   c) Black smut d) Little leaf

2. Answer **any five** of the following : **10**
   i) Write systematic position of Selaginella.
   ii) Sketch and label cell structure of Spirogyra.
   iii) State economic importance of Fungi.
   iv) Give general characters of Pteridophytes.
   v) Write any one method of asexual reproduction in Mucor.
   vi) Give types of Lichens.

3. A) Answer **any two** of the following : **6**
   i) Give chemical composition and ultra structure of Mycoplasma.
   ii) Describe thallus structure of Nostoc.
   iii) Write a note on anatomy of Lichen thallus.

   B) Describe L. S. of strobilus of Selaginella with suitable diagram. **4**

4. Answer **any two** of the following : **10**
   i) What is alternation of generations ? Explain it in Riccia.
   ii) Write classification and economic importance of viruses.
   iii) Give a tree diagram for classification of cryptogams up to divisions as per G. M. Smith (1955).

5. Answer **any one** of the following : **10**
   i) Describe ultrastructure of bacterial cell. Give positive and negative importance of bacteria.
   ii) Give detailed account of the thallus structure and asexual reproduction in Albugo.

SLR-N – 3

Seat No.	

B.Sc. – I (Semester – I) (CGPA Pattern) Examination, 2014
COMPUTER SCIENCE (Paper – I)
Computer Fundamentals and Programming using 'C' – I

Day and Date : Monday, 3-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 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

1. Multiple choice questions : **5**

1) The quality of image produced depends upon _____
   a) plasma b) clarity
   c) resolution d) none

2) _____ is a line printer on which characters to be printed are embossed.
   a) Laser b) Inkjet
   c) Drum printer d) None

3) Light pen is _____ device.
   a) pointing b) storage
   c) scanning d) output

4) 1024 KB is equal to _____
   a) 1 GB b) 1 MB
   c) 1024 byte d) None

5) A smallest phospher dot on CRT can be illuminated is called _____
   a) dpi b) pixel
   c) cursor d) all

P.T.O.

2. Answer **any five** of the following : **10**
   1) Define data and information.
   2) Define pointing devices. List commonly used pointing devices.
   3) Convert $(ABD)_{16} = (?)_{8}$.
   4) Define hardware and software.
   5) List various types of printers.
   6) Define compiler.
   7) Define Bit and Byte.

3. A) Write short notes on **any two** of the following : **10**
      1) Short note on ASCII code.
      2) Short note on SMPS.
      3) Short note on floppy disk.

   B) Answer **any one** of the following : **10**
      1) What is operating system ? Explain different features of O.S.
      2) Short note on CRT monitor and LCD monitor.

SECTION – II

1. Multiple choice questions : **5**
   1) _____ is exit controlled loop in 'C' language.
      a) while b) for
      c) Do while d) none
   2) _____ is not keyword in 'C' language.
      a) auto b) for
      c) float d) string
   3) 'C' language was developed by _____
      a) Jams Gosling b) Yashwant Kanetkar
      c) Dennis Ritchie d) Bjarne Straustrup
   4) Which of the following is the bitwise operator ?
      a) ; b) ^
      c) << d) +

5) Which of the following operator, not operates on float type data ?

a) size of b) %

c) + d) *

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

1) Define algorithm and flowchart.

2) Define keyword.

3) List out rules for declaration of identifier.

4) Define variable and constant.

5) Write the syntax of switch case statement.

6) Explain relational operator.

7) Define string with example.

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

1) Write a program to check entered number is palindrome or not.

2) Explain any two string function with example.

3) Explain forward and backward jump of goto statement with example.

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

1) Write a program to calculate multiplication of (3×3) matrix.

2) Explain for loop and nested for loop with example.

SLR-N – 30

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
BOTANY
Plant Physiology and Horticulture (Paper – II) (Old)

Day and Date : Thursday, 13-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 correct answer from given alternative : **10**

i) Growth is _____ increase in size.

a) Reversible b) Irreversible c) Temporary d) All of these

ii) _____ is the micro element.

a) Ca b) Mg c) P d) Mn

iii) The enzymes are _____ in nature.

a) Lipids b) Proteins c) Carbohydrates d) All of these

iv) The branch of horticulture that deals with cultivation, processing and marketing of flowers is called _____

a) Floriculture b) Pomoculture

c) Olericulture d) Landscape gardening

v) Black spot is disease of _____

a) Jasmine b) Citrus

c) Rose d) Rangoon creeper

vi) _____ is a growth retardant.

a) Cytokinins b) Gibberline c) Auxin d) CCC

vii) _____ plants flower when the day length is greater than critical day length.

a) Short day b) Long day c) Day neutral d) All of these

P.T.O.

viii) A rectangular patch of bark is removed completely in _____
a) 'T' budding b) Patch budding
c) Saddle grafting d) Stone grafting

ix) _____ is the sub aerial modification of stem which creeps horizontally on the soil surface.
a) Runner b) Bulb c) Stolon d) Sucker

x) Pr form of phytochrome absorbs _____ light.
a) Red b) Blue c) Green d) Yellow

2. Answer **any five** of the following : **10**
i) What is vernalization ?
ii) Write any two principal functions of nitrogen.
iii) Define suckers.
iv) Explain the role of stock in grafting.
v) What are enzymes ?
vi) Enlist the types of cuttings.

3. A) Answer **any two** of the following : **6**
i) What plant growth regulators ? Give classification of plant growth regulators.
ii) Write deficiency symptoms of magnesium.
iii) What are co-enzymes ? Explain in brief the role of co-enzymes in plant metabolism.

B) What is horticulture ? Comment upon the scope of horticulture. **4**

4. Answer **any two** of the following : **10**
i) What is phytochrome ? Explain in brief it's role in flowering.
ii) Explain in brief lock and key hypothesis of enzyme action.
iii) What are micro nutrients ? Write in brief about the role of any two micro-element in plant metabolism.

5. Answer **any one** of the following : **10**
i) What is sexual reproduction ? Explain merits and demerits of sexual reproduction.
ii) What is growth ? Explain in detail various stages of growth and comment upon growth curve.

_____

SLR-N – 34

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
MICROBIOLOGY (Old)
Fundamentals of Microbiology (Paper – I)

Day and Date : Friday, 14-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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 alternatives given below. **10**

i) _____ are obligatory intracellular parasites.
a) Bacteria b) Fungi c) Protozoa d) Viruses

ii) TMV infects _____
a) animal b) plant c) bacteria d) fungi

iii) Genetic material of _____are either DNA or RNA.
a) bacteria b) actinomycetes
c) viruses d) rickettsia

iv) _____ is a group of species.
a) Family b) Genus c) Order d) Phylum

v) _____ is present in the cell wall of gram positive as well as gram negative bacteria.
a) Peptidoglycan b) Phospholipid
c) Polysaccharide d) Lipoprotein

vi) Cell membrane is responsible for _____
a) locomotion b) transport of nutrients
c) protection d) digestion

vii) Antibiotic penicillin was discovered by _____
a) Louis Pasteur b) Joseph Lister
c) Alexander Flemming d) John Tyndall

P.T.O.

viii) Staphylococci are arranged in _____

a) pairs b) chains c) clusters d) clones

ix) _____ is discontinuous process of sterilization.

a) pasteurization b) sterilization c) tyndallization d) radiation

x) Actinomycetes show characteristics of both bacteria and _____

a) yeast b) viruses c) fungi d) algae

2. Answer in short (**any 5**) : **10**

i) Define fermentation

ii) Nucleoid

iii) Protozoa

iv) Functions of pili

v) Define mycology

vi) Medical microbiology.

3. A) Answer in brief (**any 2**) : **6**

i) Cultural criteria for bacterial classification.

ii) Contribution of Edward Jenner.

iii) Bacterial capsule.

B) Differentiate between procaryotic and eucaryotic cell. **4**

4. Describe **any two** of the following : **10**

i) General characteristics of fungi

ii) Structure of cell membrane

iii) Contribution of Antony Von Leeuwenhoek.

5. Answer **any two** of the following : **10**

i) Contribution of Louis Pasteur

ii) Chemical composition of cell wall of gram negative bacteria

iii) Classification of viruses based on host and type of nucleic acids.

_____

SLR-N – 39

Seat No.	

B.Sc. – I (Semester – II) (New) Examination, 2014
ENGLISH (Compulsory)
On Track : English Skills for Success

Day and Date : Wednesday, 10-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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**

i) The _____ missile became the first missile to exceed the speed of sound.

a) SLV-3 b) V-2 c) V-3 d) V-4

ii) The lethal V-2 missiles had devasted _____ in World War II.

a) Hiroshima b) Berlin c) Dover d) London

iii) The passage, 'The Great Journey to The West' illustrates Vivekananda's adventurous journey to _____

a) Chicago b) Boston

c) New York d) Washington

iv) The first session of the Parliament of Religions was scheduled to begin on _____

a) 21 September 1894 b) 31 May 1893

c) 11 September 1893 d) 11 September 1894

v) According to Nani Palkhivala, the main reason for serious economic problems of the majority is _____

a) famine b) negligence

c) drought d) ignorance

P.T.O.

vi) In the Zoo at Lusaka, there is a cage where the notice reads, 'The World's most dangerous animal'. Inside the cage there is _____

a) an Anaconda b) a Crocodile

c) a Leopard d) no animal but a mirror

vii) The poem, Brahma, is written by _____

a) Robert Hayden b) Emerson

c) W. B. Yeats d) Sarojini Naidu

viii) _____ challenge the sacred identify of the Moon.

a) Astronomers b) Rocket experts

c) Mothers d) The children

ix) The dog is asleep in _____ Kennel.

a) his b) her c) its d) it's

x) Of all boxes in the van, the black steel one is the _____

a) heaviest b) heavier c) heavily d) heavy

2. Answer in brief **any five** of the following questions : **10**

1) Who was Wernher von Braun and what was his contribution to science and to the World ?

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

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

4) How was Vivekananda's speech at the Parliament of Religion different from those of the other speakers ?

5) What was the motivating Slogan behind the American Civil War ?

6) Why does Pulkhivala declare that human rights cannot function in a vacuum ?

3. A) Answer the following questions in about **fifty** words **each** (**any two**) : **6**

1) Explain the central idea of the poem, Brahma.

2) Who were the 'Watchers of The Moon' ? What happened to them ?

3) What role do gods and religion have in the poem, in relation to Brahma ?

B) Answer briefly **any two** of the following : **4**

1) What are the important features of notices ?
2) You are secretary of Vijay Sports Club in your town. The meeting of the office bearers is scheduled for the 10th of the next month. Prepare an agenda for the meeting.
3) As the secretary of Vijay Sports Club, draft the minutes of the fourth meeting of the office bearers held in the club's office.

4. You are Ajay/Anjali Pathak, an IT engineer, living at Diamond Apartments, Mahavir Nagar, Kolhapur. Write an e-mail application in response to an advertisement for the post of software engineer in a well-known IT company. Refer briefly your educational qualifications, work experience in the body of the letter. **10**

OR

Imagine that you have received a letter of appointment as a software engineer in a reputed IT Company. Write an e-mail accepting the appointment.

5. Suppose you are applying for the post of an Assistant Professor in Chemistry. Prepare the CV for the said post. **10**

SLR-N – 4

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
PHYSICS (Paper – I) (CGPA Pattern)
Mechanics, Properties of Matter and Optics and Laser

Day and Date : Wednesday, 5-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N. B. : *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 table and calculator is* ***allowed****.*
v) Answers to the ***two*** *Sections must be written in* ***separate*** *answer book.*

SECTION – I
(Mechanics and Properties of Matter)

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

i) Length of equivalent simple pendulum is given by _____

a) $L = \frac{k^2}{l} + l$ b) $L = \frac{k^2}{l} - l$

c) $L = \frac{2k^2}{l} + l$ d) $L = \frac{2k^2}{l} - l$

ii) The relation between Y, η and σ is given by _____

a) $\sigma = \frac{Y}{2\eta} + 1$ b) $\sigma = \frac{Y}{2\eta} - 1$

c) $\frac{Y}{2\eta} = 1 - \sigma$ d) $\frac{Y}{2\eta} = \sigma - 1$

iii) Dimensions of surface tension are _____

a) $[M^0L^0T^{-1}]$ b) $[M^0L^{-1}T^{-1}]$ c) $[M^1L^0T^{-1}]$ d) $[M^1L^0T^{-2}]$

iv) As the temperature of liquid increases, the coefficient of viscosity _____

a) Increases b) Decreases

c) Remains unchanged d) Reduces to zero

v) M.I. of a rectangular lamina about an axis passing through its centre and perpendicular to its plane of rotation (I) = _____

a) $\frac{ML^2}{1^2} + \frac{Mb^2}{1^2}$ b) $\frac{ML^2}{3}$

c) $\frac{ML^2}{4}$ d) $\frac{ML^2}{2}$

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

i) Give any two applications of surface tension.

ii) Define critical velocity of fluids.

iii) If M.I. of a circular disc about the axis passing through its centre and perpendicular to its plane of rotation is $\frac{MR^2}{2}$; obtain the M.I. about its diameter.

iv) Draw neat diagram of venturimeter.

v) Mention any two factors affecting surface tension.

vi) For a material, the value of Y and η are 7.05×10^{10} N/m^2 and 2.67×10^{10} N/m^2. Calculate value of σ for the material.

vii) What are the energies associated with fluid in motion ?

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

i) Show shear is equivalent to compression and extension strain when mutually perpendicular to each other.

ii) The value of bulk modulus of copper K = 14×10^{10} N/m^2 and modulus of rigidity $\eta = 4.2 \times 10^{10}$ N/m^2. Calculate the value of Young's modulus and Poisson's ratio.

iii) Obtain an expression for M.I. of a flywheel.

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

i) Define compound pendulum, obtain an expression for its period. Hence determine length of equivalent simple pendulum.

ii) Define excess pressure. Obtain the relation between excess pressure, surface tension and radius of curvature. Discuss different cases.

SECTION – II
(Optics and Laser)

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

1) According to the Fermat's modified principle a ray of light chooses that path between two points along which the time of travel is _____

a) Zero b) Minimum

c) Maximum d) Extremum

2) Ramsden's Eyepiece is _____

a) Negative b) Positive

c) Single lens d) None of the above

3) The fringes in wedge shaped film are fringes of _____

a) Equal thickness b) Equal inclination

c) Different thickness d) None of the above

4) There are 15,000 lines per inch of a given grating; then its grating element is _____

a) $\frac{2.54}{15000}$ cm b) $\frac{1}{15000}$ cm

c) 2.54 cm d) 15,000 cm

5) He – Ne laser is _____

a) Crystalline solid laser b) Semiconductor laser

c) Gas laser d) Liquid dye

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

i) What is chromatic aberration ?

ii) State any two application of spectrometer.

iii) Draw a ray diagram for wedge shaped air film.

iv) Define diffraction of light. State the types of diffraction.

v) State properties of LASER.

vi) What is population inversion ?

vii) Two thin lenses in contact form an achromatic combination of focal length 10 cm and 20 cm. Calculate equivalent focal length of combination.

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

i) Prove Snell's law of refraction on Fermat's Principle.

ii) Explain the construction and working of Ruby laser.

iii) The focal length of Ramsden's eye-piece is $\frac{9}{4}$ cm. Calculate

1) The focal length of field lens and eye-lens,

2) Distance between the lenses.

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

i) Obtain an expression for diameter of n^{th} dark ring in Newton's rings produced by reflected monochromatic light. In Newton's rings experiment, a planoconvex lens of radius of curvature 120 cm is used. If the wavelength of light used is 6000 A.U. Calculate the diameters of second dark ring.

ii) Explain the construction of plane diffraction grating. Give the elementary theory of plane diffraction grating.

SLR-N – 40

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
CHEMISTRY (New)
Organic Chemistry (Paper – III)

Day and Date : Thursday, 11-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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. Choose the most correct alternative for **each** of the following : **10**

1) Racemic mixture is optically inactive due to _____
   a) Internal compensation
   b) Presence of plane of symmetry
   c) External compensation
   d) None of these

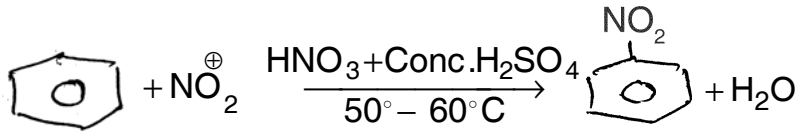
2) The hybridisation of carbon involved in acetylene molecule is _____
   a) Sp^3 b) Sp
   c) Sp^2 d) Sp^3d^2

3) Alkyl halide when heated with sodium metal in presence of dry ether forms higher alkane, this reaction is known as _____
   a) Wurtz reaction b) Kolbe's reaction
   c) Corey-House reaction d) Perkins reaction

4) Addition of conjugated diene to an unsaturated compound dienophile to form cyclic compound, this reaction is known as _____
   a) Wurtz reaction b) Internal Wurtz reaction
   c) Kolbe's reaction d) Diel's-Alder reaction

P.T.O.

5) What is the type of following reaction ?



a) Electrophilic addition reaction
b) Electrophilic substitution reaction
c) Nucleophilic addition reaction
d) Nucleophilic substitution reaction

6) Heterolytic fission of covalent bond gives _____

a) Free radicals b) Only cations
c) Only anions d) Both cation and anion

7) Alkenes when reacts with diborane followed by oxidation with alkaline hydrogen peroxide forms _____

a) Alcohols b) Aldehydes
c) Ketones d) Acids

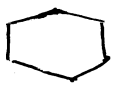
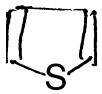
8) The correct structure of benzene was given by _____

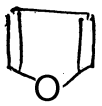
a) Dewar b) Faraday c) Kekule d) Claus

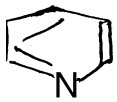
9) Alcohols on heating with Conc.H_2SO_4 loses a molecule of water and forms _____

a) Alkyne b) Alkene c) Alkane d) Cycloalkane

10) Which of the following is not showing aromatic character ?

a) 
b) 

c) 

d) 

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

i) What is hybridisation ? Give various types of hybridisation.
ii) Explain aromaticity of naphthalene by applying Huckel's rule.
iii) What is optical activity ? Give optical isomers of lactic acid.
iv) What are intermediates ? Mention different types of intermediates.
v) How will you prepare cyclopentane by using internal Wurtz reaction.
vi) Write 1 : 4 addition and 1 : 2 addition products of 1, 3 - butadiene with HCl.

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

i) Which of the following compounds are optically active or not ?

a) $CH_3 - \underset{\underset{C_2H_5}{|}}{CH} - Br$

b) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - COOH$

c) $CH_2OH - CH(OH) - CHO$

ii) What are rearrangement reactions ? Distinguish between intramolecular and intermolecular rearrangement reactions.

iii) Explain Sp hybridisation with respect to acetylene.

B) Discuss the radical mechanism for chlorination of methane. **4**

4. Answer **any two** of the following : **10**

i) What is action of following reagents on propene ?

a) alk.KM_nO_4

b) $O_3/Zn+H_2O$

c) per acid

d) Raney Ni/200-300°C

e) Cl_2/CCl_4.

ii) Discuss nitration reaction with mechanism.

iii) What is geometrical isomerism ? Explain conditions for geometrical isomerism. Give geometrical isomers of maleic acid and fumaric acid.

5. Write notes on **any two** of the following : **10**

i) Inductive effect

ii) Types of reagents

iii) Discuss polymerisation and Diels-Alder reaction with respect to butadiene.

SLR-N – 42

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
CHEMISTRY (Paper – IV) (New)
Analytical Chemistry

Day and Date : Friday, 12-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *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 Wt. H = 1, C = 12, O = 16, N = 14, Na = 23, Cl = 35.5)

1. Choose the correct alternative and rewrite the sentence : **10**

1) The shape of liquid droplet is spherical due to _____
   a) Dipole moment b) Viscosity
   c) Surface tension d) Fluidity

2) If there is _____ of solute in second solvent, the distribution law can be modified as $k = \frac{c_1}{c_2(1-\alpha)}$.
   a) Association b) Dissociation
   c) Solvation d) Extraction

3) $N.m.^{-2}s.$ is the S.I. unit of _____
   a) Viscosity b) Surface tension
   c) Parachor d) Fluidity

4) In the mathematical representation of distribution law $k = \frac{c_1}{c_2}$, the constant K is called as _____
   a) Distribution coefficient b) Rate constant
   c) Temperature coefficient d) None of these

P.T.O.

5) Rock salt is an example of _____ ore.
   a) Sulphate b) Nitrate
   c) Halide d) Silicate

6) _____ gas is responsible for green house effect.
   a) SO_2 b) CO
   c) NO_2 d) CO_2

7) Sodium nitropruside is the reagent used for the detection of _____
   a) Carbon b) Nitrogen
   c) Sulphur d) None of these

8) Carbon is estimated by _____
   a) Carius method b) Liebig's method
   c) Kjeldahl's method d) Duma's method

9) Earth surface contains fresh water to the extent of _____
   a) 97.2% b) 23%
   c) 0.6% d) 6%

10) The compound used to treat cancer is _____
   a) Sodium Carbonate b) Cis-platin
   c) Magnesium hydroxide d) Aluminium phosphate

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

i) Give the types of pollution.

ii) Define the term Parachor. Give its Macleod's mathematical equation.

iii) Explain the following terms :
   a) Roasting
   b) Smelting.

iv) Illustrate the principle of carius method for estimation of halogen.

v) Name the minor nutrients of plants.

vi) In Lassaigne's test, why organic compound is fused with sodium metal ?

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

   i) Explain the various reactions takes place in different zones of blast furnace.

   ii) Explain the determination of molecular weight of organic acid by titration method.

   iii) What are air pollutants ? How are they classified ?

   B) At 298 K, an aqueous solution containing 0.0413 kg/dm^3 of Iodine is in equilibrium with CCl_4 solution. Containing 3.531 kg of Iodine per dm^3. If the solubility of Iodine in water is 0.34 kg/dm^3. What will be its solubility in CCl_4 ? **4**

4. Answer **any two** of the following : **10**

   i) Discuss the experimental determination of surface tension by drop-weight method.

   ii) Discuss in detail milk adulterants and their purpose.

   iii) An organic compound on analysis was found to contain 92.3% carbon and 7.7% hydrogen. Its molecular weight is 78. Calculate its molecular formula.

5. Answer **any two** of the following : **10**

   i) Explain any two applications of distribution of law in detail.

   ii) Define viscosity. Give its S.I. unit. Give Poiseuille equation. Sketch Ostwald's viscometer.

   iii) State and explain 'Antacid' products.

SLR-N – 44

Seat No.	

B.Sc. – I (Sem. – II) Examination, 2014
PHYSICS (Paper – III) (New)
Heat and Thermodynamics

Day and Date : Saturday, 13-12-2014 Max. Marks : 50

Time : 11.00 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 diagrams **wherever** necessary.*
*4) **Use** of logarithmic table is **allowed**.*

1. Select correct alternative. **10**

i) Clausius expression for mean free path is _____

a) $\lambda = \frac{4}{3\pi\sigma^2 n}$ b) $\lambda = \frac{3}{4\pi\sigma^2 n}$

c) $\lambda = \frac{1}{3\pi\sigma^2 n}$ d) $\lambda = \frac{1}{4\pi\sigma^2 n}$

ii) Coefficient of performance of refrigerator is always _____

a) less than 1 b) greater than 1

c) equal to 1 d) zero

iii) At room temperature hydrogen and helium gases showed _____ effect in Joule Thomson experiment.

a) heating b) cooling

c) null d) both a) and b)

iv) Any device which converts heat into mechanical work is called as _____

a) refrigerator b) cycle

c) air conditioner d) heat engine

P.T.O.

v) All natural processes are _____ processes.

a) isothermal b) adiabatic

c) irreversible d) reversible

vi) In adiabatic demagnetisation cooling method, the magnetic salt used was _____

a) diamagnetic b) ferromagnetic

c) ferrimagnetic d) paramagnetic

vii) In heat engine, if source temperature is 227°C and sink temperature is 27°C then its efficiency is _____

a) 0.4 b) 0.3 c) 0.2 d) 0.1

viii) First law of thermodynamics is given by _____

a) $dQ = dU - Pdv$ b) $dQ = dU + Pdv$

c) $dQ = dU + Vdp$ d) $dQ = dU - Vdp$

ix) The dependence of coefficient of viscosity η on the higher absolute temperature T of a gas is _____

a) $\eta \alpha T$ b) $\eta \alpha T^2$ c) $\eta \alpha \frac{1}{T}$ d) $\eta \alpha \sqrt{T}$

x) If the coefficient of viscosity of nitrogen is 2×10^{-4} C.G.S. unit and coefficient of thermal conductivity is 4×10^{-5} C.G.S. unit then molecular specific heat at constant volume C_v = _____ cal/gm.

a) 0.2 b) 0.02 c) 2 d) $^1/_2$

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

i) State the principle of air conditioning.

ii) Give any two properties of liquid helium.

iii) What are the conditions of system to be reversible ?

iv) Explain the effect of pressure on thermal conductivity of gas.

v) State the second law of thermodynamics.

vi) A Carnot's engine with its sink at 27 °C has an efficiency of 30%. What should be the temperature of source ?

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

   i) Give the comparison between otto and diesel engine.

   ii) Derive an expression for the work done in an isothermal change.

   iii) Calculate the mean free path of hydrogen molecules at N.T.P. if the diameter of hydrogen molecule is 2.5×10^{-8} cm. and the no. of molecules per cc is $2.7\times10^{+19}$ (Use Clausius expression).

   B) With the schematic diagram, describe Linde's method of liquefaction of air. **4**

4. Answer **any two** of the following : **10**

   i) Derive an expression for coefficient of viscosity of gas.

   ii) Deduce the relation PV^r = constant for an adiabatic change.

   iii) In a vapour compression machine, ammonia is used as a refrigerant. The temperature at which the refrigerator is maintained is – 15°C; while the temperature of coolent is 30°C. Calculate the coefficient of performance of the machine.

5. Answer **any one** of the following : **10**

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

   ii) Explain working of diesel engine, obtain expression for its efficiency.

SLR-N – 46

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
PHYSICS (Paper – IV) (New)
Electricity, Magnetism and Basic Electronics

Day and Date : Monday, 15-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. : *i) Figures to the **right** indicate **full** marks.*
*ii) **Use** of calculators and log table is **allowed**.*
*iii) **Neat** diagrams should be drawn **wherever** necessary.*
*iv) **All** questions are **compulsory**.*

1. Select correct alternative : **10**

i) The decay of current in L-R circuit is given by the equation_____

a) $I = I_o.e^{-R/L}$ b) $I = I_o.e^{\frac{-R}{L}t}$

c) $I = I_o.e^{\frac{R}{L}.t}$ d) $I = e^{\frac{-R}{L}t}$

ii) Discharging of condenser through resistance is given by the equation _____

a) $q = q_o \, . \, e^{-t/R}$ b) $q = q \, . \, e^{\frac{tC}{R}}$

c) $q = q_o \, . \, e^{\frac{-t}{RC}}$ d) $q = q_o \, . \, e^{\frac{-t}{C}}$

iii) The operator j on multiplication turns vector through _____

a) 180° b) 90° c) 45° d) 60°

iv) In purely inductive circuit, the phase of alternating current over the applied emf is _____

a) Lagging by $\frac{\pi}{2}$ b) Leading by $\frac{\pi}{2}$

c) Out of phase d) None of above

P.T.O.

v) The damping in ballistic galvanometer is due to _____
   a) Air damping
   b) Electromagnetic damping
   c) Both a) and b)
   d) None of above

vi) The unit of figure of merit of ballistic galvanometer is _____
   a) μA/mm
   b) mm/μA
   c) V/mm
   d) q/mm

vii) π-filter is also called as _____
   a) Resistor input filter
   b) Inductance input filter
   c) Capacitor input filter
   d) None of above

viii) An ideal reverse biased diode offers_____
   a) Infinite resistance
   b) Zero resistance
   c) Minimum resistance
   d) Moderate resistance

ix) Common collector amplifier has the highest _____
   a) Voltage gain
   b) Current gain
   c) Power gain
   d) Input impedance

x) _____ is the transistor amplifier configuration in which a phase change of 180° is produced between input and output signals.
   a) Common base configuration
   b) Common collector configuration
   c) Common emitter configuration
   d) None of above

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

i) Define sharpness of resonance and bandwidth for series resonance circuit.

ii) What is a rejector circuit ?

iii) Draw the circuit diagram of π-filter circuit.

iv) Define the term ripple factor and peak inverse voltage.

v) Find the values of current amplification factors β and γ, if $\alpha = 0.98$.

vi) Give the special features of common base mode.

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

   i) Explain positive and negative clipper.

   ii) Write a note on Owen's bridge.

   iii) In a common emitter connection V_{CC} is 8 volt and the voltage drop across the load resistance of 500 Ω connected in the collector circuit is 1 volt. If $\alpha = 0.95$, determine the collector-emitter voltage and the base current.

   B) Write a note on bridge rectifier. **4**

4. Answer **any two** of the following : **10**

   i) Explain sharpness of resonance in series L-C-R circuit.

   ii) Define clamper. Write a note on positive and negative clamper.

   iii) Explain with neat circuit diagram, working of transistor as common emitter amplifier.

5. Answer **any one** of the following : **10**

   i) Explain the principle, construction and working of ballistic galvanometer. Hence obtain the expression for charge through ballistic galvanometer.

   ii) Obtain the expression for charging and discharging of condenser through resistance.

SLR-N – 49

Seat No.	

B.Sc. – I (Sem. – II) Examination, 2014
ZOOLOGY (Paper – III) (New)
Animal Diversity – II

Day and Date : Tuesday, 16-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Select the appropriate answer and rewrite the sentence. **10**

1) Herdmania belongs to _____
   a) Cephalochordata b) Cyclostomata
   c) Urochordata d) Pisces

2) The larva of petromyzon is called _____
   a) tadpole b) fusiform larva
   c) ammocoetus larva d) axolottl larva

3) Cycloid scales are present in _____
   a) Labeo b) Scoliodon c) Dog Fish d) Shark

4) Bile of frog is _____ in nature.
   a) acidic b) neutral c) alkaline d) strongly acidic

5) Vocal Sacs are present only in _____ frog.
   a) male b) female
   c) male and female d) sterile

6) In frog the eggs are laid in bunches called as _____
   a) spawn b) amplexus c) stroma d) blastula

7) Cavity of pectoral girdle is _____
   a) glenoid cavity b) pulp cavity
   c) acetabular cavity d) chest cavity

P.T.O.

8) In Labeo all the gills are _____
   a) holobranch b) hemibranch c) demibranch d) half gills
9) The liver of frog secrete bile which is stored in _____
   a) pancreas b) gall bladder c) air bladder d) urinary bladder
10) In frog lung respiration is called as _____ respiration.
   a) skin b) partial c) cutaneous d) pulmonary

2. Write short notes on **(any five)** : **10**
   1) Salient features of agnatha
   2) Paired fins of fish
   3) Functions of scales in fishes
   4) Pancreas of frog
   5) Egg of frog
   6) Bile of frog.

3. A) Attempt **any two** of the following : **6**
   1) Neotany
   2) Hepatic Portal System of frog
   3) Ultra-filtration in frog.

   B) Functions of brain of frog. **4**

4. Answer **any two** of the following : **10**
   1) Digestion in stomach of frog
   2) White blood corpuscles of frog
   3) Ammocoetus Larva.

5. Answer **any one** of the following : **10**
   1) What is respiration ? Describe the lung respiration in frog.
   2) Describe the structure of gill in bony fish and add a note on mechanism of gill respiration.

_____

SLR-N – 5

Seat No.	

B.Sc. – I (Semester – I) (C.G.P.A. Pattern) Examination, 2014
PHYSICAL GEOGRAPHY (Paper – I)
Geomorphology

Day and Date : Wednesday, 5-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Draw ***neat*** *diagrams* ***wherever*** *necessary.*
3) ***Use*** *of stencils is* ***allowed****.*
4) Figures to ***right*** *indicate* ***full*** *marks.*
5) Solve ***each*** *Section in* ***separate*** *answer book.*

SECTION – I

1. Select the proper answer from the given below and rewrite the sentence : **5**

1) The cigar-shaped matter ejected from the primitive sun is called _____
   a) Filament b) Orbit
   c) Sun d) Star

2) Binary star hypothesis proposed by _____
   a) James Jeans b) Kant
   c) Russell d) Chamberline

3) The average density of the whole earth is about _____ gm/cm^3.
   a) 5.5 b) 6.5
   c) 7.5 d) 7.9

4) _____ is a example of metamorphic rock.
   a) Quartzite b) Dyke
   c) Laccolith d) Sills

5) Geomorphology is a significant branch of _____
   a) Physical Geography b) Human Geography
   c) Social Geography d) Cultural Geography

P.T.O.

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

i) Define the Earth.

ii) Define the term of 'Geomorphology'.

iii) Define the term of 'Metamorphic Rocks".

iv) Describe the term 'SIAL'.

v) Describe the term of Longitudinal wave.

vi) What is 'NIFE' ?

vii) What is volcanoes ?

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

i) Classification of Rocks

ii) Types of fold

iii) Chemical composition of Earth.

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

i) State the types of volcanoes and its distribution in the world.

ii) Write in brief the nature and scope of Geomorphology.

SECTION – II

1. Select the proper answer from the given below and rewrite the sentence : **5**

1) _____ is a chemical reaction between mineral and water.

a) Hydrolysis b) Hydration

c) Oxidation d) Carbonation

2) Cyclic concept was postulated first by _____ scientist.

a) Hutton b) Davis

c) Penk's d) Kant

3) According to W. M. Davis landforms undergo sequential changes through _____

a) Time b) Process

c) Erosion d) Weathering

4) Faceted rock boulders, cabbles and pebbles abraded by long periods of wind erosion are called _____

a) Ventifacts b) Yardangs c) Demoiselles d) Inselbergs

5) Rich dark, or ganic material in soil formed by decay of dead leaves and plants is called as _____

a) Minerals b) Humus c) Soil material d) Podosols

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

i) What is Abrasion ?

ii) Describe the concept of Alluvial fan.

iii) Describe the term of Barchan.

iv) What is N. P. K. of soils ?

v) Define the concept of cycle of erosion.

vi) Describe the concept of peneplain.

vii) Define the term of weathering.

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

i) What is fertility of soil ? Discuss the soil type on the basis of texture.

ii) Discuss the nutritive elements in the soil.

iii) State the different types of chemical weathering.

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

i) Describe the positive and negative aspects of Davis model.

ii) What is erosion ? State the different between erosion and weathering.

_____

SLR-N – 50

Seat No.	

B.Sc. – I (Semester – II) (New) Examination, 2014
STATISTICS (Paper – IV)
Probability and Probability Distribution – II

Day and Date : Wednesday, 17-12-2014 Max. Marks : 50

Time : 11.00 a.m. to 1.00 p.m.

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

*2) **All** questions carry **equal** marks.*

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

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

i) Let X be a discrete r.v. with means then E (2X – 5) is

a) 10 b) 7 c) 5 d) 0

ii) If (X, Y) is a bivariate r.v. with joint pmf

$$P(x, y) = \frac{x^2+y^2}{4} \quad \begin{matrix} x=0,1 \\ y=0,1 \end{matrix}$$

then P (y = 1) is

a) $\frac{3}{4}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) 1

iii) Variance of constant is

a) 1 b) 0 c) 0.5 d) Constant

iv) If X and Y are independent r.v. then

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

c) E (X+Y) = E(X) + E(Y) d) None of these

v) Five cards are drawn from a pack of cards without replacement. X denotes number of red cards then X has

a) Uniform distribution b) Binomial

c) Hypergeometric d) None of these

vi) For Binomial distribution the second central moment is

a) np b) n c) npq d) $\sqrt{npq}$

P.T.O.

vii) If $P_X(S)$ is probability generating function of X, then it will generate

a) Raw moments b) Central moments

c) Factorial moments d) None of these

viii) The correlation coefficient between X and Y is zero. We then conclude that

a) X and Y have same distribution

b) The variance of X and Y are same

c) There exists no relationship between X and Y

d) X and Y are independent

ix) If X has hypergeometric distribution with (20, 8, 5) then its mean is

a) 8 b) 2 c) 4 d) 5

x) Pgf of one point distribution taking value C is

a) 0 b) 1 c) S^X d) S^C

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

i) A r.v.X has following probability distribution. Obtain E(X)

X :	0	1	2
P(x):	0.3	0.4	0.3

ii) State additive property of Bernoulli distribution.

iii) Define 1st order and 2nd order factorial moments.

iv) The mean of a r.v.X is 30. Find the mean of $\frac{X-22}{4}$.

v) Prove that for binomial distribution mean is always greater than variance.

vi) State two real life situations where discrete uniform distribution can be used.

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

i) Prove E(aX + b) = aE(X) + b

ii) Let V(X) = 2 and V(Y) = K

Let X, Y are independent r.v. Such that V(3X – Y) = 25 find K.

iii) State and prove multiplication theorem on expectation.

B) Define two point distribution and obtain its mean. **4**

4. Attempt **any two** from the following : **10**

i) Obtain conditional mean and conditional variance of X given Y = 3 for the following probability distribution:

X \ Y	1	2	3
0	0.1	0.2	0.1
1	0.2	0.3	0.1

ii) Define Binomial distribution and obtain it's Pgf and hence find mean of Binomial distribution.

iii) Define Covariance of (X, Y) and obtain variance of linear combination of X and Y. (V(ax + by)).

5. Attempt **any one** of the following : **10**

i) The joint distribution of X and Y is given by

X \ Y	1	2	3
0	2K	K	K
1	K	K	2K
2	3K	K	0

Find : i) K

ii) P(X + Y = 2)

iii) P(X = Y)

iv) COV (X, Y)

ii) Define Pgf of a r.v. X. Prove that

a) $P_{ax+b}(S) = S^b . P_X(S^a)$

b) $P_{x+y}(S) = P_X(S) . P_Y(S)$ if (X, Y) are independent

c) $P_X(1) = 1$.

SLR-N – 51

Seat No.	

B.Sc. Part – I (Sem. – II) Examination, 2014
ZOOLOGY (Paper – IV) (New)
Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Wednesday, 17-12-2014 Total Marks : 50
Time : 3.00 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 diagrams* ***wherever*** *necessary.*

1. Rewrite the sentence by selecting appropriate answer : **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
   a) Habitat b) Biome c) Niche d) Habit

4) Rearing of silkworm is known as
   a) Apiculture b) Sericulture c) Floriculture d) Aquaculture

5) The basic functional unit of organisms and their environment interacting with each other and within their own component is called
   a) Ethology b) Biome c) Ecosystem d) Ecology

6) The soil transported by wind is called as
   a) Colluvial b) Alluvial c) Glacial d) Eolian

7) In ecosystem carnivores are
   a) Producers b) Primary consumers
   c) Secondary consumers d) Tertiary consumers

8) All food chains in a community together forms
   a) Pyramid b) Biome c) Climax d) Food substance

9) Palaeontology is the study of past life based on
   a) Anatomy b) Fossil records c) Morphology d) Physiology

10) ———————— is first phase in the process of formation of ecological sucession.
   a) Climax b) Invasion c) Rection d) Nudation

2. Answer **any five** of the following : **10**
   i) Mimicry.
   ii) Scope of ecology.
   iii) Parasitism.
   iv) What is petrification ?
   v) Herbivores.
   vi) Vestigial organs.

3. A) Answer **any two** of the following : **6**
   i) What are the biotic factors ?
   ii) What is mimicry ? Explain it with example.
   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 as temperature. Add a note on their influence on ecosystem.
   iii) Explain social behaviour observed in Honeybee.

5. Answer **any one** of the following : **10**
   i) Give an account of vermicomposting.
   ii) What is mimicry ? How it helps in survival of an organism ?

———————

SLR-N – 52

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MATHEMATICS (Paper – III) (New)
Geometry

Day and Date : Thursday, 18-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 the point are $\left(6, \frac{\pi}{6}\right)$, then its Cartesian co-ordinates are _____

a) $\left(6, \frac{\sqrt{3}}{2}\right)$ b) $\left(6, \frac{1}{2}\right)$ c) $(3\sqrt{3}, 3)$ d) $(3, 3\sqrt{3})$

2) The equation $8x^2 + 5y^2 - 4xy + 4x - 10y - 31 = 0$ represents _____
a) Straight line b) Ellipse c) Parabola d) Hyperbola

3) The polar equation of $xy = 2$ is _____
a) $r = \cos\theta$ b) $r = \sin\theta$ c) $r = \sin 2\theta$ d) $r^2 \sin 2\theta = 4$

4) The angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$ is _____

a) $\frac{\pi}{2}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{6}$ d) $\frac{\pi}{4}$

5) The equation of a plane passing through the point $(4, 5, -6)$ and parallel to the plane $2x + 3y + 5z + 6 = 0$ is _____
a) $2x + 3y + 5z - 7 = 0$ b) $2x + 3y + 5z + 6 = 0$
c) $2x + 3y + 5z - 6 = 0$ d) $2x + 3y + 5z + 7 = 0$

P.T.O.

6) The intercept made by the plane $3x + 4y + 6z = 12$ on Y-axis is _____

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

7) The distance of a point (3, 4, 2) from the plane $6x – 2y + 3z + 7 = 0$ is _____

a) $\frac{13}{7}$ b) $\frac{3}{7}$ c) $\frac{23}{7}$ d) $\frac{6}{7}$

8) The centre and radius of the sphere $x^2 + y^2 + z^2 + 2x – 4y – 6z + 5 = 0$ is _____

a) (–1, 2, 3), 3 b) (–1, 2, 3), 2
c) (–1, 2, 3), 4 d) (–1, 2, 3), 5

9) The equation of the sphere whose diameter is the line joining A(3, 4, – z) and B(– 2, –1, 0) is _____

a) $x^2 + y^2 + z^2 – x + 3y – 2z – 10 = 0$
b) $x^2 + y^2 + z^2 – x – 3y + 2z + 10 = 0$
c) $x^2 + y^2 + z^2 – x – 3y + 2z – 10 = 0$
d) $x^2 + y^2 + z^2 + x – 3y + 2z + 10 = 0$

10) Intersection of two spheres is _____

a) circle b) straight line
c) sphere d) hyperbola

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

1) If the origin is shifted to a point (1, – 2) keeping the axes parallel, find the new equation of a conic given by the equation $2x^2 + y^2 – 4x + 4y = 0$.

2) Find the polar form of the following Cartesian equation $x^2 + y^2 = 2ax$.

3) Find the angle between the planes $2x + 3y + 6z + 10 = 0$ and $x – 2y + 2z + 5 = 0$.

4) Find the euqation of the plane through the points P(2, 2, –1), Q(3, 4, 2) and R(7, 0, 6).

5) Find the tangent plane at (2, 6, 3) to the sphere $x^2 + y^2 + z^2 = 49$.

6) Find the radical plane of the spheres $x^2 + y^2 + z^2 – x + 2y – 5z + 12 = 0$ and $x^2 + y^2 + z^2 + 4x – y + 3z + 10 = 0$.

3. A) Attempt **any two** from the following : **6**

   1) Transform the equation
   $x^2 + y^2 + 4xy = a^2$ when the axes are rotated through an angle 45°.

   2) Find the equation of the plane passing through (1, 3, 1) and perpendicular to two planes $x + 2y + 2z = 7$ and $3x + 3y + 2z = 5$.

   3) Obtain the equation of sphere through the four points (0, 0, 0), (a, 0, 0), (0, b, 0) and (0, 0, c).

   B) Show that the equation of the plane whose normal form the origin has the direction cosines l, m,n and the length p is $lx + my + nz = p$. **4**

4. Attempt **any two** from the following : **10**

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

   2) Find the equation of the plane through A(–1, 1, 1) and B(1, –1, 1) and perpendicular to the plane $x + 2y + 2z = 5$.

   3) Show that the condition for orthogonal intersection of two spheres

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

   $x^2 + y^2 + z^2 + 2u'x + 2v'y + 2w'z + d' = 0$

   is $2uu' + 2vv' + 2ww' = d + d'$.

5. Attempt **any one** from the following : **10**

   1) a) Show that the equation of a plane, in terms of its intercepts a, b, c which it makes on the axes is $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$.

   b) Find the equation of the plane which is perpendicular to the plane $5x + 3y + 6z + 8 = 0$ and which contains the line of intersection of the planes $x + 2y + 3z – 4 = 0$ and $2x + y – z + 5 = 0$.

   2) a) Show that the equation of tangent plane to the sphere $x^2 + y^2 + z^2 = a^2$ at point (x_1, y_1, z_1) is $xx_1 + yy_1 + zz_1 = a^2$.

   b) Find the two tangent planes to the sphere $x^2 + y^2 + z^2 – 4x + 2y – 6z + 5 = 0$ which are parallel to the plane $2x + 2y – z = 0$.

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SLR-N – 54

Seat No.	

B.Sc. – I (Sem. – II) Examination, 2014
MATHEMATICS (Paper – IV) (New)
Differential Equations

Day and Date : Friday, 19-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions *: 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 general solution of differential equation $\left(\sqrt{1-x^2}\right)dy+\left(\sqrt{1-y^2}\right)dx=0$ is _____

a) $\sin^{-1}y + \cos^{-1}x = c$ b) $\sin^{-1}x + \sin^{-1}y = c$

c) $\sin^{-1}x + \cos^{-1}y = c$ d) $\cos^{-1}x + \sin^{-1}y = c$

2) A function $f(x, y) = 3x^2 - 8xy + y^2$ is homogeneous function of degree _____

a) 1 b) 2

c) 3 d) 4

3) The differential equation $(x^4 - 2xy^2 + y^4)\,dx - (2x^2y - 4xy^3 + \text{siny})\,dy = 0$ is _____

a) non exact b) of variable separable

c) exact d) of second order

4) The differential equation $(y + x + 5)\,dy = (y - x + 1)\,dx$ can be reduces to $\frac{dy'}{dx'}=\frac{y'-x'}{y'+x'}$ by substitutions _____

a) $x = x' - 2, y = y' - 3$ b) $x = x' - 2, y = y' + 3$

c) $x = x' + 2, y = y' - 3$ d) $x = x' + 2, y = y' + 3$

P.T.O.

5) The integrating factor of $\frac{dx}{dy} + Px = Q$, where P and Q are functions of y, is given by _____

a) $e^{\int P dx}$ b) $e^{\int P dy}$

c) $e^{\int Q dx}$ d) $e^{\int Q dy}$

6) The general solution of the differential equation

$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 4y = 0$ is _____

a) $y = c_1e^x + c_2e^{4x}$ b) $y = c_1e^x + c_2e^{5x}$

c) $y = c_1e^{-x} + c_2e^{-4x}$ d) $y = c_1e^{-x} + c_2e^{5x}$

7) The general solution of $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 10y = 0$ is _____

a) $y = e^x (c_1 \cos 4x + c_2 \sin 4x)$ b) $y = e^x (c_1 \cos 3x + c_2 \sin 3x)$

c) $y = e^{-x} (c_1 \cos 3x + c_2 \sin 3x)$ d) $y = e^{-x} (c_1 \cos 4x + c_2 \sin 4x)$

8) Meaning of $\frac{1}{D} X$ is _____

a) $\frac{d}{dx} X$ b) $e^{ax} \int X \cdot e^{-ax} dx$

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

9) The value of $\frac{1}{D+2} \cdot \sin x$ is _____

a) – cos x b) sin x

c) – sin x d) cos x

10) The particular integral of $\frac{1}{D-2} \cdot e^x$ is

a) e^x b) e^{-x}

c) $-e^x$ d) $-e^{-x}$

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

1) Solve :

$$y\sqrt{1-x^2}\cdot dy + x\sqrt{1-y^2}\cdot dx = 0\cdot$$

2) Solve :

$(\sin x.\cos y + e^{2x})\, dx + \cos x.\sin y + \tan y)dy = 0.$

3) Solve :

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

4) Solve :

$$\frac{d^3y}{dx^3} - 6\frac{d^2y}{dx^2} + 11\frac{dy}{dx} - 6y = 0\ .$$

5) Solve :

$(D^2 + 1)\, y = 0.$

6) Evaluate $\frac{1}{D^2}\cdot x^4$.

3. A) Attempt **any two** from the following : **6**

1) Solve :

$(\sin x\ .\ \cos y + e^{2x})\, dx + (\cos x\ .\ \sin y + \tan y)\, dy = 0$

2) Solve :

$$\frac{dy}{dx} = \frac{2x+3y+4}{4x+6y+5}$$

3) Solve :

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = x$$

B) Show that

$$\frac{1}{D-a}\cdot X = e^{ax}\int X\cdot e^{-ax}\cdot dx\ .$$ **4**

4. Attempt **any two** from the following : **10**

   1) Solve :

   $$\left(y + \frac{y^3}{3} + \frac{x^2}{2}\right)dx + \frac{1}{4}(1+y^2)x\,dy = 0$$

   2) Solve :

   $$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = \cos 3x .$$

   3) Prove that

   $$\frac{1}{F(D)} \cdot e^{ax} = \frac{x^2}{2!} \cdot \frac{1}{\psi(a)} \cdot e^{ax}$$

   where $F(D) = (D - a)^2\ \psi\ (D)$ and $\psi(a) \neq 0$.

5. Attempt **any one** from the following : **10**

   1) Explain the method of solving the Bernoulli's differential equation

   $\frac{dy}{dx} + Py = Qy^n$, where P and Q are functions of x only.

   Hence, solve

   $$(1 - x^2)\ \frac{dy}{dx} + xy = xy^2$$

   2) If $F(D)\ Y = e^{ax}.\ V$

   where V is a function of x only and F(D) is polynomial in $D = \frac{d}{dx}$, then show

   that $\frac{1}{F(D)}\left[e^{ax} \cdot V\right] = e^{ax} \cdot \frac{1}{F(D+a)} \cdot V$

   Hence, solve $\frac{d^2y}{dx^2} + 4y = xe^{2x}$.

SLR-N – 56

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
ELECTRONICS (Paper – III) (New)
Electronic Devices

Day and Date : Saturday, 20-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Use*** *of log-table and calculator is* ***allowed****.*
4) ***Draw*** *the neat and labelled diagram,* ***wherever*** *necessary.*

1. Select correct alternative for the following : **10**

i) The energy gap in a semiconductor _____
   a) increases with temperature
   b) does not change with temperature
   c) decreases with temperature
   d) overlapping takes place

ii) The LED formed by GaAs emits radiations mostly in_____
   a) Ultra-violet region b) Visible region
   c) Blue-green radiations d) Infra-red-region

iii) At O°K, pure semiconducting material, acts as _____
   a) insulator b) conductor
   c) semiconductor d) resistor

iv) Acceptor impurities, in semiconductor creates _____
   a) Excess electrons b) Excess holes
   c) Both a) and b) d) None of these

v) The SCR is the abbreviation of _____
   a) Silicon Conducting Resistor b) Silicon Controlled Resistor
   c) Silicon Controlled Rectifier d) Silicon Conducting Rectifier

vi) The triac is device which conducts during _____ of input voltage.

a) Positive half cycle

b) Negative half cycle

c) Both positive and negative half cycle

d) None of these

vii) The measured value of β for given transistor is 199 then, what will be the α value of that transistor ?

a) 0.95 b) 0.99

c) 0.905 d) 0.995

viii) In BFWIO ; n-channal JFET the charge carriers are _____

a) electrons b) holes

c) both electrons and holes d) negative ions

ix) The principle used in varactor diode, is variation of_____

a) resistor b) capacitor

c) inductor d) carriers

x) For given transistor, the following current equation is true, according to KCL.

a) $I_B = I_C + I_E$ b) $I_C = I_E + I_B$

c) $I_E = I_B - I_C$ d) $I_E = I_C + I_B$

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

i) Why npn transistor is mostly used in application than pnp transistor ?

ii) Draw the I-V characteristics of tunnel diode.

iii) Give two points of compression between depletion and enhancement MOSFET.

iv) Draw the symbol of LED and photo-diode with labels.

v) Name the semiconductor devices having trans-resistance and trans-conductance features.

vi) Determine amplification factor (μ) of JFET, having drain resistance = 200 kΩ and trans-conductance = 2.5×10^{-4} mohs.

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

   i) Explain the effect of temperature on the barrier potential of the p-n junction.

   ii) Write a note on construction of UJT.

   iii) State and give the interpretation of diode equation.

   B) A JFET has parameters of $V_{GS(off)}$ equal to –20 volts and I_{DSS} equal to 12 mA then determine the value of drain current for V_{GS} equal to –5 volts. **4**

4. Answer **any two** of the following : **10**

   i) Write a note on LED's.

   ii) Define current gain of CB and CE configuration. How they are related to each other ?

   iii) Explain the construction and working of MOSFET.

5. Answer **any one** of the following : **10**

   i) Explain how hybrid parameters are utilized, for common emitter configuration of transistor ; with its equivalent circuit.

   ii) Explain the working of SCR with the help of its I-V characteristics; with effect of gate current.

SLR-N – 58

Seat No.	

B.Sc. – I (New) (Semester – II) Examination, 2014
GEOLOGY (Paper – III)
Introduction to General Geology

Day and Date : Saturday, 20-12-2014 Max. Marks : 50
Time : 3.00 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*** *necessary.*

1. Fill in the blanks with correct answer from the given options : **10**

1) The causes of "Tsunami" is _____
   a) Volcano b) Earthquake in the sea
   c) Moon's attraction d) Fissure eruption

2) The shooting star is a _____
   a) Asteroid b) Comet
   c) Meteorite d) Meteor

3) The _____ planet has least density.
   a) Earth b) Mars
   c) Venus d) Saturn

4) The point on earth surface where L waves are generated is _____
   a) Focus b) Epicentre
   c) Centre d) None of these

5) The discontinuity between crust and mantle of the earth is _____
   a) Conrad b) Gutenberg
   c) Mohorovicic d) Lehman

P.T.O.

6) 90% of earthquakes occur in _____ belt.

a) Trans-Mediterranean b) Asiatic

c) Circum Pacific d) Mid Oceanic

7) Second abundant gas released by a volcano is _____

a) Stream b) Carbon dioxide

c) Nitrogen d) Hydrogen

8) The opening through with hot water and steam erupts at regular interval is _____

a) Geysers b) Fumaroles

c) Hot spring d) Solfators

9) Centre of the galaxy is surrounded by an ellipse of oldest stars is _____

a) Halo b) Black hole

c) Smoky ring d) Supermassive stars

10) Continents are _____ features on the earth.

a) 3^{rd} order b) 2^{nd} order

c) 1^{st} order d) 4^{th} order

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

1) Density of earth.

2) Focus

3) Hydrosphere

4) Earthquake zones of India

5) Equinox

6) Rotation of earth.

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

   1) Revolution of earth

   2) Structure of volcano

   3) Fissure eruptions.

   B) Write note on : **4**

   Galactic movements.

4. Answer **any two** of the following : **10**

   i) Describe solar system.

   ii) Modern theories of origin of earth.

   iii) Describe Internal structure of earth.

5. Answer **any two** of the following : **10**

   i) Describe precautions of earthquake.

   ii) Explain principal divisions of earth.

   iii) Expalin products of volcano.

SLR-N – 6

Seat No.	

B.Sc. – I (Sem. – I) Examination, 2014
(C.G.P.A. Pattern)
STATISTICS (Paper – I)
Descriptive Statistics, Probability and Probability Distributions – I

Day and Date : Friday, 7-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

SECTION – I

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

1) With help of an ogive curve; one can not determine
   a) Median b) Quartiles
   c) Percentiles d) None of these

2) Median of an arranged data is the
   a) Most frequent value b) Minimum value
   c) Maximum value d) Middle most value

3) In order to compare the variability of different groups, the best measure is
   a) Range b) S. D.
   c) C. V. d) None of these

4) The first order moment about 5 is 7, then the mean is equal to
   a) 5 b) 7
   c) 12 d) None of these

5) The Bowley's coefficient of skewness lies between
   a) – 1 and 1 b) 0 and 1
   c) –1 and 0 d) None of these

P.T.O.

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

i) What do you mean by inclusive method and exclusive method of class interval ?

ii) What is class mark and class interval ?

iii) Define median and mode.

iv) State empirical relation between mean, median and mode. Use it to find mode of the distribution whose mean is 78 and median is 72.

v) Define quartile deviation and mean deviation.

vi) State the combined variance formula.

vii) Write a note on Sheppard's correction.

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

i) Explain the construction of cumulative frequency (Ogive) curves.

ii) Show that sum of deviation taken from mean is zero.

iii) What is the effect of change of origin and scale on S.D.

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

i) Define A.M.,G.M.,H.M. for any two positive observations a and b show that A.M. $\geq$, G.M. $\geq$, H.M.

ii) Define raw and central moments. Obtain the first four central moments in terms of raw moments.

SECTION – II

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

1) Probability lies between

a) 0 to 1 b) – 1 to 0

c) – 1 to 1 d) $-\infty$ to $+\infty$

2) The probability of obtaining a total of 7 in a throw of two dice is

a) Maximum b) Minimum

c) One d) Zero

3) If for two events A and B $P(A \cup B) = 1$, then A and B are

a) Mutually exclusive events b) Equally likely events

c) Dependent events d) Exhaustive events

4) P(B/A) is defined only when

a) A is sure event b) B is a sure event

c) A is not an impossible event d) B is an impossible event

5) Let a sample space S = $\{X_1, X_2, X_3\}$ which of the following defines probability measure on S.

a) $P(X_1) = 1/4$ $P(X_2) = \frac{1}{3}$ $P(X_3) = \frac{1}{3}$

b) $P(X_1) = 0$ $P(X_2) = \frac{1}{3}$ $P(X_3) = \frac{2}{3}$

c) $P(X_1) = \frac{2}{3}$ $P(X_2) = \frac{1}{3}$ $P(X_3) = \frac{2}{3}$

d) None of these

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

i) Define mutually exclusive event giving one example.

ii) If A is subset of B then prove that $P(A) \leq P(B)$.

iii) A committee of 3 is to be formed from a group of 6 boys and 4 girls. Find the probability that committee consist of all boys ?

iv) Prove that if A, B are mutually exclusive events then

$$P(A \cup B/C) = P(A/C) + P(B/C)$$

v) State Baye's theorem.

vi) Verify whether the following function of X can be looked upon as pmf.

$$P(x) = \frac{x-3}{10} \quad x = 1, 2, 3, 4, 5$$

vii) State axioms of probability measure.

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

i) For any two events A and B prove that

$$P(A \cap B) \leq P(A) \leq P(A \cup B)$$

ii) Let S = {1, 2, 3, 4} and A = {1, 2} B = {1, 3} C = {1, 4} show that A, B, C are pairwise independent.

iii) If A and B are independent events then prove that

i) A and $\overline{B}$ are independent

ii) $\overline{A}$ and B are independent.

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

i) A r.v.X has the probability mass function given by

X :	0	1	2	3	4	5	6	7	8
P(x) :	a	3a	5a	7a	9a	11a	13a	15a	17a

Find :

i) a

ii) $P(X > 4)$

iii) $P(0 \leq X \leq 7 / X > 4)$

iv) Median of X

v) Distribution function of X.

ii) The probabilities of A, B and C becoming managers are $\frac{4}{9}, \frac{2}{9}$ and $\frac{1}{3}$ respectively. The probabilities that the employment insurance scheme will be introduced if A, B, C become managers are $\frac{3}{10}$, $\frac{1}{2}$ and $\frac{4}{5}$ respectively.

i) What is the probability that the employment insurance scheme will be introduced.

ii) If the employment insurance scheme has been introduced; what is the probability that the manager appointed was A.

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SLR-N – 60

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
ELECTRONICS (Paper – IV) (New)
Digital Electronics

Day and Date : Monday, 22-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Neat diagram must be drawn ***whenever*** *necessary.*

1. Select the correct alternative for the following : **10**

i) Maximum value of sourcing current in TTL is _____
a) 1 mA b) 1.6 mA c) 16 mA d) 40 μA

ii) TTL has _____ input transistor.
a) Normal b) Multi collector
c) Multi base d) Multi emitter

iii) IC 7447 is _____
a) Encoder b) Decoder c) Multiplexor d) Counter

iv) _____ number of AND gates used in demultiplexer 4:1.
a) Four b) Three c) Two d) One

v) RS flipflop is set when _____
a) R = S = 0 b) R = S= 1 c) R = 0, S = 1 d) R = 1, S = 0

vi) T flipflop can be used as _____
a) Decoder b) Encoder c) Multiplexer d) Counter

vii) Mod 5 counter requires minimum _____ flipflops.
a) Five b) Three c) Two d) One

viii) In case of shift register SIPO mem. _____
a) Serial input parallel output b) Standard input present output
c) Serial input present out put d) Standard input parallel output

P.T.O.

ix) _____ number of control lines required in 4 : 1 multiplexer.

a) Four b) Three c) Two d) One

x) _____ IC is universal 4 bit shift register.

a) 7400 b) 7447 c) 7490 d) 7495

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

i) What is meant by propagation relay in TTL ?

ii) What is encoder ?

iii) Differentiate between MUX and DEMUX.

iv) Draw truth table of JK flipflop.

v) What is meant by combination counter ?

vi) Draw 4 bit PIPO shift register diagram.

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

i) Draw the diagram of 3 : 8 decoder.

ii) Differentiate between synchronous and asynchronous counter.

iii) Draw the diagram of left shift register using IC 7495.

B) Draw the timing diagram of decode counter. **4**

4. Answer **any two** of following : **10**

i) Explain TTL NAND gate.

ii) Explain Mod 5 counter.

iii) Explain 1 : 4 demultiplexer.

5. Answer **any one** of the following : **10**

i) Explain BCD to decimal decoder.

ii) Explain 4 bit asynchronous counter.

SLR-N – 62

Seat No.	

B.Sc. – I (Sem. – II) Examination, 2014
GEOLOGY (Paper – IV) (New)
Introduction to Physical Geology

Day and Date : Monday, 22-12-2014 Max. Marks : 50
Time : 3.00 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*** *necessary.*

1. Fill in the blanks with correct answer from the given options. **10**

1) A valley is a longitudinal depression whose cross section is _____ shaped.
   a) U b) V c) S d) W

2) Materials occupying beneath the surface upto solid rock are collectively termed as _____
   a) Etch plains b) Tors c) Karren d) Regolith

3) A _____ is formed when it is parallel to the sea shore.
   a) Bar b) Spit c) Hook d) Tombolo

4) _____ are formed where a glacier flows from the mountains into the sea.
   a) Cirques b) Fjords c) Crevasses d) Aretes

5) _____ are the flat areas in front of the continental ice sheets become the sites of deposition for a large part of the glaciofluvial deposits.
   a) Eskers b) Outwash plains
   c) Kettles d) Kames

6) Continents of polar region are covered by ice sheets are called as _____
   a) middle latitude deserts b) topographic deserts
   c) low latitude deserts d) polar deserts

7) A basin which is bordered by mountains is known as _____
   a) Bolson b) Bajadas c) Pediment d) Barchan

P.T.O.

8) _____ river changes its work from erosion to deposition.
   a) Young b) Old c) Mature d) None of these

9) Highest point of the river is called as _____
   a) Head b) Mouth c) Channel d) Bed

10) The removal of loose materials by the blowing action of wind is called _____
   a) deflation b) corrasion c) abrasion d) saltation

2. Answer **any five** of the following : **10**
   1) Activity of organisms in weathering
   2) Name the products of weathering
   3) Alluvial fans
   4) Beaches
   5) Erratics
   6) Ventifacts.

3. A) Answer **any two** of the following : **6**
   1) Tors
   2) Eskers
   3) Yardangs

   B) Write note on : **4**
   Chemical weathering.

4. Answer **any two** of the following : **10**
   1) Describe erosional features, river piracy and rapids by stream.
   2) Explain glacial movement.
   3) Explain kinds of deserts.

5. Answer **any two** of the following : **10**
   1) Describe any three types of sand dunes.
   2) Explain erosional features, wave cut terrace and sea notch of ocean.
   3) Describe varves and moraines, depositional features of glaciers.

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SLR-N – 64

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
ENGLISH (Compulsory) (Old)
Realms of Gold

Day and Date : Wednesday, 10-12-2014 Max. Marks : 50
Time :11.00 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 choosing the correct alternative : **10**

i) Swami Vivekananda left Bombay on _____
   a) 31st May 1893 b) 31st May 1983
   c) 28th Sept. 1893 d) 15th Aug. 1993

ii) The Maharaja of _____ had taken Vivekananda's ticket on the boat for him.
   a) Bengal b) Khetri
   c) Nepal d) Kolhapur

iii) A scientist regards disease as a manifestation of _____ law.
   a) Artificial b) Court
   c) Natural d) God's

iv) The red planet Mars is called as the _____
   a) Distant planet b) Smallest planet
   c) Child of the sun d) God of war

v) The Negro tenant requested the landlord to repair broken _____ of his cottage.
   a) Steps b) Door
   c) Wall d) Roof

vi) The title of the poem 'Ecology' means the branch of _____
   a) Botany b) Biology
   c) Zoology d) Geography

P.T.O.

vii) My sister _____ in a medical college at Karad.

a) Study b) Studying

c) Studies d) To study

viii) Bhimsen Joshi _____ a great classical singer.

a) are b) is

c) was d) has

ix) The match _____ at 9.30 tomorrow morning.

a) begin b) will begin

c) began d) can begin

x) He _____ since fifteen years.

a) works b) is worked

c) worked d) is working

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

i) Describe the speech that Vivekananda gave at the Parliament of Religions.

ii) How did the fate help Vivekananda in returning back to Chicago from Boston ?

iii) State two ways in which science affects the average man or woman.

iv) What is a light year ? Explain.

v) What do you know about Jupiter ?

vi) Who are the real enemies of man and how are they to be conquered ?

3. A) Write short answers to the following questions (**any two**) : **6**

i) How does the poem present a story through the words of two speakers followed by newspaper headlines ?

ii) How does the landlord respond to his tenants request to have his place repaired ?

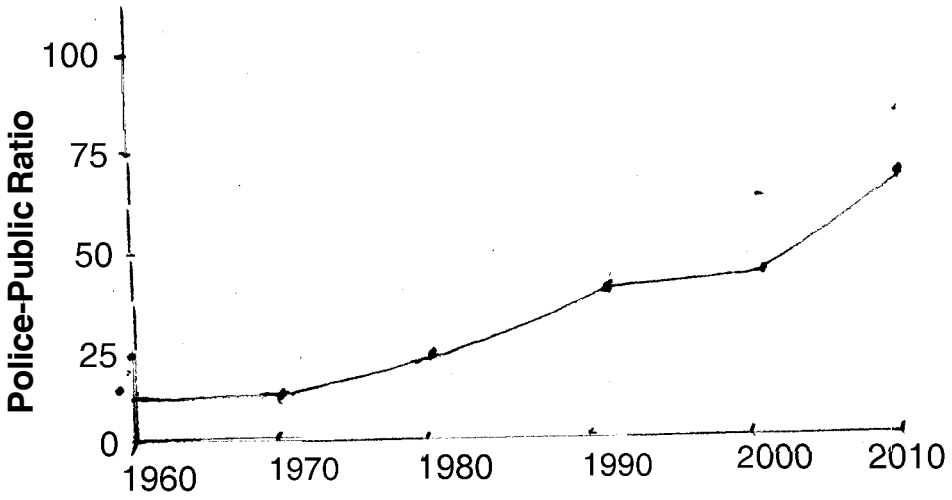
iii) What according to the mother, is the story of the origin of the Champak tree ?

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

i) You wish to support 'Lokpal Bill' movement run by Anna Hajare. Write an e-mail letter with reference to day, date and opinion to join it.

ii) Write a short paragraph on the following graph :

Police-Public ration in Maharashtra during 1960-2010



iii) Draw a bar chart for the above police-public ration during 1960-2010.

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

i) Read the following passage carefully and make a note on it.

Unfortunately, the most serious water-pollution threats are those which cannot be seen, smelt or picked up by the handful. The organic content in man domestic water supplies which have been treated to some degree is apparently still high enough to protest viruses from the effect of chlorine. Hence tap water is a suspected transmission route for the alarming rise in the infectious hepatitis in the United States today. Moreover, the vast array of Chemicals which industry spreads into the environment in many cases defies filtration. These chemicals now pervade not only rivers, lakes and even oceans but also the vast reservoirs of ground water. As with air pollutions, their possible toxic effects have in most cases not even been adequately catalogued. Many of course, are know to be fatal to fish, which is the mainstay of high quality protein suppliers in much of the world.

ii) Write a brief newspaper report on 'A Railway Accident' which you have seen recently.

5. Draft out an advertisement on 'New Shopping Mall' which has recently opened in your town. **10**

SLR-N – 66

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE (Old)
Computer Fundamentals – II (Paper – III)

Day and Date : Thursday, 11-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) Window is a _____ operating system.
   a) Multitasking single user b) Single tasking single user
   c) Multitasking multiuser d) All of above

2) _____ application in windows is used for creating, viewing, editing bitmap images.
   a) Paint b) Wordpad c) Notepad d) Text

3) The ability of a computer to run more than one program simultaneously is _____
   a) Multiprogramming b) Multiprocessing
   c) Multitasking d) Multithreading

4) URL stands for _____
   a) Universal Resource Locator b) Uniform Resource Locator
   c) Uni Resource Locator d) All of the above

5) The modem speed or data transfer rate is measured in _____
   a) Kbps b) Mbps c) Bps d) Gbps

6) _____ is shortcut key for paste.
   a) Ctrl + V b) Ctrl + X c) Ctrl + C d) Ctrl + S

7) A worksheet can have a maximum of _____ number of rows.
   a) 65,536 b) 1,024 c) 256 d) 128

P.T.O.

8) Which of the following tag is use to define a paragraph ?

a) <paragraph> b) <para> c) <pr> d) <p>

9) MS-EXCEL is an _____ software.

a) Application b) System c) Operating d) Hardware

10) WWW stands for _____

a) Word While Web b) World Wide Web

c) Web Wide World d) World Web Wide

2. Write the answer of the following questions (**any five**) : **10**

1) What is windows operating system ?

2) What is multiprogramming ?

3) What is an HTML ?

4) Explain the uses of internet.

5) Define the term Anchor tag.

6) What is Microsoft Excel ?

3. A) Write the answer of the following question (**any two**) : **6**

1) What is windows modulus ? Explain the control panel.

2) Define word processors. Explain features of MS-Word.

3) Explain the following tags with example :

i) <img> ii) <Li>

B) What are the difference between DOS and Windows O.S. ? **4**

4. Write answer of the following question (**any two**) : **10**

1) Define Computer Network. Explain different types of Network.

2) Define the Word Processor. Explain features of MS-Word.

3) What is Frame ? Explain <frameset> tag in details.

5. Write answer of the following question (**any two**) : **10**

1) What is Process Management ? Explain the time sharing and multiprocessing.

2) What is Table ? Explain <Table> tag in details.

3) What is internet ? Explain evaluation of internet.

_____

SLR-N – 68

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
COMPUTER SCIENCE (Paper – IV) (Old)
Programming Using 'C' – II

Day and Date : Friday, 12-12-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) By default function return _____ type value.
   a) int b) char c) float d) void

2) All static variables are automatically initialized to _____
   a) One b) Two c) Three d) Zero

3) _____ operator is used to access value of variable through its pointer.
   a) * b) & c) + d) –

4) 'C' is what kind of language ?
   a) Machine b) Assembly c) Procedural d) None

5) Execution of 'C' program ends from _____ function.
   a) getch() b) getchar() c) gets() d) main()

6) Using file concept, we can store data permanently on secondary storage device.
   a) True b) False

7) The _____ operator is used to access structure members.
   a) . b) * c) & d) +

8) _____ function modifies the size of previously allocated memory space.
   a) malloc() b) calloc() c) realloc() d) free()

P.T.O.

9) The value of _____ variable is accessed within every function of program.
   a) Global b) Local c) Formal d) Actual

10) _____ type of pointer can holds address of any type variable.
   a) int b) float c) char d) void

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

1) Define “chain of pointer”.

2) What is actual and formal parameter ?

3) What is file ?

4) What is static memory allocation ?

5) List out different storage classes in ‘C’ language.

6) Define “Union”.

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

1) Write the difference between structure and union.

2) What is pointer ? List out rules to declare the pointer.

3) Explain fprintf() in details.

B) Write a program to check entered number is even or odd by using pointer. **4**

4. Answer **any two** of the following : **10**

1) Write a program to reverse the entered number of function without argument, without return value.

2) Explain self referential structure with example.

3) Explain malloc() and calloc() functions.

5. Answer **any two** of the following : **10**

1) Explain ‘Recursion’ with example.

2) Explain getw() and putw() functions.

3) Write a program to accept and display student record by using structure.

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SLR-N – 7

Seat No.	

B.Sc. (Part – I) (Semester – I) Examination, 2014
ZOOLOGY (Paper – I) (CGPA Pattern)
Animal Diversity and Cell Biology and Genetics – I

Day and Date : Friday, 07-11-2014 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *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) Sycon belongs to phylum _____
   a) Protista b) Monera
   c) Porifera d) Annelida

2) In Hydra function of nematocyst is _____
   a) Digestion b) Respiration
   c) Excretion d) Protection

3) In earthworm gizzard is present in segment number _____
   a) 8 b) 5 c) 10 d) 12

4) Scolex of tapeworm shows _____ suckers.
   a) Two b) Four c) Three d) Six

5) Spicules of sycon are secreted by _____
   a) Porocytes b) Choanocytes
   c) Scleroblasts d) Pinacocytes

P.T.O.

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

i) Salient features of porifera.

ii) Tentacles of Hydra.

iii) Economic importance of earthworm.

iv) Archaeocytes of Sycon.

v) Cyclosis in Paramecium.

vi) Endothelia-gland cells of Hydra.

vii) Scolex of Tapeworm.

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

i) Enlist the types of locomotion in Hydra.

ii) Describe contractile vacuole in Paramecium.

iii) Septal nephridium of earthworm.

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

i) Give different types of adaptations in Tapeworm.

ii) Describe digestive system of earthworm.

SECTION – II
(Cell-Biology and Genetics – I)

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

1) In scanning electron microscope the specimen forms _____ image.

a) Two dimensional b) Three dimensional

c) Four dimensional d) A dimensional

2) In protein synthesis important role is played by _____

a) Lysosomes b) Mitochondria

c) Microtubules d) Rough endoplasmic reticulum

3) Fluid mosaic model of plasma membrane was proposed by _____
   a) Singer and Nicolson b) Robertson
   c) Darson-Danielli d) Land steiner

4) A pure dwarf pea plant has _____ genotypes.
   a) TT b) Tt c) tt d) tT

5) Nucleus is firstly observed by _____
   a) Robert Brown b) Bateson
   c) Leeuwen Hook d) Palate

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

i) Give the principles of Electron microscopy.

ii) Describe the lamp brush chromosome.

iii) Give the functions of ribosomes.

iv) Give the law of dominance.

v) What are the genotypes of person having blood groups B and O ?

vi) XY method of sex determination.

vii) Give the functions of lysosomes.

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

i) Describe the electron microscopic structure of mitochondrion.

ii) Describe the ultra structure of Eukaryotic cell.

iii) Describe human genetic disorder sickle cell anemia.

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

i) Describe the fluid Mosaic Model of plasma membrane and give its functions.

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

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SLR-N – 70

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
Physical Geography (Paper – III) (Old)
Geomorphology

Day and Date : Saturday, 13-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Draw neat diagrams and maps ***wherever*** *necessary.*
3) Use of map ***stencils*** *is allowed.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternative and complete the following sentences : **10**

1) The most abundant _____ elements of the rocks contribute ninety percent of total mass of the earth.
a) 2 b) 4 c) 8 d) 12

2) 'Parent Rock' is a popular term used for _____ rocks.
a) Igneous b) Metamorphic
c) Sedimentary d) Organic

3) Plants and animals are responsible for _____ weathering of the rocks.
a) Chemical b) Physical c) Biotic d) Mechanical

4) Hydrolysis is a process involved in _____ weathering.
a) Chemical b) Biotic c) Physical d) Mechanical

5) The concept of 'cycle of erosion' was putforth by _____
a) Darwin b) Penek c) Davis d) King

6) Gorges are formed by the erosional work of _____
a) Wind b) Streams c) Sea waves d) Glacier

7) Yardang and Zeuzen are the features produced by _____ erosion.
a) River b) Sea waves c) Wind d) Glacier

8) _____ are best suitable for the development of transport facilities.
   a) Plateaus b) Bad lands c) Mountains d) Plains

9) Human settlements are scattered in _____ areas.
   a) Plains b) Plateaus c) Mountains d) Coasts

10) _____ soils experience thick population density.
   a) Bog b) Fertile c) Red d) Non fertile

2. Answer **any five** of the following questions : **10**
   1) What is erosion ?
   2) Draw a neat diagram of 'V' shaped valley.
   3) Name the major types of weathering.
   4) State the names of agents of denudation.
   5) What is the concept of 'cycle of erosion' ?
   6) What are the major types of rocks ?

3. A) Answer **any two** of the following questions : **6**
   1) Draw a neat diagram of a 'waterfall'.
   2) Describe the relation between the transport facilities and the plains.
   3) What are the causes of metamorphism of the rocks ?

   B) Describe the concept of weathering. **4**

4. Answer **any two** of the following questions : **10**
   1) Write in brief the depositional landforms produced by a river.
   2) Describe the causes of physical weathering.
   3) Write in brief the types of igneous rocks.

5. Answer **any two** of the following questions : **10**
   1) Explain with examples the 'biotic weathering'.
   2) Describe the formation of sand dunes.
   3) Write in short the impact of geomorphology on agriculture.

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SLR-N – 72

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
PHYSICAL GEOGRAPHY (Old)
Oceanography (Paper – IV)

Day and Date : Monday, 15-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Neat*** *diagrams and maps must be drawn* ***wherever*** *necessary.*
3) ***Use*** *of map stencils is* ***allowed****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Choose the correct alternatives and complete the following sentences. **10**

1) The average depth of the continental shelf is about _____fathoms.
a) 50 b) 100 c) 2000 d) 3000

2) _____ % area of the earth's surface is surrounded by water.
a) 79 b) 71 c) 29 d) 21

3) _____ is the scientific study of oceans and seas.
a) Seismology b) Hydrology
c) Hydrography d) Oceanography

4) Mariana Trench is the deepest part found in _____ ocean.
a) Pacific b) Atlantic c) Indian d) Arctic

5) _____ deposits of deep sea floor are known as biogenous deposits.
a) In-organic b) Organic c) Alluvial d) Saline

6) The average salinity of ocean water is _____ grams per thousand grams.
a) 55 b) 45 c) 35 d) 25

7) _____ stream is a warm water current present in North Atlantic Ocean.
a) Al Nino b) Kurile c) Labrador d) Gulf

P.T.O.

8) Darwin-Dana postulated the _____ theory of origin of coral reefs.
   a) subsidence b) non-subsidence
   c) glacial control d) cycle of erosion

9) _____ tide is associated with the new moon day and full moon day.
   a) Seasonal b) Diurnal c) Spring d) Neap

10) _____ waves are produced by the submarine earthquakes.
   a) Tidal b) Oscillary c) Destructive d) Tsunami

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

1) What is 'Deep Sea Plain' ?
2) Name the oceans of the world.
3) What is mean by coral reefs ?
4) Which ocean current affects on the Indian monsoon ?
5) What is mean by the salinity of ocean water ?
6) Name any two Indian islands located in the Bay of Bengal.

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

1) Describe the salinity of the pacific ocean.
2) Write in brief 'Continental Shelf'.
3) Explain how coral islands are formed.

B) Draw a neat and labelled diagram of 'Configuration of ocean floor'. **4**

4. Answer **any two** questions from the following : **10**

1) Write a note on 'Horizontal temperature distribution of ocean water'.
2) Give the importance of oceanography.
3) Describe the ocean currents in N. Atlantic ocean.

5. Answer **any two** questions from the following : **10**

1) Write in brief 'The importance of oceans and seas to man'.
2) Explain the glacial control theory of coral formation.
3) Write a note on 'Ocean Deposits'.

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SLR-N – 73

Seat No.	

B.Sc. – I (Sem. – II) Examination, 2014
STATISTICS (Paper – III) (Old)
Descriptive Statistics – II

Day and Date : Tuesday, 16-12-2014 Total Marks : 50
Time : 11.00 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 most correct alternative : **10**

i) Fisher's Index is ———— index number.
   a) An ideal b) Inconsistent
   c) Both (a) and (b) d) None of these

ii) When the correlation is perfect then the two regression lines are
   a) Coincide b) Parallel to each other
   c) Perpendicular to each other d) None of these

iii) If one of the regression coefficient is greater than one then the other must be
   a) Greater than one b) Less than one
   c) Equal to one d) None of these

iv) The data is inconsistent if N is
   a) Less than (A) b) Equal to (A)
   c) Greater than (A) d) None of these

v) If the variables X and Y are changes in opposite direction then the correlation coefficient is
   a) Zero b) One
   c) Positive d) Negative

vi) The value of cov (aX + b, cY + d) is equal to
   a) ab cov (X, Y) b) ad cov (X, Y)
   c) ac cov (X, Y) d) none of these

vii) The limits for rank correlation are
a) – 1 and 1 b) – 1 and 0
c) 0 and 1 d) None of these

viii) The G.M. of Laspeyre's and Paasche's index is
a) Fisher's index b) Marshall-Edgeworth index
c) Walsch index d) None of these

ix) The number of ultimate class frequencies for n attributes is
a) 3^n b) 2^n
c) 2^{n-1} d) 2^{n+1}

x) Correlation coefficient (r) is independent of change of
a) Origin b) Scale
c) Both origin and scale d) None of these

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

i) Show that correlation coefficient and regression coefficient have the same algebraic signs.

ii) If the attributes A and B are independent then prove that $\delta = 0$.

iii) What is an index number ? Discuss its importance.

iv) Explain why we have two lines of regression.

v) Describe scatter diagram.

vi) Define Yule's coefficient of association (Q) and the coefficient of colligation (Y).

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

i) Derive an expression for the acute angle between the two regression lines.

ii) Define :
a) Positive association
b) Negative association and
c) Complete dissociation.

iii) Show that the correlation coefficient (r) always lies between – 1 and 1.

B) Show that Fisher's index satisfies both time reversal and factor reversal tests. **4**

4. Answer **any two** of the following : **10**

   i) Derive an expression for Spearman's rank correlation coefficient in case of without ties.

   ii) Define regression coefficients and state their properties.

   iii) With usual notations, prove that $Q = 2Y/(1 + Y^2)$.

5. Answer **any two** of the following : **10**

   i) Prove that Fisher's price index lies between Laspeyre's and Paasche's price indices.

   ii) Derive the equation of line of regression of Y on X.

   iii) Write a short note on types of correlation.

———————

SLR-N – 74

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
ZOOLOGY (Paper – III) (Old)
(Animal Diversity – II)

Day and Date : Tuesday, 16-12-2014 Total Marks : 50
Time : 3.00 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 diagrams* ***wherever*** *necessary.*

1. Select the appropriate answer for **each** of the following and complete the sentence. **10**

1) Body of urochordate is enclosed in a test called as _____
   a) Tunic b) Coat
   c) Meninge d) Sheath

2) Suctorial and circular mouth without jaws is found in _____
   a) Amphibia b) Cyclostomata
   c) Pisces d) Apoda

3) _____ scales are found in Labeo.
   a) Placoid b) Ganoid
   c) Cycloid d) Rhomboid

4) In frog lungs acts as _____ organs.
   a) Hydrostatic b) Statoacoustic
   c) Acoustic d) Hearing

5) In frog process of ultrafiltration takes place in _____
   a) Malpighian body b) Loop of Henle
   c) Bidder's canal d) Tubule

P.T.O.

6) To protect from extreme cold condition, frog takes winter sleep also known as _____

a) Amplexus b) Hibernation

c) Aestivation d) Spawning

7) Metacoel is ventricle of _____

a) Olfactory lobes b) Optic lobes

c) Cerebellum d) Medulla oblongata

8) Ear of frog is _____ organ.

a) Statoacoustic b) Hydrostatic

c) Visual d) Audio-visual

9) Sinus venosus of frog is _____ chamber.

a) Receiving b) Propelling

c) Distributing d) Circulating

10) In frog the eggs are laid in bunches called _____

a) Blastula b) Amplexus

c) Spawn d) Stroma

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

i) Functions of fins in fishes.

ii) General characters of Cephalochordata.

iii) RBCs of Frog.

iv) Ventricles of Brian of Frog.

v) Mechanical digestion in stomach of Frog.

vi) Spawning of Frog.

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

   i) Coagulation of blood

   ii) Ammocoetus larva

   iii) Urostyle of Frog.

   B) Describe the structure and functions of placoid scale. **4**

4. Answer **any two** of the following : **10**

   i) What is respiration ? Explain the cutaneous respiration in frog.

   ii) Give general characters of Cyclostomata.

   iii) Describe blastula of frog.

5. Answer **any one** of the following : **10**

   i) Explain the structure of eye of frog.

   ii) Describe Mechanism of gill respiration in bony fish.

SLR-N – 78

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
BOTANY (Paper – III) (Old)
Vascular Plants

Day and Date : Thursday, 18-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) ***Draw*** *neat labelled diagrams* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the following sentences by choosing correct alternatives : **10**

1) Gymnospermic plants exhibit _____ characters.
a) Hydrophytic b) Xerophytic c) Mesophytic d) Amphiphytic

2) ICBN has framed rules and regulations for _____ nomenclature.
a) animals b) plants c) amphibians d) insects

3) _____ is the name of Bentham and Hooker's system of Classification.
a) Genera Plantarum b) Species Plantarum
c) Flora d) Botanica

4) In Floral Formula Zygomorphic condition of flower is shown by
a) ⊕ b) ⊖ c) % d) △

5) In _____ , the ovules and seeds are nacked, not enclosed by carpels.
a) Bryophytes b) Pteridophytes
c) Gymnosperms d) Angiosperms

6) Calyx and Corolla are called _____ whorls.
a) accessory b) essential
c) non-essential d) compulsory

7) _____ is female sex organ in a flower.
a) Calyx b) Corolla c) Androecium d) Gynoecium

P.T.O.

8) Datura innoxia belongs to the family _____
   a) Caesalpiniaceae b) Solanaceae
   c) Amaryllidaceae d) Nyctaginaceae

9) Perianth is composed of individual units, known as _____
   a) Petals b) Sepals c) Tepals d) Stamens

10) _____ is an example of pteridophytes.
   a) Pinus b) Selaginella c) Datura d) Riccia

2. Answer **any five** of the following : **10**
   i) What is alternation of generation ?
   ii) State any two merits of Bentham and Hooker's system of classification.
   iii) Write any two economic importance of Pinus.
   iv) Lists the whorls of typical flower.
   v) Describe actinomorphic flower condition.
   vi) Write any four types of inflorescence with example.

3. A) Answer **any two** of the following : **6**
   i) Describe T. S. of Pinus needle with suitable diagram.
   ii) Explain diversity in habit of angiosperms.
   iii) State economic importance of Pteridophytes.

   B) Write salient features of International Code of Botanical Nomenclature (ICBN). **4**

4. Answer **any two** of the following : **10**
   i) State vegetative and floral characters of Solanaceae.
   ii) Describe ovule of Pinus with suitable diagram.
   iii) Write a salient features of angiosperms.

5. Answer **any two** of the following : **10**
   i) Describe the structure of male cone of Pinus.
   ii) What is fruit ? Give different types of simple fruit.
   iii) Give an account of Sporne's (1965) classification of Gymnosperm upto classes.

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SLR-N – 79

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
MATHEMATICS (Paper – IV) (Old)
Differential Equation

Day and Date : Friday, 19-12-2014 Total Marks : 50
Time : 11.00 a.m. to 1.00 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) The general solution of the differential equation $X^3\,dX + Y^4\,dY = 0$ is
   a) $X^4 + Y^5 = C$ b) $X^4 - Y^5 = C$
   c) $5X^4 + 4X^5 = C$ d) None of these

2) The differential equation $MdX + NdY = 0$ is _____
   a) First order and first degree b) First order and second degree
   c) Second order and first degree d) None of these

3) The differential equation $(2X + Y - 3)\,dY = (X + 2Y - 3)\,dX$ is of the form _____
   a) Variable separable b) Non Homogeneous
   c) Homogeneous d) None of these

4) An expression $x^2y + 2x^3 + 3xy^2 + y^3$ is _____
   a) Homogeneous of degree 2 b) Homogeneous of degree 3
   c) Non homogeneous of degree 2 d) None of these

5) The integrating factor of $\frac{dy}{dx} + py = Q$ where P and Q are function of X is _____
   a) $\int pdx$ b) $\int qdy$ c) $e^{\int pdx}$ d) None of these

P.T.O.

6) The general solution of $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = 0$ is y = _____

a) $C_1e^{-2x} + C_2e^{2x}$ b) $C_1e^{-2x} + C_2e^{-2x}$

c) $(C_1 + C_2x)\, e^{-2x}$ d) None of these

7) Meaning of $\frac{1}{D}X$ is _____

a) $e^{ax}\int e^{-ax}XdX$ b) $\int X\,dX$

c) $e^{-ax}\int e^{ax}XdX$ d) None of these

8) The value of $\frac{1}{D^2 + a^2}\cos aX$ = _____

a) $\frac{X}{2a}\text{Sin } aX$ b) $\frac{X}{2a}\cos ax$ c) $\frac{-X}{2a}\cos x$ d) None of these

9) The general solution of $\frac{d^2y}{dx^2} + 2y = 0$ is _____

a) $C_1 \cos\sqrt{2x} + C_2 \sin\sqrt{2}\ x$ b) $C_1 \cos\sqrt{2}\ x - C_2 \sin\sqrt{2}\,x$

c) $(C_1 + C_2x)\cos\sqrt{2}\,x$ d) None of these

10) The equation $(D^3 + 2D^2 - D - 2)\,Y = 0$ is called _____

a) Auxiliary equation b) Associated equation

c) Complete equation d) None of these

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

1) Solve $\frac{dy}{dx} + \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}} = 0$

2) Solve $(1 + 6y^2 - 3x^2y)\,dy - (3xy^2 - x^2)\,dx = 0$

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

4) Solve $(D^3 - 6D^2 + 11\ D - 6)\ y = 0$

5) The meaning of $\frac{1}{D^2}\ X^3$

6) Solve $(D^2 + 2)\ y = 0$.

3. A) Attempt **any two** : **6**

1) Solve $(x^2 + y^2)\ dx = 2xy\ dy$

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

3) Solve $(DH)\ (D^2 - 4D + 4)y = e^{3x}$

B) If $D = \frac{d}{dx}$ then show that **4**

$(D - \alpha)\ (D - \beta)\ y = (D - \beta)\ (D - \alpha)\ y$ where α, β are constant.

4. Attempt **any two** : **10**

1) Explain the method of solving homogeneous differential equation of Ist order and Ist degree.

2) How to solve $\frac{dy}{dx} + py = Q$ where p and q are function of X only ?

3) Solve $(D^2 - 5D + 6)\ Y = \sin 3X + X$.

5. Attempt **any two** : **10**

1) Prove that $\frac{1}{f(D)} e^{ax} = \frac{1}{f(a)} e^{ax}$ if $f(a) \neq 0$

2) With usual notation prove that $\frac{1}{\phi(D^2)} \sin ax = \frac{1}{\phi(-a^2)} \sin ax$

3) Solve $\frac{dy}{dx} = x^3y^3 - xy$.

SLR-N – 8

Seat No.	

B.Sc. – I (Sem. – I) (C.G.P.A. Pattern) Examination, 2014
MATHEMATICS (Paper – I)
Algebra and Calculus

Day and Date : Monday, 10-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N. B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures 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 is any square matrix then A + A′ is _____ matrix.
   a) scalar b) diagonal
   c) skew-symmetric d) symmetric

2) The characteristic polynomial of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is _____
   a) $\lambda^2 - 5\lambda - 2$ b) $\lambda^2 - 5\lambda + 2$
   c) $\lambda^2 + 5\lambda - 2$ d) $\lambda^2 + 5\lambda + 2$

3) If $x + \frac{1}{x} = 2\cos\theta$ then $x^5 + \frac{1}{x^5}$ = _____
   a) $5\cos\theta$ b) $5\cos 2\theta$ c) $2\cos 5\theta$ d) $2\cos\theta$

4) For any complex number z, sin iz = _____
   a) – i sinhz b) i sinhz c) i sinh(–z) d) sinhz

5) Find the value $(1 + i)^4 + (1 - i)^4$ = _____
   a) 8 b) 4 c) – 8 d) – 4

P.T.O.

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

1) If A and B is symmetric matrices of the same order prove AB – BA is skew-symmetric.

2) Solve the equations : x – y + z = 0; x + 2y – z = 0; 2x + y + 3z = 0.

3) Find eigen values of matrix $\begin{bmatrix} 3 & 1 \\ 6 & 2 \end{bmatrix}$.

4) Separate given complex number into real and imaginary part if $z = \sqrt{i}$.

5) Find all values of $(-1)^{1/3}$.

6) Write a polar form of $\sqrt{3} + i$.

7) If z is a complex then prove that $\cos^2 z + \sin^2 z = 1$.

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

1) If $\cos(\alpha + i\beta) = x + iy$ then prove that

a) $\frac{x^2}{\cos h^2 \beta} + \frac{y^2}{\sin h^2 \beta} = 1$

b) $\frac{x^2}{\cos^2 \alpha} - \frac{y^2}{\sin^2 \alpha} = 1.$

2) For what value of λ, the equations, $x + 2y + z = 3$, $x + y + z = \lambda$, $3x + y + 3z = \lambda^2$ have a solution and solve them for any one value λ.

3) Find eigen value and eigen vector of the following matrix $\begin{bmatrix} 3 & 2 \\ -1 & 0 \end{bmatrix}$.

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

1) State and prove Cayley-Hamiltone theorem and find the characteristic equation of matrix $\begin{bmatrix} 2 & \sqrt{2} \\ \sqrt{2} & 1 \end{bmatrix}$.

2) State and prove De-Moivre's theorem and prove that $(1 + i\sqrt{3})^8 + (1 - i\sqrt{3})^8 = -256.$

SECTION – II
(Calculus)

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

1) If $y = \frac{1}{a^n} e^{ax}$, then $y_n =$ _____

a) $a^n e^{ax}$ b) $a^{-n} e^{ax}$ c) e^{ax} d) $\frac{1}{a^n} e^{ax}$

2) If ϕ is a scalar point function, then $\nabla\phi$ is only _____

a) scalar point function
b) vector point function
c) either scalar or vector point function
d) none of these

3) If f(x, y) be a homogenous function in x and y of degree n – 1 then f(x, y) = _____

a) $x^n F\left(\frac{y}{x}\right)$ b) $x^{n-1} F\left(\frac{y}{x}\right)$

c) $x^{n+1} F\left(\frac{y}{x}\right)$ d) none of these

4) By integrating every term of the cosine series we get expansion of _____

a) cosine series b) sine series
c) tangent series d) none of these

5) The directional derivative of $\phi(x, y, z)$ at (x, y, z) along positive direction of Y-axis is the partial derivative of ϕ _____

a) w.r.t. x b) w.r.t. y c) w.r.t. z d) none of these

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

1) If $u = \log(x^3 + y^3)$ then show that $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$.

2) If $f(x, y, z) = x^2y + y^2x + z^2$ then find ∇f at the point (–1, –1, –1).

3) Expand cosx in powers of x by using Maclaurin's series.

4) Evaluate $\int_0^a \frac{x^4}{\sqrt{a^2 - x^2}} dx$.

5) Evaluate $\lim_{x \to 0} \frac{\tan x - x}{x^2 \tan x}$.

6) Find the n^{th} derivative of $\frac{x}{x^2 - a^2}$.

7) If $\bar{f} = x^2 y\, i + xzj + 2yzk$, then find curl $\bar{f}$.

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

1) Test whether f(x, y) defined below has a limit as (x, y) $\rightarrow$ (0, 0).

$$f(x, y) = \frac{x + y}{x^2 + y^2 + x}, \quad (x, y) \neq (0, 0)$$

$$= 0 \qquad (x, y) = (0, 0)$$

2) If $\phi(x, y, z) = 2x^3 y^2 z^4$, then find div (grad ϕ).

3) Show that : $\int_0^\infty \frac{x^2}{(a^2 + x^2)^4} dx = \frac{\pi}{32a^5}$.

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

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

2) If z is homogeneous function of x and y of order n then $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = nz$

and then prove that if $z = \sin^{-1}\left(\frac{x^2 + y^2}{x + y}\right)$ then $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = \tan z$.

SLR-N – 81

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Old)
Basic Electronics (Paper – III)

Day and Date : Saturday, 20-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 PN junction that radiates energy in the form of light instead of heat is called _____

a) LED b) Photodiode c) Photocell d) Zener diode

ii) At 0K temperature intrinsic semiconductor behaves as _____

a) an insulator b) a conductor
c) n type semiconductor d) p type semiconductor

iii) The ripple factor of a half wave rectifier is _____

a) 2 b) 1.21 c) 0.48 d) 2.5

iv) A semiconductor diode is a _____ device.

a) linear b) non-linear
c) bilateral d) none of these

v) In a transistor, the base current is about _____ of emitter current.

a) 25% b) 20% c) 95% d) 5%

vi) The direction of arrow head in the symbol of a transistor on emitter indicates the _____ current.

a) conventional emitter b) electron
c) reverse bias d) none of these

P.T.O.

vii) When the temperature changes, the operating point is shifted due to _____

a) change in $I_C B_O$

b) change in V_{CC}

c) change in values of circuit resistances

d) none of these

viii) In p channel JFET, the charge carriers are _____

a) electrons b) holes

c) both electrons and holes d) ions

ix) As the temperature of PN diode increases, its barrier potential _____

a) decreases b) increases

c) remains same d) May increase or may decrease

x) In a BJT, largest current flow occurs _____

a) in the base b) in the collector

c) in the emitter d) through CB junction

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

i) Explain, why extrensic semiconductor acts as an intrinsic semiconductor at very high temperature.

ii) Draw the symbol of LED and photo diode with labels.

iii) Draw circuit diagram of voltage regulator using zener diode.

iv) A transistor has $\beta = 100$. If the collector current is 40 mA. Determine the emitter current.

v) Explain the necessity of a transistor biasing.

vi) The JFET has a transconductance is 200 $\mu\mho$ and drain resistance is 100 K Ω. Calculate the amplification factor.

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

   i) Define stability factor. Draw circuit diagram of voltage divider biasing circuit.

   ii) Write a short note on p-type semiconductor.

   iii) Explain construction of NPN transistor.

   B) Draw and explain working of half wave rectifier. **4**

4. Answer **any two** of the following : **10**

   i) Explain the static and dynamic resistance of a diode.

   ii) Explain temperature compensation using single diode.

   iii) What is filter circuit ? Explain working of capacitor filter.

5. Answer **any two** of the following : **10**

   i) Define JFET parameters. Establish the relation between them.

   ii) Explain output characteristics of transistor in CB configuration.

   iii) Write a short note on LED. Give the applications of LED.

SLR-N – 83

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
GEOLOGY (Paper – III) (Old)
Introduction to Physical Geology

Day and Date : Saturday, 20-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: I)* ***All*** *questions are* ***compulsory****.*
II) Answer ***all*** *the questions.*
III) Figures to the ***right*** *indicate* ***full*** *marks.*
IV) ***Draw*** *neat diagrams* ***wherever*** *necessary.*

1. Fill in the blanks with correct answers from the given options : **10**

1) Point bars are characteristic of _____ deposits.
a) wind b) sea c) river d) glaciers

2) A beach sand deposits that connects an island with the mainland is called as _____
a) Bar b) Tombolos c) Fjords d) Escarpment

3) _____ are the till deposits formed by melting of water of the glacier.
a) Moraines b) Varve c) Esker d) Kames

4) Ox-bow lakes are generally associated with _____ stage of river.
a) Youth b) Old c) Mature d) All above

5) Pinnacle rock is a feature developed by _____ erosion.
a) Wind b) River c) Sea d) Glacier

6) Feldspar minerals converts to clay minerals by _____ process.
a) solution b) oxidation c) carbonation d) all the above

7) Most susceptible mineral to weathering _____
a) Olivine b) Hornblende c) Quartz d) Biotite

8) Wind erosion is manifested mainly by _____ action.
a) solution b) deflation c) attrition d) corrosion

P.T.O.

9) Yardangs are erosional features of _____ process.
   a) River b) Sea c) Wind d) Glacier

10) Exfoliation is a form of _____ weathering.
   a) Physical b) Chemical
   c) Biological d) None of the above

2. Answer **any five** of the following : **10**
   a) Types of moraines
   b) Types of delta
   c) Spits, bars and tombolo
   d) Products of weathering
   e) Ox-bow lake
   f) Barchans.

3. A) Answer **any two** of the following : **6**
   a) Spheroidal weathering
   b) Ventifacts
   c) Cirques.

   B) Write the answer/notes : **4**
   a) River piracy
   b) Tors.

4. Answer **any two** of the following : **10**
   a) Define valley. Describe the processes of development of river valley.
   b) Describe depositional features developed by wind.
   c) Define glacier. Describe any four depositional features.

5. Answer **any two** of the following : **10**
   a) Define weathering. Describe with examples the chemical weathering process.
   b) What is marine cycle ? Describe it in brief.
   c) Describe the process of wind erosion.

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SLR-N – 85

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
ELECTRONICS (Old)
Digital Electronics (Paper – IV)

Day and Date : Monday, 22-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 logarithmic table and calculator is **allowed**.*

1. Select the correct alternative for the following : **10**

i) 8 to 1 multiplexer has _____ number of control lines.
   a) 2 b) 3
   c) 4 d) 5

ii) IC 74154 is a _____ demultiplexer.
   a) 1 : 2 b) 1 : 4
   c) 1 : 8 d) 1 : 16

iii) IC 7474 includes a _____ flip flop.
   a) RS b) D
   c) JK d) T

iv) Race around condition is observed in _____ flip flop.
   a) RS b) JK
   c) D d) T

v) In shift register SISO stands for
   a) Switch In Switch Out b) Store In Store Out
   c) Serial In Serial Out d) None of these

vi) The fundamental character of shift register is _____
   a) Counting b) Storage
   c) Switching d) None of these

P.T.O.

vii) IC 7490 contains _____ counter section.
   a) MOD 10 only b) MOD 2 only
   c) MOD 2 and MOD 5 d) MOD 2 and MOD 10

viii) MOD 8 counter requires _____ flip flops.
   a) 2 b) 3
   c) 4 d) 5

ix) _____ is not an operating system.
   a) MS office b) Windows
   c) UNIX d) DOS

x) ROM is a _____ memory.
   a) Volatile b) Non volatile
   c) Temporary d) None of these

2. Answer **any five** of the following : **10**
   i) Explain encoder using block diagram.
   ii) Draw block diagram of MSJK flip flop.
   iii) State types of shift register.
   iv) Draw pin diagram of IC 7490.
   v) State input-output devices of computer.
   vi) Draw logic diagram of 1 to 4 demultiplexer.

3. A) Answer **any two** of the following : **6**
   i) Draw logic diagram of multiplexer tree using IC 74150.
   ii) Explain PIPO shift register.
   iii) Draw timing diagram of 4 bit ripple counter.

   B) Explain the important characteristics of digital computer. **4**

4. Answer **any two** of the following : **10**
   i) Explain BCD to Decimal decoder.
   ii) Write short on Ring Counter.
   iii) Draw and explain working of positive edge triggered D flip flop.

5. Answer **any two** of the following : **10**
   i) Draw and explain block diagram of computer system.
   ii) Explain MOD5 counter using series and parallel combinations.
   iii) Draw pin out diagram of IC 74147 and its truth table.

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SLR-N – 87

Seat No.	

B.Sc. (Part – I) (Semester – II) Examination, 2014
GEOLOGY (Paper – IV) (Old)
(Igneous, Sedimentary and Metamorphic Petrology)

Day and Date : Monday, 22-12-2014 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Neat*** *diagrams should be drawn.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Select the correct one : **10**

1) In dynamothermal metamorphism schistosity is developed due to _____ agent.
   a) Uniform pressure b) Directed pressure
   c) Heat d) All above

2) The rapid cooling leads to formation of non-crystalline _____ texture.
   a) Glassy b) Granitic
   c) Porphyritic d) None of above

3) Most sedimentary rocks are characterised by _____
   a) Mud crack b) Stratification
   c) Tracks d) None of above

4) Batholith is _____ type of igneous form.
   a) Extrusive b) Intrusive
   c) Both the above d) None of the above

5) Alternate schistose and granulose bands are developed in _____
   a) Schistose b) Gneissose
   c) Granulose d) All above

P.T.O.

6) Antistress minerals are developed due to _____
   a) Directed pressure b) Uniform pressure
   c) Tensile force d) All the above

7) Volcanic neck is found in the regions of _____
   a) Unfolded b) Folded
   c) Unfolded and tilted rocks d) Folded and compressed rocks

8) Poikilitic texture is formed due to _____
   a) Phenocrysts are surrounded by glassy matter
   b) Smaller crystals are enclosed in larger crystals
   c) Both the crystals are of same size
   d) All the above

9) Typical graphic texture is observed in _____
   a) Basalt b) Granite
   c) Dolerite d) None of the above

10) Asymmetrical ripples are _____
   a) With smooth crests
   b) Smooth troughs
   c) Both the crests and troughs are smooth
   d) None of the above

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

1) Types of magma
2) Stratification
3) Rock cycle
4) Agents of metamorphism
5) Schistose structure
6) Ripple marks.

3. A) Answer **any two** of the following : **6**
   i) Stress and Antistress minerals.
   ii) Porphyritic texture
   iii) Ring dyke.

   B) Write the notes : **4**
   i) Laccoliths
   ii) Oölitic and Pisolitic structure.

4. Answer **any two** of the following : **10**
   1) Megascopic structures of Igneous rock.
   2) Dynamothermal metamorphism.
   3) The formation of sedimentary rocks.

5. Answer **any two** of the following : **10**
   i) Describe the discordant igneous forms.
   ii) Describe depth zones of metamorphism.
   iii) Classification of secondary rocks.

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SLR-N – 89

Seat No.	

B.Sc. (Part – II) (Sem. – III) Examination, 2014
CHEMISTRY (Paper – V) (New)
Organic Chemistry

Day and Date : Friday, 28-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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, 0 = 16, Cl = 35.5, I = 127, Ag = 108
6) Spectroscopic chart is ***supplied****.*

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

i) Increase in the intensity of absorption i.e. $\in_{max}$ increase observed in _____ shift.

a) Hypsochromic b) Hypochromic
c) Hyperchromic d) Bathochromic

ii) Ethylene glycol on oxidation with HNO_3 gives _____

a) 2 H.COOH b) OHC – CHO
c) CO_2 d) HOOC – COOH

iii) In aldol condensation of acetaldehyde intermediate formed is _____

a) Free radical b) Carbocation
c) Carbanion d) Carbene

iv) Methyl orange indicator is prepared by coupling diazonium salt of sulphanilic acid with _____

a) 2, 3 dimethyl aniline b) Naphthionic acid
c) Benzidine d) N, N-dimethyl aniline

P.T.O.

v) IUPAC name of acrylic acid is _____

a) Prop-2-enoic acid b) But-2-enoic acid

c) Prop-3-enoic acid d) But-3-enoic acid

vi) Williamson's synthesis is used to prepare _____

a) Aldehydes b) Ethers

c) Ketones d) Alcohols

vii) Reimer-Tiemann reaction involves _____ intermediate.

a) Free radical b) Carbocation

c) Carbonium ion d) Carbene

viii) Auxochrome contains the atom having _____ Pair of electrons.

a) Sigma b) Pi

c) Non-bonding d) Bonding

ix) In n-butane when the dihedral angle between two bulky methyl groups is 60°, is known as _____ conformation.

a) Eclipsed b) Ganche

c) Staggered d) Anti

x) In benzoin condensation reaction, the product formed is _____

a) β-hydroxy aldehyde b) α, β unsaturated acid

c) α-hydroxy ketone d) γ-hydroxy ketone

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

i) Write two methods of formation of cinnamic acid.

ii) How will you prepare benzene and phenyl hydrazine from benzene diazonium chloride ?

iii) Write reactions of acid catalysed ring opening of ethylene oxide.

iv) Define :

a) Configuration

b) Conformation.

v) What is action of oxidation and HI on malic acid ?

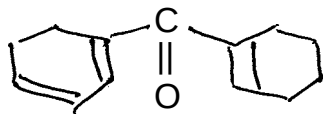
vi) Define :

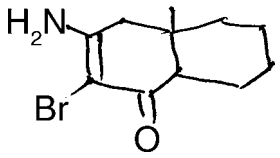
a) Exocyalic double bond with example

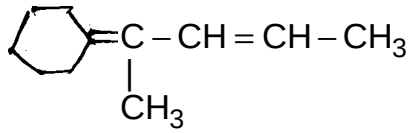
b) Heteroannular diene with example.

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

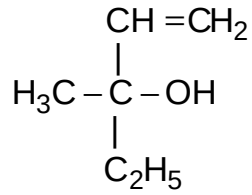
i) Calculate the λ_{max} of the following dienes and enones by using Woodward Fieser rules.

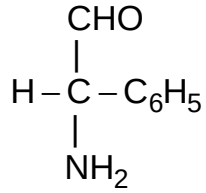
a) 

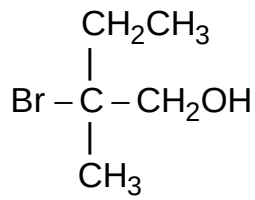
b) 

c) 

ii) Assign R and S configuration of the following :

a) 

b) 

c) 

iii) Write synthesis of congo-red.

B) 0.69×10^{-5}kg of methoxy compound having formula $C_7H_{22}O_2$ is subjected to zeisel's method produced 2.35×10^{-5}kg of AgI, calculate the percentage and number of methoxy groups per molecule. **4**

4. Answer **any two** of the following : **10**

   i) Explain claisen rearrangement reaction with mechanism.

   ii) Explain cannizzaro's reaction with mechanism.

   iii) What are aldoximes and ketoximes ? How Beckmann transformation is used to assign the configuration of ketoxime ?

5. Answer **any two** of the following : **10**

   i) How succinic acid is prepared from maleic acid ? What is the products by action of heat on :

      a) Malic acid

      b) Phthalic acid

      c) Citric acid

      d) Succinic acid

   ii) Explain types of electronic transitions in UV spectroscopy.

   iii) Explain Reimer-Tiemann reaction with mechanism.

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-N – 9

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
BOTANY (Paper – I) (CGPA Pattern)
Microbiology and Cryptogams, Plant Physiology and Horticulture

Day and Date : Monday, 10-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Solve ***each*** *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 alternatives : **5**

1) In bacteria the ribosomes are of _____ types.
   a) 70-S b) 80-S
   c) 55-S d) None of these

2) _____ is an alga used to research work in cytology and genetics.
   a) Acetabularia b) Chara
   c) Nostoc d) Sargassum

3) Mode of nutrition in Mucor is _____
   a) Autotrophic b) Saprophytic
   c) Symbiotic d) Both a) and c)

4) _____ moss is used as surgical dressings in hospitals.
   a) Anthoceros b) Sphagnum
   c) Riccia d) Spirogyra

5) _____ is found in the T. S. of Selaginella stem.
   a) Siphonostele b) Actinostele
   c) Protostele d) Plectostele

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

i) Sketch and label the typical bacterial cell.

ii) Enlist the names of divisions of algae according to G. M. Smith.

iii) Give the types and functions of rhizoides in Riccia.

iv) Write any four economic importance of pteridophytes.

v) Mention the types of Lichens with examples.

vi) Give systematic position of Spirogyra.

vii) General characters of mycoplasma (any four).

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

i) General characters of Fungi.

ii) Sexual reproduction in Riccia.

iii) Cell structure and heterocyst in Nostoc.

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

i) Give economic importance of bryophytes.

ii) Describe the T. S. of stem and L. S. of Strobilus in Selaginella.

SECTION – II
(Plant Physiology and Horticulture)

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

1) Fusion of male and female gamets takes place in _____ reproduction.

a) vegetative b) sexual

c) asexual d) all of these

2) Floribunda is a variety of _____

a) Marigold b) Rose

c) Gerbera d) Jasmin

3) _____ is co-factor.

a) Mg^{++} b) ATP

c) NAD d) FAD

4) The effect of light period on flowering is studied under the heading _____

a) Vernalizaiton b) Photoperiodism

c) Phototropism d) Photomorphism

5) _____ is micro-element.

a) P b) K

c) Mg d) Fe

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

i) Enlist any four means of vegetative propagation.

ii) What is primary structure of enzyme ?

iii) What are growth regulators ?

iv) Define O'lericulture.

v) Mention any two properties of enzyme.

vi) Define macro element.

vii) What is phytochrome ?

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

i) Different phases of vegetative growth.

ii) Pest and disease management in Rose.

iii) 'T' and patch budding.

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

i) What is reproductive growth ? Explain the role of photoperiod in physiology of flowering.

ii) What is vegetative propagation ? Explain the techniques of Air layering and approach grafting.

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SLR-N – 90

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
COMPUTER SCIENCE (Paper – V)
Object Oriented Programming Using C++

Day and Date : Friday, 28-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternative : **10**

1) The wrapping up of data and functions into a single unit is known as _____
   a) Polymorphism b) Inheritance
   c) Encapsulation d) None of these
2) The operator >> is known as _____
   a) Insertion b) External
   c) Extrime d) Extraction
3) _____ variables are normally used to maintain values common to entire class
   a) Public b) Private
   c) Protected d) Static
4) A _____ constructor takes a reference to an object of the same class as itself as an argument.
   a) Default b) Auto
   c) Copied d) Copy
5) The Mechanism of giving special meaning to an operator is known as operator _____
   a) Conversion b) Operand
   c) Destructor d) Overloading

P.T.O.

6) Multiple inheritance allows us to combine the features of several _____ classes as a starting point for defining new classes.

a) External b) Extrime

c) Existing d) None of these

7) The compiler replaces the function call with the corresponding function code is called _____ function.

a) Friend b) Virtual

c) Inline d) None of these

8) _____ can be used to create a memory space for any data type including user defined types.

a) Constructor b) Allocate

c) Newly d) New

9) Which of the following return value of the main function signifies successful termination of C++ program.

a) – 1 b) 0

c) 1 d) None of these

10) The _____ pointer is used in C++ to implicitly bind a member function call with the calling object.

a) Virtual b) Reference

c) This d) None of these

2. Write the answer of following questions (**any five**) : **10**

1) List a few areas of application of OOP technology.

2) What is a reference variable ? What is it's major use ?

3) What is a friend function ?

4) What is a constructor ?

5) Name the operators that can not be overloaded in C++.

6) What is an abstract class ?

3. A) Write the answer of following questions (**any two**) : **6**
   1) Write a short note on 'nested class'.
   2) Write a short note on type conversion in C++.
   3) Write a short note on Dynamic memory allocation.

   B) Write an object-oriented program to print Fibonacci series 'n' times (Series – 0, 1, 1, 2, 3, 5, 8, 13, ...) **4**

4. Write the answer of following questions (**any two**) : **10**
   1) What are the different forms of inheritance ? Give an example for each.
   2) Explain default constructor and copy constructor with example.
   3) Explain various control statements used in C++ with appropriate example.

5. Answer **any two** of the following : **10**
   1) Define function overloading, write a program in C++ to calculate the area of circle and area of rectangle by using function overloading.
   2) What is a parameterized constructor ? Give suitable example.
   3) Explain array of objects with suitable example.

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SLR-N – 91

Seat No.	

B.Sc. (Part – II) (Semester – III) Examination, 2014
CHEMISTRY (New)
Inorganic Chemistry (Paper – VI)

Day and Date : Saturday, 29-11-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

1. Select the correct alternative for the following and rewrite the sentences. **10**

1) Geometrical isomerism is also called _____ isomerism.
   a) Optical b) Mirror image c) Cis.trans d) Symmetric

2) The coordination number of Co in $[Co(NH_3)_5Cl]Cl_2$ is _____
   a) Three b) Four c) Six d) Eight

3) The ligand is electron _____ species.
   a) Acceptor b) Donor
   c) Donor and acceptor d) None of these

4) More stable metal chelate generally contains _____ membered ring.
   a) Four b) Five c) Six d) Seven

5) EDTA is used as _____
   a) Food preservative b) Water softener
   c) Masking agent d) All of these

6) Ammonia molecule is _____
   a) Arrhenius acid b) Lewis acid
   c) Lewis base d) None of these

7) Lithium ion (Li^+) is the _____
   a) Soft base b) Soft acid c) Hard base d) Hard acid

8) Colour of $[Ti(H_2O)_6]^{3+}$ solution is _____
   a) Red b) Green c) Violet d) Yellow

9) Most of the transition elements are _____
   a) Diamagnetic b) Paramagnetic
   c) Ferromagnetic d) Non magnetic

10) First transition elements shows _____ stable oxidation states.
   a) + 2 and + 3 b) + 1 and + 2 c) + 3 and + 4 d) + 6 and + 7

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

i) Define terms :
   a) Ligand b) Coordination number

ii) Explain stability of $k_4[Fe(CN)_6]$ on the basis of EAN rule.

iii) Give analytical applications of DMG.

iv) Write full form of EDTA and DMG.

v) Give merits of Lewis concept.

vi) Explain why Fe^{3+} is more stable than Fe^{2+}.

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

1) Give difference between double salt and complex salt.

2) Give salient features of VBT.

3) Explain colour behavior of 3d series elements.

B) Discuss structural requirement of Chelate formation. **4**

4. Write notes on **(any two)** : **10**

1) Werner's theory

2) Oxidation states of 3d-series elements.

3) Applications of HSAB concept.

5. Answer **any two** of the following : **10**

I) On the basis of VBT, explain the formation of $[CuCl_4]^{2-}$ and comment on hybridisation, magnetic behavior and stability.

II) What are transition elements ? Give names, symbols and electronic configuration of first transition series elements.

III) Explain the magnetic behaviour of 3d transition series elements.

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SLR-N – 92

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
COMPUTER SCIENCE (Paper – VI)
RDBMS

Day and Date : Saturday, 29-11-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Choose correct alternatives : **10**

1) Which of the following is not a integrity constraint ?
   a) not null b) positive
   c) unique d) predicate

2) The relational database model was created by E.F. Codd.
   a) True b) False

3) Dates must be specified in the format.
   a) mm/dd/yy b) yyyy/mm/dd
   c) dd/mm/yy d) yy/dd/mm

4) Select name _____ instructor name, course id from instructor, teaches where instructor.id = teaches.id. Which keyword must be used to rename the field name ?
   a) from b) rename
   c) as d) join

5) A _____ is a query that retrieves rows from more than one table or view.
   a) start b) end
   c) join d) all of above

6) A database design may be based on existing data.
   a) True b) False

7) Which of the following creates a virtual relation for storing the query ?
   a) function b) view
   c) procedure d) none of these

8) Select emp_name from department where dept_name like '_____Computer Science'. Which one of following has to be added into the blank to select dept_name which has computer science as its ending string ?
   a) % b) _
   c) || d) $

9) Which SQL keyword is used to sort the result set ?
   a) order b) sort
   c) sort by d) order by

10) Create, alter and drop are
   a) Data defination language b) Data manipulation language
   c) Data control language d) None of these

2. Solve **any five** of the following : **10**
   1) Write any two aggregate function used in SQL.
   2) Define 'Nested query'.
   3) State the components of DBMS.
   4) Write the syntax of function used in PL/SQL.
   5) Write the data types in PL/SQL.
   6) Define "View" in DBMS.

3. A) Solve **any two** of the following : **6**
   1) Explain the block structure of PL/SQL.
   2) Define cursor. Explain its type.
   3) Explain data function in SQL.

   B) Write a PL/SQL block to create a function to calculate square of given number. **4**

4. Solve **any two** of the following : **10**
   1) Explain the term 'trigger'.
   2) What are different types of classification of SQL commands ?
   3) Write a PL/SQL block to generate Fibonacci series by using procedure.

5. Solve **any two** of the following : **10**
   1) Explain operators used in SQL.
   2) Write a short note on 'exception handling'.
   3) Explain the select, insert, update clause with example.

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SLR-N – 93

Seat No.	

B.Sc. – II (Sem. – III) (New) Examination, 2014
PHYSICS (Paper – V)
General Physics, Heat and Sound

Day and Date : Monday, 1-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

N.B. : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to the ***right*** *indicates* ***full*** *marks.*
iii) ***Use*** *of log table or calculator is* ***allowed****.*
iv) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*

1. Select correct alternative : **10**

i) If div $\vec{A} = 0$, the vector $\vec{A}$ is called _____
   a) Solenoidal b) Non-solenoidal
   c) Unit vector d) Zero vector

ii) The gradient of a scalar field is a _____
   a) Scalar b) Vector c) Constant d) Non-zero

iii) The change in plane of rotation of a rotating disc is called _____
   a) Rotation b) Vibration
   c) Precession d) Notation

iv) By Lanchester's rule, the relation between the precessional torque, Γ_1, gravitational torque Γ_2 and centripetal torque Γ_3 is _____
   a) $\Gamma_1 + \Gamma_2 = \Gamma_3$ b) $\Gamma_2 - \Gamma_3 = \Gamma_1$
   c) $\Gamma_1 - \Gamma_2 = \Gamma_3$ d) $\Gamma_2 + \Gamma_3 = \Gamma_1$

v) Torsional oscillations of a wire are due to its _____
   a) Young's modulus b) Bulk modulus
   c) Modulus of rigidity d) None of these

P.T.O.

vi) Searle's viscometer is used to determine the viscosity of _____

a) Highly viscous liquid b) Low viscous liquid

c) Gases d) All of these

vii) The C.G.S. unit of coefficient of viscosity is _____

a) poise b) kg/m.s

c) gm cm/s d) Ns/m^2

viii) Entropy is a measure of _____

a) Perfect order b) Randomness

c) disorder d) Available energy

ix) The frequency of ultrasonics is _____

a) below 20 Hz b) above 20 KHz

c) 20 Hz to 20 Kz d) 20 Hz to 200 KHz

x) Loud speaker converts _____ energy into sound energy.

a) Optical b) Mechanical

c) Heat d) Electrical

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

i) Define scaler triple product.

ii) What is nutation ?

iii) What is meant by flat spiral spring ?

iv) Define coefficient of viscosity.

v) State the properties of ultrasonic spring.

vi) Calculate the increase in entropy of 1 kg of water of 100°C when it changes to vapour.

(Latent heat of steam = 540 cal/gm)

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

   i) What is vector field ? Give any two examples.

   ii) Show that the rate of precession is directly proportional to the applied is torque.

   iii) Derive Sabine's formula for reverberation time.

   B) Determine the critical velocity of a disc of radius 30 cm rolling over a horizontal surface. ($g = 980\ cm/s^2$) **4**

4. Answer **any two** of the following : **10**

   i) What is gradient of scaler ? Explain its physical significance.

   ii) Describe Ostwald viscometer and explain how the coefficient of viscosity of two liquids can be compared.

   iii) What is T-S diagram ? Obtain an expression for efficiency of Carnot's engine.

5. Answer **any one** of the following : **10**

   i) What is cantilever ? Obtain an expression for depression of free end of a cantilever.

   ii) What is transducer ? How are they classified ? Explain the construction and working of moving coil loud speaker.

SLR-N – 94

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
BIOCHEMISTRY (Paper – I) (New)
Biomolecules

Day and Date : Monday, 1-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N.B. : *1)* ***All*** *questions are* ***compulsory.***
2) Figures to the ***right*** *hand side indicate* ***full*** *marks.*
3) Write biochemical reactions ***wherever*** *necessary.*

1. Write following sentences selecting most correct answer from given options : **10**

1) _____ is a Ketohexose.
a) Glucose b) Fructose c) Ribose d) Erythrose

2) Vitamin _____ is derived from carbohydrates.
a) A b) B_1 c) C d) D

3) _____ is sulphur containing amino acid.
a) Cysteine b) Tyrosine c) Phenyl alanine d) Arginine

4) _____ are conjugated proteins.
a) Collagens b) Gelatines c) Chromoproteins d) Elastins

5) Velocity of enzyme catalysed reaction is maximum and constant at high _____
a) pH b) Substrate concentration
c) Temperature d) Concentration of enzyme

6) Commission on enzymes classified enzymes on the basis of _____
a) Prosthetic group
b) Molecular weight
c) Class of protein to which enzyme belongs
d) Nature of reaction catalysed the enzyme

P.T.O.

7) Polyneuritis is another name for _____ disorder resulting due to deficiency of thiamine vitamine.

a) Nyctalopia b) Beriberi c) Pellagra d) Glossitis

8) _____ Vitamin does not act as a coenzyme.

a) Retinol b) Pyridoxine c) Riboflavin d) Thiamine

9) Terpenes are considered to be derived from _____

a) Free fatty acids b) Triglycerides c) Phospholipids d) Isoprene units

10) Phospholipids occur in large proportion in _____

a) Plasma membrane b) Nucleic acids c) Cytoplasm d) Ribosomes

2. Attempt **any five** from below : **10**

1) What are keratins ? Give two examples.
2) Differentiate between proteoses and peptones.
3) What is the effect of pH on rate of enzyme catalysed reaction ?
4) Write down the structural formula for NADH.
5) Define enzyme. Give two examples.
6) Discuss about spingolipids.

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

1) Explain induced fit hypothesis of enzyme catalysis.
2) Discuss reduction of monosaccharides with suitable example.
3) Illustrate the role of thiamine pyrophosphate in decarboxylation reaction.

B) Write an account of triglycerides and waxes. **4**

4. Answer **any two** from below : **10**

1) With suitable examples explain the role of NAD^+ in dehydrogenation reactions.
2) Illustrate the structure of myoglobin.
3) Discuss in detail the classification of amino acids.

5. Attempt **any two** : **10**

1) Who classified enzymes ? How ? Discuss the classes isomerases and transferases.
2) Discuss the polysaccharides present in plants.
3) Write an account of terpenes and carotenes.

SLR-N – 95

Seat No.	

B.Sc. – II (Semester – III) Examination, 2014
PLANT PROTECTION (Paper – I) (New)
Major Crops and Methods of Integrated Plant Protection

Day and Date : Monday, 1-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Select the correct answer and rewrite the sentences. **10**

1) Arachis hypogaea is the scientific name of _____
a) Jowar b) Tur c) Groundnut d) Rose

2) Clean cultivation, crop rotation etc. are the _____ methods of pest control.
a) Cultural b) Biological c) Physical d) Chemical

3) Blue green algae are used as _____ fertilizers.
a) Bio b) Chemical c) Synthetic d) All the above

4) The period _____ is considered as the era of pesticides.
a) 1939-1975 b) 1980-1998 c) 1950-1999 d) 1965-2005

5) India ranks _____ in cotton cultivation so for world cultivation is considered.
a) 3^{rd} b) 4^{th} c) 5^{th} d) 9^{th}

6) _____ crop is considered as the cash crop.
a) Tur b) Wheat c) Cotton d) Gram

7) Organic fertilizers are very useful in _____
a) Water holding capacity b) Increase in soil porosity
c) Increase in soil fertility d) All the above

8) Netting, hand picking and burning are the methods of _____ pest control.
a) Physical b) Mechanical c) Biological d) Chemical

P.T.O.

9) Resistance of a crop can be used against _____
   a) disease b) insects pests
   c) light d) both a) and b)

10) _____ are the sources of microbial control of pests.
   a) Some viruses b) Nematodes
   c) Higher plants d) All the above

2. Answer **any five** of the followings : **10**
   I) Define plant quarantine.
   II) Give the morphology of Gerbera.
   III) Name the sources of biofertilizers.
   IV) Define seed rate.
   V) What are fungicides ?
   VI) Give the use of sticky band in pest control.

3. A) Answer **any two** of the followings : **(2×3=6)**
   I) Give the economic importance of sugarcane.
   II) Give the soil type and seed rate required for wheat.
   III) Describe the physical method of pest control by soil solarization.

   B) Give the brief account of bactericides studied by you. **4**

4. Solve **any two** of the following : **(2×5=10)**
   I) Describe the cultivation practices of Jowar crop w.r.t. soil type, seed rate, fertilizers and yield.
   II) Describe any two cultural methods of plant protection.
   III) Describe the morphology of gram crop with economic importance.

5. Solve **any two** of the following : **(2×5=10)**
   I) Describe the cultivation practices of grape crop with respect to soil type, spacing, fertilizers and yield.
   II) Describe any two mechanical methods of plant protection.
   III) Describe in brief the role of nematicide and acaricides in plant disease management.

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SLR-N – 96

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
PHYSICS
Electronics (Paper – VI)

Day and Date : Tuesday, 2-12-2014 Max. Marks : 50
Time : 11.00 a.m. to 1.00 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) The most widely used method of transistor biasing is _____
   a) Base resistor method b) Biasing with feedback
   c) Voltage divider bias d) None of a, b, c

ii) In phase shift oscillator each RC section has phase shift of _____
   a) 60° b) 90° c) 180° d) 360°

iii) Electronic circuit which converts d.c. energy into a.c. energy form is called _____
   a) Rectifier b) Amplifier c) Oscillator d) UJT

iv) FET is a _____ terminal semiconductor device.
   a) One b) Two c) Three d) Four

v) The intrinsic stand off ratio of UJT is calculated by the relation _____
   a) $R_{B1} + R_{B2}$ b) $\frac{R_{B1}}{R_{B2}}$ c) $\frac{R_{B1}+R_{B2}}{R_{B1}}$ d) $\frac{R_{B1}}{R_{B1}+R_{B2}}$

vi) _____ gate is called universal gate.
   a) NAND b) OR c) AND d) XOR

vii) The De Morgan's second theorem is given by the relation $\overline{A.B.}$ = _____
   a) $\overline{A+B}$ b) $\overline{A} + \overline{B}$ c) $A + \overline{B}$ d) $A + B$

P.T.O.

viii) Voltage regulator is used to provide a nearly _____ output.

a) Sinusoidal b) Smooth c) Constant d) Fluctuating

ix) DMM stands for_____

a) Data Measurement b) Digital Multimeter

c) Digital Multimedia d) Distance Measurment

x) The time period of waveform measured on CRO is 20 ms then unknown frequency of wave is _____

a) 0.5 Hz b) 50 Hz c) 50 KHz d) 50 MHz

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

i) State the De Morgan's theorems.

ii) Give the uses of CRO.

iii) Draw the logical circuit of J.K. Flip-flop.

iv) Define :

a) Drain resistance and b)Transconductance in FET

v) What is feedback ? Define positive and negative feed back.

vi) Explain regulated power supply with block diagram.

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

i) Explain the working of half adder.

ii) Write a short note on CRT.

iii) Describe the FET as VVR.

B) What is oscillator ? Find the frequency of transistor collpitt's oscillator, if $C_1 = 0.001\ \mu F$, $C_2 = 0.01\ \mu F$ and $L = 15\ \mu H$. **4**

4. Answer **any two** of the following : **10**

i) Explain construction and working of UJT.

ii) Describe with neat circuit diagram the operation of phase shift oscillator.

iii) What is Flip-flop ? Explain the construction of R-S Flip-flop.

5. Answer **any one** of the following : **10**

i) What is multistage transistor amplifier ? Explain two stage RC coupled transistor amplifier in detail.

ii) Draw the neat circuit diagram of dual power supply and describe it in detail.

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SLR-N – 97

Seat No.	

B.Sc. – II (Sem. – III) Examination, 2014
BIOCHEMISTRY (Paper – II) (New)
Biochemical Techniques

Day and Date : Tuesday, 2-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

N. B. : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right hand side*** *indicate* ***full*** *marks.*
3) ***Draw*** *labelled diagrams* ***wherever*** *necessary.*

1. Write following sentences selecting most correct answer from given options : **10**

1) In chromatographic separation mobile phase cannot be _____
   a) a solid b) a liquid c) a gas d) mixture of gases

2) Sephadex gels are prepared from _____
   a) acrylamide b) starch gel
   c) agarose d) dextrin

3) In electrophoretic separation increase in resistance results _____
   a) decrease in voltage b) increase in current
   c) decrease in current d) increase in voltage

4) According to Beer's law absorbance due to coloured solution depends on _____
   a) length of medium
   b) pH of solution
   c) nature of colour
   d) concentration of colouring substance in solution

5) _____ dye is used for staining proteins in starch gel electrophoresis.
   a) Bromocrysol green b) Bromophenol blue
   c) Amidoblack 10B d) Oil red O

6) The technique used for blot transfer of proteins is called _____ blotting technique.
   a) Southern b) Northern c) Western d) Eastern

7) _____ is an intellectual property.
   a) Novel b) House c) Ornaments d) Car

P.T.O.

8) High resolution power of HPLC is due to high pressure and _____
   a) use of constant pressure b) constant elution rate
   c) small particle size d) use of pressure dampener

9) Hybridoma technology is used for production of _____ on large scale.
   a) DNA b) Ethanol
   c) Immunoglobulins d) Insulin

10) CNBr is used in _____ type of enzyme immobilisation.
   a) adsorption b) covalent binding
   c) intermolecular cross-linking d) entrapment in a gel

2. Answer **any five** from below : **10**

1) State the principle of gel permeation chromatography.

2) What is the effect of supporting electrolytes on electrophoretic mobility of protein ?

3) Which factors affect the immobilisation of enzymes by adsorption ?

4) Why are the inventions patented ?

5) What is the role of β-mercaptoethanol in SDS-PAGE ?

6) Why are myeloma cells used in hybridoma technology ?

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

1) Why is stacking gel used in SDS-PAGE ?

2) What are the properties of primers used in PCR technique ?

3) What are disadvantages of patents ?

B) Draw a labelled block diagram of HPLC. **4**

4. Answer **any two** : **10**

1) Discuss applications of SDS-PAGE.

2) Describe construction and working of colorimeter.

3) Explain the technique of western blotting.

5. Solve **any two** : **10**

1) Explain immobilisation of enzyme by covalent binding method.

2) Discuss the technique of PCR (Polymerase Chain Reaction).

3) Write an account of TLC (Thin Layer Chromatography) Technique.

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SLR-N – 98

Seat No.	

B.Sc. – II (Semester – III) (New) Examination, 2014
PLANT PROTECTION
Crop Diseases and Their Management (Paper – II)

Day and Date : Tuesday, 2-12-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Draw a ***neat*** *labelled diagram* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*

1. Rewrite the sentences by selecting correct answer from the given alternative. **10**

1) Classification of plant diseases based on _____ types.
a) Two b) Three c) Four d) Five

2) Rust of groundnut is a _____ disease.
a) Bacterial b) Viral c) Mycoplasma d) Fungal

3) Causal organism of grain smut of jawar is _____ sorghi.
a) Cercospora b) Puccinia c) Sphacelotheca d) Xanthomonas

4) Early blight of disease occur on _____ plant.
a) Tomato b) Bean c) Mustard d) Cabbage

5) Disease caused by phytoplasma on _____ plant.
a) Sugar cane b) Tomato c) Tobacco d) Garlic

6) Little leaf of brinjal is also known as _____
a) Pea plant b) Egg plant c) Seed plant d) Egg-pea plant

7) Citrus canker disease occur on _____ plant.
a) Bean b) Lemon c) Watermelon d) Ginger

8) Wilt of tomato is a _____ disease.
a) Bacterial b) Viral c) Fungal d) Mycoplasma

P.T.O.

9) Powdery mildew is a common and sometimes very serious disease of _____ plant.

a) Cucurbits b) Melon c) Cherry d) Maize

10) Downy mildew disease is occur on _____ plant.

a) Pomegranate b) Sugarcane c) Grapes d) Wheat

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

i) What is susceptibility ?

ii) Define hypersensitivity.

iii) What is immunity ?

iv) Define isolation.

v) Name any two bacterial disease.

vi) Give the two name of phytoplasma disease.

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

i) Explain the causal organism and control measures of rust of soyabean.

ii) Give the symptoms and control measures of rust of groundnut.

iii) Explain the concept of plant disease studied by you.

B) Classification of plant diseases based on severity of disease. **4**

4. Answer **any two** of the following : **10**

i) Explain the symptoms, causal organism and control measures of grain smut of jawar.

ii) Describe the mode of transmission through air and soil.

iii) Describe the symptoms, causal organism and control measures of early blight of tomato.

5. Answer **any two** of the following : **10**

i) What is resistance ? Give the physical and chemical protection studied by you.

ii) What is etiology ? Explain the quantitative methods studied by you.

iii) Explain the symptoms, causal organism and control measures of little leaf of brinjal.

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SLR-N – 99

Seat No.	

B.Sc. II (Semester – III) (New) Examination, 2014
STATISTICS (Paper – V)
Continuous Probability Distributions – I

Day and Date :Wednesday, 3-12-2014 Max. Marks : 50

Time : 11.00 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 alternatives : **10**

1) If $F_x(x)$ is the cumulative distribution function (cdf) of a continuous random variable (r.v)X, then it is

a) decreasing function of X b) increasing function of X

c) non-decreasing function of X d) none of these

2) If X is a random variable, then $E[e^{tx}]$ is known as

a) Probability mass function of X b) MGF of X

c) Probability density function of X d) none of these

3) Let X be a continuous random variable with probability density function f (x), the $P(X < Q_2)$ =

a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) 3/4 d) none of these

4) If X is a continuous random variable defined on real line, then $P(a < X < b)$ is the area under the curve between

a) $(-\infty, a)$ b) (a, b) c) (a, ∞) d) none of these

5) If $M_X(t)$ is moment generating function of a continuous random variable X, then $M_X(0)$ =

a) 0 b) 1 c) t d) none of these

P.T.O.

6) The p.d.f. of a continuous random variable x is $f(x) = \begin{cases} k & \text{for } 1 \le x \le 4 \\ 0 & ; \quad \text{ow} \end{cases}$ then

K is equal to

a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{1}{3}$ d) none of these

7) Let $F_{X,Y}(x, y)$ be the c.d.f of bivariate random variable (X, Y), then $F_{X,Y}(x, y)$ lies between

a) 0 to 1 b) – 1 to 0 c) –1 to 1 d) none of these

8) Let X follows uniform distribution over (–1, 1), then $\mu_2 =$

a) $\frac{1}{6}$ b) 0 c) $\frac{1}{3}$ d) none of these

9) If X ~ U (0, 1), then E (X) is

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

10) If X follows exponential distribution with parameter θ, then var (X) will be

a) $\frac{1}{\theta}$ b) $\frac{1}{\theta^2}$ c) θ d) none of these

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

For a continuous random variable X, define

i) Probability density function (pdf) of X

ii) Cumulative distribution function (cdf) of X

iii) Expectation of X

iv) Moment generating function (MGF) of X

v) r^{th} raw moment of X

vi) r^{th} central moment of X.

3. a) Attempt **any two** of the following **:** **6**

i) The p.d.f of X is given by $f(x) = \begin{cases} \frac{x}{2} & ; \ 0 \le x \le 2 \\ 0 & ; \quad 0w \end{cases}$

Find mean and variance of X.

ii) Explain the concept of marginal and conditional distribution of bivariate continuous random variable (X, Y).

iii) Let X be continuous r.v. with pdf f (x) given by

$$f(x) = \begin{cases} k & ; 1 \le x \le 4 \\ 0 & ; \quad 0w \end{cases}$$

Find k and obtain the distribution of Y = 2X + 1.

b) State and prove additive theorem of expectation. **4**

4. Attempt **any two** of the following **:** **10**

i) If $f(x) = \begin{cases} 6x(1-x) & ; 0 \le x \le 1 \\ 0 & ; \quad 0w \end{cases}$

then

a) check whether f (x) is a pdf or not

b) obtain cumulative distribution function of X.

ii) If X follows exponential distribution with parameter θ, then obtain its MGF and hence find E (X).

iii) If X is a continuous uniform distribution over (0, 1). Then find the distribution of $Y = -\frac{1}{\theta}\log_e^X$.

5. Attempt **any two** of the following **:** **10**

i) State and prove lack of memory property of exponential distribution.

ii) Define uniform distribution over (a, b). Obtain its cumulative distribution function.

iii) Let (X, Y) be the bivariate continuous random variable having p.d.f.

$$f(x, y) = \begin{cases} \frac{3}{2}y^2 & ; 0 \le x \le 2,\ 0 \le y \le 1 \\ 0 & ; 0w \end{cases}$$

Determine the marginal p.d.f's of X and Y.