Seat No.

B.Sc. I (Semester – I) Examination, 2014
ENGLISH (Compulsory) (Old)
Text Book : Realms of Gold : An Anthology for Degree Classes

Day and Date: Tuesday, 3-6-2014   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. Fill in the blanks by choosing the correct alternative given below them.   **10**

1) The high priest of Rameswaram temple was _____
   a) Prashant Lakshmana Sastry b) Pakshi Lakshmana Sastry
   c) Prabhu Lakshmana Sastry   d) None of the above

2) Within the next twenty years _____
   a) half of the world's population will be living in cities
   b) all the world's population will be living in cities
   c) one third of the world's population will be living in cities
   d) none of the above

3) Datta had learnt by long experience that his customers never came _____
   a) correctly   b) punctually   c) timely   d) none of the above

4) Goldsmith presents the _____ as an amusing character in his poem.
   a) lawyer   b) schoolmaster
   c) doctor   d) writer

5) Datta was a _____
   a) painter   b) frame-maker
   c) goldsmith   d) hunter

6) Let me give you _____ umbrella.
   a) a   b) an   c) the   d) none

7) _____ psychiastrist is a doctor who treats mental illness.
   a) the   b) an   c) a   d) none

P.T.O.

8) I wrote with _____ pencil.
   a) the   b) an   c) a   d) none

9) The water was very cold _____ the child still jumped into the pool.
   a) and   b) but   c) so   d) or

10) Lakshmi sends e-mails _____ all her friends now and them.
    a) in   b) to   c) at   d) on

2. Write short answers of the following (**any five**) : **10**

   1) Describe briefly the locality in which Kalam stayed with his parents.

   2) Mention 'two' qualities of Kalam's father.

   3) What is the forecast of Economic Commission for Africa ?

   4) Describe the character and habits of the frame maker in a few words.

   5) Describe the schoolmaster as he appeared to his students.

   6) How will the urban explosion affect the standard of life ?

   7) What was the intention of the customer in the story when he went to Datta ?

3. A) Write short answers of the following (**any two**) : **6**
   1) Why does Colin Legum says that the urban growth is harmful (carcinogenic) ?
   2) What was the disaster that struck the photograph ? What was Datta's reaction to this disaster ?
   3) Describe the house in which Abdul Kalam lived during his childhood.

   B) Answer the following question in brief (**any two**) : **4**
   1) Write in brief the theme of the poem "The Village Schoolmaster".
   2) Why are more and more people attracted to cities ?
   3) What did Kalam learn from his father about the power of prayer ?

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

   1) Describe how would you prepare a favourite dish. Make list of the ingredients required and describe the preparation in clear stages.

   2) Nita is on her way to her violin class. She meets Dr. Prakash, her father's boss, outside the music school. The two persons greet each other and exchange a few words before taking leave. Write a brief dialogue with appropriate expressions.

5. Write a letter of an application for the post of lecturer in the college. Give your details. **10**

_____

Seat No.

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

Day and Date : Monday, 9-6-2014   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**

   1) If mean of 10 observations is 20 then mean of new set of observations when each value is increased by 5 is
      a) 5   b) 10   c) 30   d) 25

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

   3) Median of an arranged data is the
      a) Most frequent value   b) Minimum value
      c) Maximum value   d) Middle most value

   4) Mean deviation is least when measured from
      a) Mean   b) Median   c) Mode   d) None of these

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

   6) If $\beta_2 < 3$ then curve is
      a) Leptokurtic   b) Plattykurtic   c) Mesokurtic   d) None of these

   7) With the help of histogram, one can determine
      a) Median   b) Quartiles   c) Mean   d) Mode

   8) The Bowley's coefficient of skewness lies between
      a) –1 and 1   b) 0 and 1   c) –1 and 0   d) None of these

9) An ideal measure of dispersion is
   a) Range
   b) Quartile deviation
   c) Mean deviation
   d) Standard deviation

10) If the smallest value in a set is 7 and its range is 88 then the largest value of the set is
   a) 81
   b) 92
   c) 95
   d) None of these

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

   i) Define moments about origin and about mean.

   ii) State the requirement of a good measures of central tendency.

   iii) State the combined variance formula.

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

   v) Explain the term skewness.

   vi) Explain class frequency and relative frequency.

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

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

   ii) Distinguish between absolute and relative measures of dispersion.

   iii) Show that the mean square deviation is greater than or equal to variance.

   B) Explain the construction of histogram. **4**

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

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

   ii) A variable takes values 1, 2,.....,n with frequencies 1, 2,..., n. Find its mean and variance.

   iii) What is kurtosis ? For any frequency distribution, show that $\beta_2 \geq 1$.

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

   i) Show that standard deviation is greater than or equal to mean deviation.

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

   iii) What is the effect of change of origin and scale on arithmetic mean ?

————————————

Seat
No.

B.Sc. – II (Semester – IV) Examination, 2014
GEOGRAPHY (Paper – VII)
Bio-Geography

Day and Date : Tuesday, 6-5-2014   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) Use of stencils is allowed.

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

    1) The whole _____ history of the earth is divided into 5 era.
        (Biological, Geological, Ecological, Political)

    2) Humus is the _____ stage of organic decomposition in the soil.
        (initial, original, final, beginning)

    3) The _____ regions are based on climate as given by Mr. Newbegin.
        (Faunal, Floral, Floristic, Biotic)

    4) The history of the _____ of forests is an old as men himself.
        (Conservation, exploitation, aforestration, plantation)

    5) _____ and oil are also called as fossile fuels.
        (char coal, petroleum, marsh gas, coal)

    6) Drought is an example of _____ dispersal of animals.
        (gradual, forced, rapid, climatic)

    7) Endangered plant species are conserved through _____
        (gene bank, Herbarium, tissue, genelibrary)

    8) Project Tiger is a type of _____ conservation of biodiversity.
        (in situ, ex situ, genetic, judicial)

9) The waterborne diseases are caused by _____ water.
   (polluted, purified, oxigenated, rain)

10) Food processing industry, chemical industry are responsible for mostly _____ pollution.
    (air, water, land, noise)

2. Answer the following questions in short :   **10**

   1) What is meant by geological time scale ?

   2) Any two causes of migration.

   3) Names of forest product.

   4) Types of resources.

   5) Types of environmental hazards.

3. Answer the following questions in brief (**any two**) :   **6**

   A) 1) Write on animal evolution.

      2) Explain barriers of dispersal.

      3) Write on environment management.

   B) Write a note on uses of forest product and marine resources.   **4**

4. Answer the following questions (**any two**) :   **10**

   1) Explain drawing theory.

   2) Define resources and explain its classification.

   3) Write on environmental pollution.

5. Answer the following questions (**any two**) :   **10**

   1) What do you mean by dispersal ? Explain causes of dispersal and migration.

   2) Examine the impact of human activities on plants and animals.

   3) What is hazard ? Explain environmental hazard in detail.

_____

Seat No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
PSYCHOLOGY (Paper – VII)
Cognitive Psychology

Day and Date : Tuesday, 6-5-2014 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. Multiple Choice Questions. **10**

    1) Short cut in problems solving are called

       [Algorithms, Heuristic, Divergent thinking, Any other]

    2) Problem with a common structure are

       [Different, Analogous, Equal, Any other]

    3) Mean ends strategy is a

       [Algorithms, Log, Heuristic, Convergent thinking]

    4) _____ is a record of electrical activity in specific regions of the brain.

       [ECT, ERP, MRI, ERG]

    5) General problems solver was developed by

       [Newell and Simon, Anderson, Class, Hylyok]

    6) _____ is memory for events from one's own life.

       [Semantic, Episodic, Autobiographical, Any other]

    7) _____ memory is the active part of declarative memory.

       [Working, Procedural, Semantic, Episodic]

    8) _____ is the model of semantic memory.

       [Working memory, Network Model, Act Model, EIG Model]

9) _____ is the memory for the situation in which we first learned a very surprising and emotionally arousing events.

[Flash bulb, Autobiographical, Semantic, Any other]

10) _____ is attempt to bring order and pattern to the material we learn.

[Chunking, Organization, Practice, Work]

2. Write short answer of the following **(any 4)**.   **8**

   1) Give the name of two important components of Meta-Cognition.

   2) Define script.

   3) Write the common defination of creativity.

   4) Write the main four factors which influence problem solving.

   5) What is functional fixedness ?

   6) What is ill defined problem ?

3. Write short notes **(any four)**.   **12**

   1) Methods of Loci

   2) The multimodel approach

   3) Mood

   4) Flashbulb memories

   5) Expertise

   6) External memory aids.

4. Answer **any one** long type questions of the following.   **10**

   A) Explain in brief the different model of semantic memory.

   B) Explain in brief the condition reasoning and syllogism with example.

5. Explain the problem solving as a cognitive skill.   **10**

_____

Seat No.

B.Sc. – II (Semester – IV) Examination, 2014
ELECTRONICS (Paper – VII)
Fundamentals of Operational Amplifier

Day and Date : Tuesday, 6-5-2014   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 log table and calculator is **allowed**.

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

   i) The input impedance of an ideal operational amplifier is
     a) 0   b) infinity
     c) $10\,K_\Omega$ d) none of these

   ii) In case of op-amp, if CMRR = 5000 and $A_c = 0.2$ then $A_d =$
     a) 1000   b) 25000   c) 10000   d) 2500

   iii) The OP AMP can amplify
     a) DC signals only   b) AC signals only
     c) Both AC and DC signals   d) None of these

   iv) In op-amp inverting amplifier circuit the inverting terminal voltage is equal to
     a) Input voltage   b) Output voltage
     c) Supply voltage   d) Zero voltage

   v) The voltage gain of a voltage follower is
     a) unity   b) less than unity
     c) greater than unity   d) variable

   vi) Current to voltage converter is also called as
     a) Transresistance amplifier
     b) Transconductance amplifier
     c) Log amplifier
     d) None of these

vii) An op-amp comparator with positive feedback results into a
   a) Differentiator   b) Integrator
   c) Schmitt-trigger   d) Active filter

viii) The peak value of the input to a precision half-wave rectifier is 10V. The approximate peak value of the output is
   a) 9.3 V   b) 10 V
   c) 10.7 V   d) 5 V

ix) In an op-amp phase-shift oscillator the ratio of feedback resistor R_f to R_1 should be
   a) Zero   b) Less than 29
   c) Greater than 29   d) Any value

x) Astable multivibrators can be used to generate
   a) only a square wave
   b) only a triangular wave
   c) both square and triangular waves
   d) a sine wave

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

   i) In case of op-amp define :
   a) input offset voltage
   b) slew rate

   ii) Draw the schematic symbol for op-amp.

   iii) Draw the diagram of differentiator using op-amp.

   iv) What are the non linear applications of op-amp ?

   v) Draw the diagram of saw tooth oscillator with the help of op-amp.

   vi) Draw the circuit diagram of monostable multivibrator using IC 741.

3. A) Answer **any two** of the following :   **6**
   i) Why the inputs of operational amplifier are called inverting and non inverting ?
   ii) With neat circuit diagram, explain op-amp as subtractor and derive expression for the output voltage.
   iii) Explain sample and Hold circuit by using op-amp.

   B) Design a Wienbridge oscillator using op-amp for frequency $f_0 = 965$ Hz. Given $c = 0.01\,\mu F$.   **4**

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

 i) Draw the functional block diagram of op-amp and explain function of each block.

 ii) Explain voltage to current converter for floating and grounded load.

 iii) Explain the operation of full wave precision rectifier.

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

 i) Derive an expression for closed loop gain for an op-amp in non inverting mode.

 ii) Explain op-amp as positive and negative clipper.

 iii) Explain the working of Triangular wave generator by using op-amp.

_____

Seat No.

B.Sc. – II (Semester – IV) Examination, 2014
GEOGRAPHY (Paper – VIII)
Agricultural Geography

Day and Date : Wednesday, 7-5-2014   Max. Marks : 50

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

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

2) Draw **neat** diagrams and maps **wherever** necessary.

3) **Use** of stencils is **allowed**.

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

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

1) Agricultural geography is a subdivision of _____ geography.

   1) Medical   2) Human   3) Social   4) Cultural

2) Plantation agriculture forms well in _____ topography.

   1) Plains   2) Platues   3) Coasts   4) Undulating

3) In India, wheat and _____ are the dominant crops of intensive subsistence farming.

   1) Millets   2) Pulses   3) Sugarcane   4) Oilseeds

4) _____ land holdings is one of the reasons of low agricultural productivity in India.

   1) Extensive   2) Large   3) Medium   4) Small

5) Saline soils are mainly present along

   1) River banks   2) Coasts   3) Shore zones   4) Till plains

6) Most widely cultivated food crop of the world is

   1) Rice   2) Wheat   3) Maize   4) Millets

7) Fruit processing units are generally located near

   1) Market centres   2) Urban areas

   3) Harbours   4) Fruit producing areas

8) 'Viticulture' is a term related with the production of

1) Grapes   2) Silk worms   3) Flowers   4) Orchids

9) Commercial grain farming is also known as _____ over extensive areas.

1) Sericulture   2) Mono culture   3) Multiculture   4) Silviculture

10) Atleast _____ frost free days is a limit of wheat cultivation in northern hemisphere.

1) 40   2) 80   3) 100   4) 120

2. Write short answers **any five** questions :   **10**

1) Define 'dry farming'.

2) What is a 'zoom' cultivation ?

3) What is 'domastification of animals' ?

4) State the names of crops cultivated in plantation agriculture.

5) What is cultivation ?

6) Classify the types of cultivation.

3. A) Answer **any two** questions :   **6**

1) Write in brief the approaches in agriculture.

2) State the importance of climate in agriculture.

3) What is subsistence farming ?

B) Explain the economic factors affecting agricultural productivity in India.   **4**

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

1) Explain the importance of biotechnology in agriculture.

2) Describe the 'white revolution'.

3) What are the merits of intensive agriculture ?

5. Write in short answers of **any two** questions :   **10**

1) Describe the sheep and goat rearing.

2) Describe the importance of irrigation in agriculture.

3) Write in brief the characters of plantation agriculture.

_____

Seat No.

B.Sc. – III (Semester – V) Examination, 2014
PHYSICS
Special Paper – IX : Mathematical and Statistical Physics

Day and Date : Thursday, 10-4-2014   Max.Marks : 50

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

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

           2) Draw diagrams **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**

   1) The gradient of a scalar function $\overline{\nabla}. \phi$ is

     a) a scalar   b) a vector   c) a tenser   d) zero

   2) Del operator is known as

     a) Gauss   b) Stockes   c) Green   d) Nabla

   3) In Cartesian coordinate system $h_1 = h_2 = h_3 =$

     a) γ b) $\sin \theta$ c) 0   d) 1

   4) The three coordinates in sperical polar coordinate system are

     a) (γ, θ, ϕ) b) (γ, θ, Z) c) (x, y, z) d) (x, γ, ϕ)

   5) The volume of the cell in phase space is

     a) h b) h^2 c) h^3 d) h^4

   6) For the distribution to be the most probable then

     a) $\omega = 0$ b) $\log \omega = 0$ c) $\delta (\log \omega) = 0$ d) $\dfrac{1}{\log \omega} = 0$

   7) In M-B distribution law the constant B is

     a) kT b) $\dfrac{1}{kT}$ c) $\dfrac{kT}{2}$ d) $2|kT$

8) The relation between V_{mp}, $\overline{V}$ and V_{rms} of gas molecules in a system is

a) $V_{rms} < \overline{V} < V_{mp}$

b) $V_{rms} \leq \overline{V} \leq V_{mp}$

c) $V_{rms} = \overline{V} = V_{mp}$

d) $V_{mp} < \overline{V} < V_{rms}$

9) Boson particles have _____ spin.

a) Zero or integral

b) Half

c) One

d) None of these

10) The heighest filled energy of quantum state is

a) Zero point energy

b) Electron energy

c) Fermi energy

d) Free energy

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

1) Define fermi energy and occupation index.

2) What is boson ? Which statistics is used to study it ?

3) What are classical and quantum particles ?

4) What is meant by an ensemble ?

5) Define scalar triple product with example.

6) What is distance formula of sperical polar coordinates ?

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

1) Define curl of vector field and obtain expression for it.

2) Describe the cylindrical coordinate system.

3) Describe microcanonical ensemble.

B) Five particles are distributed in two equal cells. Find the number of macrostates and microstates. **4**

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

1) Compare M-B, B-E and F-D statistics.

2) Give the physical significance of $\overline{\nabla} \times \overline{V}$.

3) Obtain an expression for the average speed of gas molecules.

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

1) What is Fermi-Dirac statistics ? Derive F.D. distribution law.

2) Obtain an expression for curl of vector field in orthogonal curvilinear coordinates.

_____

Seat
No.

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

Day and Date : Tuesday, 10-6-2014   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) How many sample points are there if two coins are tossed together ?
       a) 2   b) 4   c) 6   d) 8

    ii) Probability of getting a red ball from a box containing 8 red balls is

       a) $\dfrac{1}{8}$ b) 0   c) 1   d) $\dfrac{7}{8}$

    iii) If A and B are two events which have no point in common then the events A
        and B are
        a) Complementary   b) Independent
        c) Mutually exclusive   d) Dependent

    iv) X and Y denote the number of points obtained when two six faced unbiased
        dice were thrown, then $P[x + y = 8]$ is

       a) $\dfrac{2}{12}$ b) $\dfrac{3}{36}$ c) $\dfrac{4}{36}$ d) $\dfrac{5}{36}$

    v) The probability of sure event is

       a) 0   b) $\dfrac{1}{2}$ c) 1   d) $\dfrac{1}{4}$

    vi) If A and B are two independent events then P(A/B) is equal to
        a) P(A)   b) P(B)
        c) $P(A \cap B)$ d) $P(A \cup B)$

vii) Which one of the following is a probability distribution ?

    a) (0.1, 0.7, 0.3)   b) (0.2, 0.2, 0.7)

    c) (0.2, 0.1, 0.9)   d) (0.7, 0.2, 0.1)

viii) F(x) is distribution function of X then $F(\infty)$ is

    a) 0   b) $\dfrac{1}{4}$ c) $\dfrac{3}{4}$ d) 1

ix) If P(x) = K (3+x) x = –1, 0, 1 then K is

    a) $\dfrac{1}{2}$ b) $\dfrac{1}{4}$ c) 9   d) $\dfrac{1}{9}$

x) Given the cdf of r.v.x the median is

    X :   0   1   2   3

    F(x) :   0.1   0.2   0.6   1

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

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

   i) Write down the sample space corresponding to the experiment " a two digit number is formed from the digits 4, 5, 6 using each digit only once.

   ii) Give aromatic definition of probability.

   iii) Prove that $P(\overline{A}) = 1 - P(A)$.

   iv) Prove that $P(A|B) \geq 0$.

   v) Define partition of sample space.

   vi) Verify whether following function is pmf of x $P(x) = \dfrac{x+1}{3}$ x = 0, 1.

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

    i) If P(A) = 0.5, P(B) = 0.4, P(A∩B) = 0.3 compute

      a) $P(\overline{A})$ b) $P(\overline{A} \cap B)$

    ii) Define distribution function of X and state its properties.

    iii) If A, B, C are mutually independent then $P(C/A \cap B) = P(C)$.

  B) State and prove addition law of probability.   **4**

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

    i) If A, B are independent then prove that

        a) A, $\bar{B}$ are independent

        b) $\bar{A}, \bar{B}$ are independent

    ii) State and prove Baye's theorem.

    iii) For the following probability distribution

X :	– 2	–1	0	1	2
P(x) :	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{1}{15}$	$\frac{2}{15}$	$\frac{1}{5}$

        a) Obtain cdf of x

        b) Find Median

        c) $P(x \leq 0)$

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

    i) If A_1, A_2, A_3 form a partition of the sample space S such that $P(A_1) = 2P(A_2) = 3P(A_3)$ find

        a) $P(A_1 \cup A_2)$

        b) $P(A_1 \cap A_2)$

    ii) For the following probability distribution of X.

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

        Find :

         i) K

        ii) Mode of X

        iii) $P(0 < X < 5)$

        iv) Probability distribution of 2X.

    iii) Find P(A|B) if

        a) A, B are mutually exclusive

        b) A is subset of B

        c) B is subset of A

        d) A and B are independent.

_____

Seat No.

B.Sc. (Part – III) (Sem. – V) Examination, 2014
STATISTICS
Statistical Inference – I (Special Paper – IX)

Day and Date : Thursday, 10-4-2014   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.

Multiple Choice questions.

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

    i) Mean squared error of an estimator T_n of $\phi(\theta)$ is

    a) $\text{bias} + \text{var}_\theta(T_n)$
    b) $\left[\text{bias} + \text{var}_\theta(T_n)\right]^2$

    c) $\text{bias}^2 + \left[\text{var}_\theta(T_n)\right]^2$
    d) $(\text{bias})^2 + \text{var}_\theta(T_n)$

    ii) If $X_1, X_2, ..., X_n$ is a random sample from an infinite population, where the

    $S^2 = \frac{1}{n}\sum_i (X_i - \overline{X})^2$, the unbiased estimator for the population variance σ^2 is

    a) $\frac{1}{n-1}S^2$
    b) $\frac{1}{n}S^2$
    c) $\frac{n-1}{n}S^2$
    d) $\frac{n}{n-1}S^2$

    iii) If the expected value of an estimator is not equal to a parameter θ, it is said to be
    a) Unbiased for θ
    b) Biased for θ
    c) Consistent for θ
    d) None of these

    iv) Consistency of an estimator is a property associated with
    a) Large samples
    b) Small samples
    c) Not related to sample size
    d) None of the above

    v) A Minimum Variance Unbiased Estimator (MVUE) is said to be unique if for any other estimator T_n^*.
    a) $\text{Var}(T_n) = \text{Var}(T_n^*)$
    b) $\text{Var}(T_n) \leq \text{Var}(T_n^*)$
    c) Both a) and b)
    d) Neither a) nor b)

P.T.O.

vi) If $X_1, X_2,..., X_n$ is a random sample from $N\left(0, \sigma^2\right)$, the sufficient statistic for σ^2 is

a) ΣX_i b) ΣX_i^2 c) $\left(\Sigma X_i\right)^2$ d) None of these

vii) If $X_1, X_2, ..., X_n$ is a random sample from B (1, P), a sufficient statistic for P is

a) ΣX_i b) $\parallel X_i$

c) max $(X_1, X_2, ..., X_n)$ d) min $(X_1, X_2, ..., X_n)$

viii) Cramer-Rao inequality is valid for

a) continuous variables   b) discrete variables

c) both a) and b)   d) neither a) nor b)

ix) If $X_1, X_2, ..., X_n$ is a random sample from N (0, θ), then the MLE for θ is

a) $\sqrt{\Sigma X_i^2/n}$ b) $\Sigma X_i^2/n$ c) $\sqrt{\Sigma X_i^2}/n$ d) $\Sigma X_i^2/\sqrt{n}$

x) If $X_1, X_2, ..., X_n$ is a random sample from U (0, θ), then the estimator of θ by the method of moments is

a) ΣX_i b) ΣX_i^2 c) $2\overline{X}$ d) $3\overline{X}$

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

i) Define a statistic and give two examples.

ii) Explain the concept of efficiency of an estimator

iii) Define :
a) Unbiased estimator
b) Positive and negative bias

iv) Explain the concept of consistency of an estimator.

v) Define a sufficient statistic and state Neyman's factorization criteria.

vi) Define Fisher information function in a statistic T.

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

i) Prove that Uniformly Minimum Variance Unbiased Estimator (UMVUE) is unique

ii) Obtain a sufficient statistic for the parameter (α, β) based on a random sample $X_1, X_2, ..., X_n$ from uniform distribution U (α, β).

iii) Based on a random sample $X_1, X_2, ...,X_n$ of size n from a Poisson distribution with parameter θ, find Fisher information function I (θ)

B) Explain the procedure of obtaining the estimators of parameters by the method of maximum likelihood.   **4**

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

   i) If Minimum Variance Bound Unbiased Estimator (MVBUE) exists for θ, then prove that it exists for $\phi\,(\theta)$ if θ is a linear function.

   ii) Let X_1, X_2, ...,X_n be a random sample of size n from B (1, p) distribution. If $T = \sum\limits_{i=1}^{n} X_i$, show that $\dfrac{T\,(n - T)}{n\,(n - 1)}$ is an unbiased estimator of p (1 – p).

   iii) Show that sample mean square S^2 is a consistent estimator of population variance σ^2 of N (μ, σ^2)

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

   i) If I (θ) is the information function of an unknown parameter θ of a distribution F = F (x, θ), show that $I\,(\theta) = -E\left[\dfrac{\partial^2 \log F}{\partial \theta^2}\right]$

   ii) Obtain the maximum likelihood estimator of the parameter p in the distribution
   $P\,(x, p) = qp^{x-1}$:   x = 1, 2, 3, ...
                                            0 < p < 1
                                            q = 1 – p

   iii) Obtain the estimates of the parameters α and β by the method of moments in the distribution $f\,(x\,;\,\alpha, \beta) = \dfrac{\beta^{\alpha}}{\overline{|\alpha}}\,e^{-\beta x}\,x^{\alpha-1}, x > 0$.

_____

Seat No.

B.Sc. – III (Semester – V) Examination, 2014
COMPUTER SCIENCE (Special Paper – IX)
Visual Programming

Day and Date : Thursday, 10-4-2014   Total Marks : 50

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

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

   1) The tick event is found only in which object ?
      a) Form   b) Button   c) Text Box   d) Timer

   2) The Boolean data type is
      a) Unsigned   b) Has two states
      c) Both a) and b)   d) None of the above

   3) Which operator is evaluated first ?
      a) NOT   b) AND   c) XOR   d) OR

   4) The left side of assignment statement will hold
      a) A variable   b) An object property
      c) Expression   d) Both a) and b)

   5) In the for ... next statement the default value for the step is
      a) –1   b) 0   c) 1   d) 2

   6) Which action will raise an exception ?
      a) Divide by zero
      b) Assigning string to integer variable
      c) Accessing an empty CD drive
      d) Both a) and b)

   7) The activated event is found only in which object ?
      a) Form   b) Button   c) Text Box   d) Label

   8) The date data type does not hold, which type information ?
      a) Seconds
      b) Hours
      c) Days
      d) None of these

9) How many return statements are allowed in function procedure ?
   a) 0
   b) 1
   c) 2
   d) No limit

10) Properties are used to represent _____
   a) Action
   b) Classes
   c) Data
   d) Events

2. Answer the following :   **10**

   i) What are multicast delegate ?

   ii) Distinguish between value type and reference type.

   iii) What are boxing ?

   iv) What is GAC ?

   v) Virtual method.

3. A) Answer **any two** of the following :   **6**
   i) What is an interface ? Explain with example.
   ii) What are the types of assemblies ?
   iii) What is the difference between structure and enumeration ?

   B) Write a C# program to overload a constructor ?   **4**

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

   i) What is exception ? Write C# program to implement custom exception handlers.

   ii) Write a C# program to read all data from a file named "Demo.txt" and display if.

   iii) Write a program to overload < = and > = operates.

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

   i) What are thread priorities ? Explain with example.

   ii) Write a C# program to overload = = operator.

   iii) What is stack ? Write a C# program to demonstrate stack operation.

_____

Seat No.

B.Sc. III (Semester – V) Examination, 2014
PHYSICS
Solid State Physics (Special Paper – X)

Day and Date : Friday, 11-4-2014　　　　　　　　　　　　　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 and labelled diagrams **wherever** necessary.
　　　4) Use of log table and calculator is **allowed**.

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

　i) The temperature below which certain materials are antiferromagnetic is called
　　a) Debye temperature　　　　　　　b) Curie temperature
　　c) Weiss temperature　　　　　　　d) Neel temperature

　ii) The most important characteristics of ferromagnetic materials is
　　a) Spontaneous magnetization　　　b) Neel temperature
　　c) Faraday's temperature　　　　　d) Demagnetization temperature

　iii) The temperature at which a metal becomes a superconductor is called
　　a) Curie temperature　　　　　　　b) Neel temperature
　　c) Critical (Transition) temperature　d) None of the above

　iv) For a metal to be considered as a superconductor, it has to exhibit
　　a) Only zero resistivity
　　b) Only Meissner effect
　　c) Zero resistivity and Meissner effect both
　　d) Only Josephson effect

　v) Bragg's law in terms of reciprocal lattice vector G is
　　a) $2K \cdot G + K^2 = 0$　　　　　b) $2k \cdot G + G^2 = 0$
　　c) $G \cdot G + 2K \cdot 2K = 0$　　d) $2G \cdot G + K \cdot K = 0$

vi) If a, b, c are the primitive vectors in direct lattice then a*, the primitive vectors in reciprocal lattice is proportional to

a) $\dfrac{a \times c}{a.b \times c}$

b) $\dfrac{a \times b}{a.b \times c}$

c) $\dfrac{b \times c}{a.b \times c}$

d) $\dfrac{a.b \times c}{b \times c}$

vii) The range of electrical to thermal conductivity $\left(\dfrac{\sigma}{K}\right)$ was found from _____ at room temperature.

a) 6.7×10^{10} to 7.5×10^{10}

b) 4.5×10^{10} to 5.6×10^{10}

c) 2.8×10^{10} to 3.7×10^{10}

d) 1.2×10^{10} to 2.8×10^{10}

viii) In metals, the forbidden energy gap is _____ eV.

a) 0

b) 1 to 0.75

c) 3 to 4

d) 5 to 6

ix) According to Sommerfeld's model of metal, energy of electron $E_n =$ _____.

a) $\dfrac{n^2 m^2}{8h^2 L^2}$

b) $\dfrac{m^2 h^2}{8n^2 L^2}$

c) $\dfrac{n^2 L^2}{8m^2 h^2}$

d) $\dfrac{n^2 h^2}{8mL^2}$

x) In primitive cell, the number of lattice points per unit cell will be equal to

a) 4

b) 3

c) 2

d) 1

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

i) What is principle of powder method of X-ray diffraction ?

ii) What is Fermi Energy ?

iii) What are the properties of ferrimagnetism ?

iv) What is Anti-Ferromagnetism ?

v) Explain the term superconductivity.

vi) What is soft superconductors ?

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

    i) Describe free electron gas model of the metal.

    ii) Explain the effect of magnetic field on superconductor.

    iii) Calculate the lattice spacing between (101) planes in an orthorhombic lattice where a = 2.4 A°, b = 3.1 A°, C = 2.9A°.

  B) Write a note on 'hysteresis loop' in ferromagnetic materials. **4**

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

   i) Discuss Fermi-Dirac distribution of an electron in the metal.

   ii) Show that volume of the unit cell of the reciprocal lattice is inversely proportional to the volume of the unit cell of the direct lattice.

   iii) Explain in short the formation of energy bands in solid.

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

   i) What do you understand by packing fraction in crystals ? Show that the packing fraction for bcc and fcc structures are $\dfrac{\pi\sqrt{3}}{8}$ & $\dfrac{\pi\sqrt{2}}{8}$ respectively.

   ii) Explain Hall effect. Obtain an expression for Hall voltage, Hall coefficient, Mobility of charge carrier and Conductivity of the metal on the basis of Hall effect.

———————————

Seat
No.

B.Sc. – III (Semester – V) Examination, 2014
CHEMISTRY
Special Paper – X : Inorganic Chemistry

Day and Date : Friday, 11-4-2014　　　　　　　　　　　Max. Marks : 50

Time : 3.00 p.m. to 5.00 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) The CFSE is maximum for _____ transition metal ions.
　　　　a) 5 d　　　　　　b) 3 d　　　　　　c) 4 d　　　　　　d) All of these

　　2) According to MOT nature of bonding in coordination complexes is
　　　　a) ionic　　　　　　　　　　　　　b) covalent
　　　　c) coordinate covalent　　　　　　d) covalent as well as ionic

　　3) In the molecular orbital diagram, electrons present in bonding molecular orbitals are _____ electrons.
　　　　a) metal　　　　　　　　　　　　　b) ligand
　　　　c) metal and ligand　　　　　　　　d) none of these

　　4) Atomic bomb work on the principle of _____ reaction.
　　　　a) chemical　　　　　　　　　　　b) chain
　　　　c) controlled chain　　　　　　　　d) uncontrolled chain

　　5) Artificial radioactivity was first discovered by
　　　　a) Rutherford　　　　　　　　　　b) G.T. Seaborg
　　　　c) Irene Curie and Federic Curie　　d) Chadwick

　　6) The haemoglobin contain _____ number of heam units.
　　　　a) 2　　　　　　b) 3　　　　　　c) 5　　　　　　d) 4

　　7) Fluorocarbons are obtained by fluorination of appropriate alkene in presence of
　　　　a) neutral solvent　　b) oxygen　　　c) nitrogen　　　d) vacuum

P.T.O.

8) The black phosphorous contain _____ linkage.
   a) P – P   b) – P – C –   c) P – N   d) P – H

9) One nanometer (nm) is _____ meter.
   a) 10^{-9} b) 10^{-8} c) 10^{-12} d) 10^{-6}

10) The _____ stores oxygen and provides to muscle whenever necessary.
    a) haemoglobin   b) protein   c) globin   d) myoglobin

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

   i) What do you know about spectrochemical series ? What is its importance ?

   ii) Draw the symmetric and non-symmetric metal and ligand orbitals involved in molecular orbitals.

   iii) Distinguish between chemical reactions and nuclear reactions.

   iv) Calcium is the most important element of human body. Explain.

   v) Define nanoparticle and give their important properties.

   vi) Explain polymerization with suitable example.

3. A] Answer **any two** of the following :   **6**
      i) Explain high spin and low spin octahedral complexes of Co (III).
      ii) Give the difference between Haemoglobin and Myoglobin.
      iii) What is polymer backbone ? Explain the types of polymer backbone.

   B] Explain the brief account of nuclear fission reactions.   **4**

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

   i) Explain the formation of tetrahedral complex with suitable example.

   ii) Write note on Fast Breeder Reactor.

   iii) Write note on Oxygen Binding Curve.

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

   i) With the help of molecular orbital diagram explain magnetic properties of $[Fe(CN)_6]^{3-}$.

   ii) What are different applications of radioisotopes as tracers ? Explain in detail structural determination of PCl_5.

   iii) What are silicones ? Give their preparation, properties and uses.

   _____

Seat
No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – X)
Biostatistics, Bioinformatics, Medical Zoology and Evolutionary Genetics

Day and Date : Friday, 11-4-2014

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. Select the appropriate answer from each of the following and rewrite the sentence. **10**

   1) Thumb drive is _____ device in computer.

      a) input   b) output

      c) print   d) storage

   2) The pathogenic agent _____ is responsible for the disease tuberculosis.

      a) plasmodium   b) virus

      c) nyctotherus   d) bacterium

   3) _____ is defined as systematic arrangement of data in rows and columns.

      a) frequency distribution   b) ogive curve

      c) tabulation   d) correlation

   4) The use of statistics in biological study is called

      a) Biostatistics   b) Biotechnology

      c) Biophysics   d) Biogeographics

   5) _____ disease is caused by a pathological agent Salmonella.

      a) Typhoid   b) AIDS

      c) Dengue fever   d) Swine-flue

P.T.O.

6) The upper limit of the class is not included in the _____ method.

   a) Exclusive

   b) Inclusive

   c) Standard Deviation

   d) Internal correlation

7) A mathematical relationship was developed to explain the equilibrium between frequencies and alleles is called

   a) Darvinism

   b) Mendalism

   c) Hardy-Weinberg law

   d) Morganism

8) Ctrl + C is command used for to _____ the file in bioinformatics.

   a) copy

   b) delete

   c) save

   d) create

9) _____ is not the measurement of central tendency.

   a) Standard deviation

   b) Mean

   c) Mode

   d) Median

10) In the perfect positive correlation the value of 'r' is

   a) 0   b) – 1   c) 0.5   d) +1

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

   i) Hydrophobia

   ii) Classification

   iii) Malaria

   iv) Genetic drift

   v) Standard deviation

   vi) Statistical mean.

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

     i) Give an account of various search engines used in bioinformatics.

     ii) Describe the streptococcus bacterium.

     iii) Describe the correlation coefficient.

   B) Plot a histogram from following data.   **4**

Class	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	8	10	14	18	16	12	8	6

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

   i) Describe the disease elephantasis.

   ii) Describe the Hardy-Weinberg law of genetics.

   iii) Give an account of the disease swine-flue.

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

   i) Give an account of Mycobacterium tuberculosis and its pathogenecity.

   ii) Define Median. Calculate the Median from the data given below.

Plant No.	1	2	3	4	5	6	7	8
No. of flowers	25	27	24	20	18	16	23	21

—————————

Seat No.

B.Sc. (Part – I) (Old Course) (Semester – I) Examination, 2014
ZOOLOGY (Paper – II)
Cell Biology and Genetics

Day and Date : Tuesday, 10-6-2014   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.
       3) Draw **neat** labelled diagrams **wherever** necessary.

1. Complete the following sentences selecting appropriate answers.   **10**

   1) The outer coat of prokaryotic (bacterial) cell is called as

     a) lipid   b) plasmid   c) cosmid   d) capsid

   2) A polynucleated cell contains _____ nuclei.

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

   3) Function of endoplasmic reticulum is

     a) Cell transport   b) Cell secretion   c) Cell division   d) Cell shifting

   4) The fluid mosaic model is studied with reference to

     a) Mitochondria   b) Plasma membrane

     c) Golgi complex   d) Endoplasmic reticulum

   5) The model for Mendel's experiment was

     a) Maize plant   b) Drosophila   c) Pea plant   d) Mice

   6) A person having _____ blood group is called as universal donor.

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

7) The disease sickle cell anemia is concerned with

   a) Thrombocytes   b) Erythrocytes (RBCS)

   c) Leucocytes (WBCS)   d) Phagocytes

8) The Balbiani rings are found in _____ chromosomes.

   a) Lamphrous   b) Sex   c) Polylene   d) Autosome

9) _____ is called as father of Genetics.

   a) Mendel   b) Altman   c) Morgan   d) Sutton

10) The nucleus is discovered by

   a) Robert Brown   b) Palade

   c) Nicholson   d) Morgan

2. Write short note on **(any five)**.   **10**

   i) Functions of Endoplasmic reticulum

   ii) Incomplete Dominance

   iii) Rh-factor

   iv) 70 s' ribosome

   v) Dominant gene.

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

    i) Polytene chromosomes

    ii) Structure of Glogi apparatus

    iii) Sickle cell anemia.

  B) Describe ultrastructure of eukaryotic cell.   **4**

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

   i) Types of lysosomes

   ii) Organization of nucleus

   iii) Mendel's law of segregation.

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

   i) Structure and functions of mitochondria.

   ii) Applications and limitations of Electron microscope.

_____

SLR-C – 130

B.Sc. – III (Semester – V) Examination, 2014
MATHEMATICS (Special Paper – X)
Abstract Algebra

Day and Date : Friday, 11-4-2014   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. Select the correct alternative for each of the following :   **10**

     1) If $2X \equiv 4 \pmod{6}$ such that $0 \leq x < 6$ then $X =$

         a) 2, 3   b) 3, 4

         c) 2, 5   d) 5, 3

     2) The g.c.d. of given set of integers $\{36, -60, 90\}$ is

         a) 2   b) 3

         c) 4   d) 6

     3) The union of all distinct right cosets of H in G is

         a) Equal to H   b) Not equal to H

         c) Equal to G   d) Not equal to G

     4) For Euler ϕ function $\phi(10) =$

         a) 10   b) 4

         c) 5   d) None of these

     5) All proper sub groups of a non abelian group are

         a) Necessarily non abelian   b) Necessarily abelian

         c) May be abelian   d) None of these

     6) The number of generators of the group Z_{12} is

         a) 1   b) 2

         c) 4   d) 11

7) The number of subgroup of the group Z_{18} is
   a) 2   b) 3
   c) 4   d) 6

8) An element $0 \neq a \in R$ is called a zero divisor if $\exists$ an element $0 \neq b \in R$ such that
   a) $ab = 0$ b) $ab = a$
   c) $ab \neq 0$ d) $ab = b$

9) The characteristics of the ring $z_3 \times z_3$ is
   a) 0   b) 3
   c) 6   d) 9

10) An ideal $P \neq R$ of a ring R is called a prime ideal if $ab \in P \Rightarrow$
   a) $a \in P$ or $b \in P$ b) $a \in P$ and $b \in P$
   c) $ab^{-1} \in P$ d) $a^{-1}b \in P$

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

   1) Show that Z_6 # is not a group w.r.t $\odot$

   2) Assume $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$ and $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$ compute $\beta^{-1} \odot \alpha^{-1}$.

   3) Decide whether the given subset $\{(1),(1\ 2\ 3),(2\ 3\ 4)\}$ is subgroup of S_4. Justify your answer.

   4) Show that every subgroup of an abelian group is normal.

   5) Define integral domain.

   6) Prove that if R is a ring then $-(ab) = a(-b)$ for all a, $b \in R$.

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

   1) Show that if a, b are any two elements of a group G then $(a\ b)^2 = a^2\ b^2$ iff G is abelian.

   2) Prove that every homomorphic image of a cyclic group is cyclic.

   3) If R is ring with unit element 1 and ϕ is homomorphism of R onto R' prove that ϕ (1) is the unit element of R'.

   B) Let Z denote the centre of a group G. If G/Z is cyclic prove that G is abelian.   **4**

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

   1) Prove that the intersection of any two normal subgroups of a group is a normal subgroup.

   2) Let f : z → G be the mapping defined by f(m) = 2^m, m∈z where G is multiplicative group of all rational numbers of the form 2^m. Prove that z ≅ G.

   3) Prove that every field is an integral domain.

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

   1) State and prove fundamental theorem of a group homomorphism.

   2) Show that the set of numbers of the form $a + b\sqrt{2}$, with a and b as rational numbers is a field.

_____

Seat
No.

B.Sc. – III (Sem. – V) Examination, 2014
MICROBIOLOGY (Special Paper – X)
Industrial Microbiology

Day and Date : Friday, 11-4-2014　　　　　　　　　　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. Rewrite the following sentences by choosing correct alternative :　　**10**

　1) The recovery of fermentation product by filtration is based upon _____ of product.

　　a) Solubility　　　　　　　　b) Molecular size

　　c) Density　　　　　　　　　d) Viscosity

　2) The decomposition of proteinic food under an anaerobic condition results in

　　a) fermentation　　　　　　b) saccharification

　　c) polymerization　　　　　d) putrefaction

　3) The reduction in aw value is observed when solute concentration is

　　a) high　　　　　　　　　　b) low

　　c) zero　　　　　　　　　　d) adequate

　4) The table wine contains _____% of alcohol.

　　a) below 9　　　　　　　　b) 9 – 15

　　c) 15 – 21　　　　　　　　d) above 21

　5) The B subunit of insulin has _____ no. of amino acids.

　　a) 15　　　　　　　　　　　b) 20

　　c) 25　　　　　　　　　　　d) 30

P.T.O.

6) _____ is a type of hard cheese.

   a) Limburger   b) Camembert

   c) Cheddar   d) Roquefort

7) <u>Lactobacillus</u> <u>bulgaricus</u> imparts _____ to yoghurt.

   a) taste   b) aroma

   c) flavour   d) colour

8) _____ combination of sugars is present in grapes.

   a) glucose-sucrose   b) glucose-lactose

   c) glucose-fructose   d) sucrose-fructose

9) Biopolymer glucan is recovered by using _____ solvent.

   a) methanol   b) ethanol

   c) ethylene   d) acetylene

10) An auxotroph of <u>S</u>. <u>typhimurium</u> is used to test

   a) mutagen   b) pyrogen

   c) allergen   d) toxin

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

   1) List out the factors that define food as a substrate.

   2) Define wine.

   3) Write uses of dextran.

   4) What is malting ?

   5) Describe cross flow filtration.

   6) Describe evaporation.

   7) Write about the recovery of streptomycin.

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

    1) Give brief account of curd as a fermental dairy product.

    2) Give a brief account of microbial spoilage of wine.

    3) Give a brief account of toxicity testing.

  B) Give an account of whole broth processing. **4**

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

    1) Give an account of insulin as rDNA product.

    2) Describe pyrogen test.

    3) Describe computer applications in the fermentation process.

5. Write answers to **any two** of the following : **10**

    1) Give an account of production of sherry.

    2) Give an account of bread as fermented food.

    3) Describe precipitation process for recovery of fermentation product.

_____

B.Sc. Part – III (Semester – V) Examination, 2014
ZOOLOGY
Special Paper – XI : Comparative Anatomy of Chordates

Day and Date : Saturday, 12-04-2014   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** and labelled diagrams **wherever** necessary.

1. Select the appropriate answer from each of the following and rewrite the sentence :   **10**

   1) _____ gland is a compound tubular gland.

     a) Sweat   b) Salivary   c) Mammary   d) Sebaceous

   2) Connection between III and IV aortic arch is called as _____

     a) Ductus botali   b) Ductus caroticus

     c) Truncus aorta   d) Systemic aorta

   3) A pneumatic endoskeleton is present in _____

     a) Avian   b) Mammalian c) Reptilian   d) Pisces

   4) Oily secretion produced by _____ glands keeps the skin soft and leathery in mammals.

     a) Scent   b) Sweat   c) Mucus   d) Sebaceous

   5) _____ is one of the contributory bones of pelvic girdle of vertebrates.

     a) Ilium   b) Coracoid   c) Scapula   d) Pterygoid

   6) Odontoid process is the peculiar feature of vertebra of mammals

     a) Axis   b) Thoracic   c) Caudal   d) Lumber

   7) Heart of _____ shows highly reduced sinus venosus.

     a) Cartilage fishes   b) Bony fishes

     c) Amphibian   d) Reptilian

8) Metanephros kidney is present in _____

   a) Elasmobranchs   b) Bonyfishes

   c) Cyclostomes   d) Aves

9) Gills of cartilage fishes are described as _____ gills.

   a) Lamelliform   b) A branch   c) Filiform   d) Dermiform

10) Lungs of pigeon are provided with _____ air sacs.

   a) Four   b) Eight   c) Nine   d) Ten

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

   1) Skin of scoliodon.

   2) Brain of reptilian.

   3) What is columella auris ?

   4) Typical vertebra of frog.

   5) Mammary gland.

   6) Heart of mammals.

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

     1) Fore gut in birds.

     2) Pronephros kidney.

     3) Lungs of reptiles.

  B) Write the answer :   **4**

     Ultrafiltration in metanephros kidney.

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

   1) Explain evolutionary changes in heart of vertebrates.

   2) Describe fore gut in frog.

   3) Describe soft derivatives of vertebrates.

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

   1) Give an account of respiratory organs in amphibians.

   2) Describe brain of scoliodon and compare with that of you have studied and compare with that of frog.

_____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – XI)
Environmental Geology

Day and Date : Saturday, 12-4-2014 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 given options : **10**

1) Coastal hazard management is required to reduce _____ hazard mainly.
   a) Cyclone
   b) Tsunami
   c) Both Cyclone and Tsunami
   d) Subsidence

2) If the vegetation is grown on the slope at catchment, it reduce risk of _____
   a) Volcano
   b) Tsunami
   c) Flood
   d) Cyclone

3) Subsidence is caused due to _____
   a) Illegal Underground mining
   b) Flood
   c) Tsunami
   d) Open cast mining

4) Rainwater mixed with ash and pyroclasts causes mud-flow is due to _____
   a) Flood
   b) Landslide
   c) Subsidence
   d) Volcano

5) Artificial levee are built along river banks to prevent _____
   a) Landslide
   b) Flood
   c) Subsidence
   d) Tsunami

6) The science which deals with the inter-relationship of various earth processes, their consequences and activities of man is _____
   a) Ecology
   b) Geology
   c) Environmental geology
   d) Geography

7) Coastal hazard by sea level change is having main reason of _____
   a) Ice melting
   b) Waves
   c) Flood
   d) Subsidence

P.T.O.

8) Reduction in carrying capacity of river may cause _____
   a) Tsunami
   b) Subsidence
   c) Landslide
   d) Flood

9) Pyroclastic material causes _____ hazard.
   a) Volcanic
   b) Flood
   c) Mining
   d) Subsidence

10) Open cast mining affects environment mainly due to _____
   a) Dust
   b) Vegetation removal
   c) Sound
   d) Oil

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

   1) Explain how duration and intensity of rainfall affects landslide.

   2) What is the role of ground water in the process of subsidence ?

   3) What are hazardous products of volcano ?

   4) Explain 'Ouch Ouch' disease.

   5) Explain Fluorosis.

   6) Explain how heart disease is caused due to mining.

3. A) Answer **any two** :   **6**
   1) Explain remedies for coastal hazards.
   2) Explain role of slope angle and shape of material that causes or influences landslide.
   3) Explain subsidence caused in limestone region.

   B) Explain role of dam in flood control.   **4**

4. Answer **any two** :   **10**

   1) Explain role of rock structures that causes landslide.

   2) Explain environmental effects of sea level changes.

   3) Explain the prevention methods of subsidence.

5. Answer **any two** :   **10**

   1) Explain hazards caused due to blasting in underground mining.

   2) Explain hill slope benching, contur trenching drains to prevent landslide.

   3) Explain causes of flood in highly populated urban areas. Add note on landslide caused due to urbanization.

_____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
MICROBIOLOGY   Special Paper – XI
Agricultural Microbiology

Day and Date : Saturday, 12-4-2014   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. Rewrite the following sentences by selecting correct answer from given alternatives :   **10**

   i) In nitrogen cycle, the ammonia combines with organic acid and results in the formation of

     a) Glutamic acid   b) Glutamine

     c) Glucose   d) Fructose

   ii) _____ organism is involved in methane oxidation.

     a) Methanococcus   b) Methanobacter

     c) Methylocystis   d) All of these

   iii) Xanthomonas oxynopoides causes infection called

     a) Whip smut of sugarcane   b) Oily spot on pomegranate

     c) Soft rot of potato   d) Curling of leaves in mango

   iv) In vermi composting on an average _____ no of adult earthworms are necessary.

     a) 20   b) 200

     c) 2000   d) 20,000

v) The transformation of complex compounds to simpler compounds by organism is _____ type of reaction.

a) Diffusion   b) Detoxification

c) Activation   d) Degradation

vi) _____ enzyme oxidize aromatic lignin containing one or two hydroxyl groups.

a) Oxygenases   b) Cellulases

c) Phenol oxidases   d) Laccases

vii) The cleavage of phosphorous from organic matter in soil is done by _____ enzyme.

a) Oxidases   b) Oxygenases

c) Phosphorylases   d) Phosphatases

viii) For satisfactory aerobic composting , the desirable moisture content is _____ %.

a) 80 – 90   b) 70 – 80

c) 40 – 60   d) 10 – 20

ix) Most abundant component of plant cell wall is _____ .

a) Cellulose   b) Hemi cellulose

c) Lignin   d) Pectin

x) The causative agent of whip smut of sugarcane is _____ organism.

a) <u>Xanthomonas citri</u>   b) <u>Xanthomonas oxynopoides</u>

c) <u>Ustilago scitaminea</u>   d) All of these

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

i) What is town compost ?

ii) What is nitrification ?

iii) What is vermi compost ?

iv) Write the properties of soil.

v) What is solubilization of phosphorous ?

vi) Define activation reaction in pesticide degradation.

vii) What is denitrification ? Give on example of denitrifying organism.

3. A) Answer the questions in brief (**any two**) : **6**

    i) Write in detail different factors governing cellulose biodegradation.

    ii) Discuss in detail role of microorganisms in carbon cycle.

    iii) Write about biodegradation of aliphatic hydrocarbons.

  B) Write about biochemistry of cellulose degardation. **4**

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

    i) Discuss in detail biodegradation of lignin.

    ii) Discuss in detail 'soil as an ecosystem'.

    iii) Explain in short 'sulfur cycle'.

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

    i) Explain in short nitrogen cycle.

    ii) Discuss in detail whip smut of sugarcane.

    iii) Discuss in brief biodegradation of pesticides.

———————————

Seat No.

B.Sc. III (Semester – V) Examination, 2014
PHYSICS (Special Paper – XII)
Electrodynamics

Day and Date: Tuesday, 15-4-2014　　　　　　　　　　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) Transformer ratio is given by

    a) $\dfrac{\in_2}{\in_1} = \dfrac{N_2}{N_1}$　　　b) $\dfrac{\in_2}{G} = \dfrac{N_1}{N_2}$　　　c) $\dfrac{\in_1}{\in_2} = \dfrac{N_2}{N_1}$　　　d) $\dfrac{\in_1}{2\in_2} = \dfrac{N_2}{N_1}$

    ii) Light is a _____ wave.
    a) Magnetic　　　　　　　　　b) Electric
    c) Electromagnetic　　　　　　d) Stationary

    iii) Skin depth is a function of
    a) Conductivity　　b) Permeability　c) Permittivity　　d) Reflectivity

    iv) Electric field ($\vec{E}$), magnetic field ($\vec{H}$) are mutually perpendicular to
    a) Current density ($\vec{J}$)　　　　b) Polarisation vector ($\vec{P}$)
    c) Magnetisation ($\vec{M}$)　　　　d) Propagation vector ($\vec{K}$)

    v) Poynting's vector is represented as
    a) $\vec{N} = \vec{E} \times \vec{H}$　　　b) $\vec{H} = \vec{N} \times \vec{E}$　　c) $\vec{E} = \vec{N} \times \vec{H}$　　d) None of these

    vi) _____ law explains inertia in electrodynamics.
    a) Kirchoff's law　　　　　　　b) Ohm's law
    c) Ampere's law　　　　　　　d) Lenz's law

    vii) The trajectory of a charged particle moving in a constant, uniform magnetic field is
    a) Cycloid　　　　b) Circle　　　　d) Parabola　　　d) Hyperbola

viii) Mathematical formulations of empirical laws in electricity and magnetism are known as
   a) Maxwell's equations
   b) Faraday's equations
   c) Lorentz's equations
   d) Einstein's equations

ix) Equation of continuity is
   a) $\nabla \cdot \vec{J} = -\partial \rho / \partial t$
   b) $\nabla \times \vec{J} = -\partial \rho / \partial t$
   c) $\nabla \cdot \vec{J} = -\phi$
   d) $\nabla \cdot \vec{J} = \partial \rho / \partial t$

x) Self inductance per unit length of conductor is
   a) $8\pi / \mu_0$
   b) $\mu_0 \pi / 8$
   c) $8\pi\mu_0$
   d) $\mu_0 / 8\pi$

2. Answer **any five** of the following : **10**
   1) Define displacement current density $\vec{D}$.
   2) Define Faraday's law of induction.
   3) State differential form of Gauss Law in electrostatics.
   4) Define permeability and permittivity of free space.
   5) Define total internal reflection.
   6) Define wave impedance and state its unit.

3. A) Answer **any two** of the following : **6**
      1) Define $\nabla \times \vec{B} = \mu_0 \vec{J}$.
      2) State and explain Lenz's law of electromagnetic induction.
      3) State Maxwell's equations in material medium.

   B) Explain mutual inductance and derive Newmann's formula. **4**

4. Answer **any two** of the following : **10**
   1) State and prove Ampere's circuital law.
   2) Explain the motion of charged particle in uniform constant electric field.
   3) Prove the orthogonality of $\vec{E}$, $\vec{B}$ and $\vec{K}$ vectors of an EM wave.

5. Answer **any one** of the following : **10**
   1) Obtain the solution of Laplace's equation in spherical coordinate system, when potential is independent of azimuthal coordinate.
   2) Obtain the boundary conditions for EM field vectors $(\vec{D}, \vec{E}, \vec{B}$ and $\vec{H})$ at the interface of two media.

_____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
BOTANY
Special Paper – XII : Plant Biochemistry

Day and Date : Tuesday, 15-4-2014   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) Starch is a polymer of
     a) Glucose   b) Fructose   c) Ribose   d) Xylose

   ii) Human milk contains _____ lactose.
     a) 2.5%   b) 7%   c) 5%   d) 3%

   iii) In wheat _____ starch grains are present.
     a) Excentric   b) Concentric   c) Polygonal   d) Dumbbell shaped

   iv) _____ are amphipathic.
     a) Polar lipids   b) Proteins   c) Carbohydrates   d) Nucleic acids

   v) Palmitic acid is
     a) Saturated fatty acid   b) Unsaturated fatty acid
     c) Organic acid   d) Amino acid

   vi) The term lipid was first used by
     a) Bloor   b) Hatch   c) Kreb   d) Calvin

   vii) Amino acid containing two amino groups and two carboxylic groups is designated as
     a) Monoamino mono carboxylic   b) Diamino mono carboxylic
     c) Monoamino dicarboxylic   d) Diamino dicarboxylic

   viii) Amino acids are readily soluble in
     a) Water   b) Benzene   c) Acetone   d) Alcohol

P.T.O.

ix) In _____ structure the aminoacids are linked in linear fashion forming a backbone of proteins.

    a) Primary   b) Secondary   c) Tertiary   d) Quaternary

x) Synthesis of m-RNA on DNA strand is called

    a) Transformation   b) Translation

    c) Translocation   d) Transcription

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

  i) Give an outline of classification of lipids.

  ii) Explain any two chemical properties of cellulose.

  iii) What is optical activity ?

  iv) What are proteins ? Enlist two sources of proteins.

  v) What is the difference between oils and fats ?

  vi) Mention the role of ribosomes in protein biosynthesis.

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

   i) What are oligosaccharides ? Mention any two properties of Maltose.

   ii) Explain primary structure of proteins.

   iii) What are saturated fatty acids ? Write structure of any one saturated fatty acid you have studied.

  B) Give an account of functional classification of proteins.   **4**

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

  i) Explain the reactions of aspartate biosynthesis.

  ii) Explain in brief the reactions of beta oxidation of fatty acids.

  iii) What is starch ? Give an account of reactions of starch degradation.

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

  i) What are aminoacids ? Explain the properties of aminoacids.

  ii) Explain in brief the biosynthesis and degradation of sucrose.

  iii) What is gluconeogenesis ? Write an outline of glyoxylate cycle.

_____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – XII)
Developmental Biology

Day and Date : Tuesday, 15-4-2014   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. Select appropriate answer from each of the following and rewrite the sentences : **10**

   1) The egg of frog is termed as _____ egg.
      a) microlecithal   b) mesolecithal
      c) macrolecithal   d) alecithal

   2) Chick embryo looses its bilateral symmetry after _____ hrs. incubation.
      a) 33   b) 21   c) 48   d) 72

   3) The cleavage in frog is
      a) meroblastic   b) discoidal
      c) holoblastic and unequal   d) superficial

   4) Chorda cells of amphioxus blastula develop into
      a) nerve cord   b) notochord   c) coelom   d) mesoderm

   5) Allantois works as _____ of chick embryo.
      a) lungs   b) heart   c) brain   d) stomach

   6) Smallest spermatozoon is found in
      a) human   b) chick   c) amphioxus   d) frog

   7) In case of chick embryo beating of heart starts at _____ hours of incubation.
      a) 72   b) 60   c) 48   d) 29

P.T.O.

8) In chick the fertilization is

   a) internal   b) superficial   c) external   d) discoidal

9) Centrolecithal eggs are found in

   a) frog   b) bird   c) insect   d) chick

10) Fertilizin is _____ in nature.

   a) carbohydrates   b) protein

   c) fats   d) glycoprotein

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

  i) Sperm of amphioxus

  ii) Superficial cleavage

  iii) Internal and external fertilization

  iv) Cleidoic egg

  v) Microlecithal egg

  vi) Amphimixis.

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

    i) Activation of egg

    ii) Significance of cloning

    iii) Chorial placenta.

  B) Fertilizin – antifertilizin reaction.   **4**

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

  i) Primitive streak

  ii) Formation of nerve chord and notochord in amphioxus

  iii) Cleavage in amphioxus.

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

  i) Describe the structure of 48 hrs. chick embryo.

  ii) What are foetal membranes ? Describe any two foetal membranes in chick.

_____

Seat
No.

B.Sc. – III (Sem. – V) Examination, 2014
STATISTICS (Special Paper – XII)
Operations Research and Applied Statistics

Day and Date : Tuesday, 15-4-2014　　　　　　　　　　　　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) For maximization L.P.P., the simplex method is terminated when _____ are non-negative.

   　a) some net-evaluations　　　　　　b) few net-evaluations

   　c) all the net-evaluations　　　　　d) none of these

   ii) The role of artificial variables in simplex method is

   　a) to aid in finding initial basic feasible solution

   　b) to start phases of simplex method

   　c) to find shadow prices from the final simplex table

   　d) none of these

   iii) An assignment problem can be

   　a) designed and solved as a transportation problem

   　b) of maximization type

   　c) solved only if number of rows equals the number of columns

   　d) all of these

   iv) The solution of a transportation problem with m-sources and n-destinations is feasible, if the number of allocations are

   　a) $m + n + 1$　　　　　　　　　　b) $m + n - 1$

   　c) $m + n$　　　　　　　　　　　　d) mn

P.T.O.

v) In the context of network, which of the following is not correct ?

   a) A network is a graphic representation of activities and nodes

   b) A project network cannot have multiple initial and final nodes

   c) An arrow diagram is essentially a closed network

   d) An arrow representing an activity may not have a length and shape

vi) The slack for an activity in network is equal to

   a) LS-ES   b) LF-LS

   c) EF-ES   d) EF-LS

vii) When there is no defective in the lot, the OC function for $p = 0$ is

   a) $L(p) = 0$ b) $L(p) = 1$

   c) $L(p) = \infty$ d) none of these

viii) The expected sample size required to arrive at a decision about the lot is called

   a) a random variable   b) average sample number

   c) both a) and b)   d) none of these

ix) The probability of accepting a lot with fraction defective p_t is known as

   a) consumer's risk   b) type I error

   c) producer's risk   d) none of these

x) 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

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

   i) Define a solution of a L.P.P.

   ii) Write a standard form of a L.P.P. in matrix form.

   iii) What is an unbalanced assignment problem ?

iv) Define a transportation problem.

v) In a single sampling plan if incoming lots are of quality $p = 0.01$, $P_a = 0.9397$ and the lot size N is large relative to the sample size n, then find approximate value of AOQ.

vi) Define optimistic time in a PERT.

3. A) Answer **any two** of the following : **6**
   i) Give the mathematical form of an assignment problem.
   ii) Give the criteria for deciding whether obtained solution of a L.P.P. is an unbounded solution.
   iii) Define project duration, earliest event time and latest event time.

   B) For a single sampling plan with lot size N, $n = 50$, $c = 1$ and $p = 0.015$, find the probability of not acceptance of the lot. **4**

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

   i) Solve the following LPP graphically

   Maximize $z = x_1 + x_2$

   subject to the constraints

   $x_1 + x_2 \leq 1, -3x_1 + x_2 \geq 3$

   and $x_1 \geq 0, x_2 \geq 0$.

   ii) Explain method of Matrix Minima.

   iii) Write a procedure of single sampling plan.

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

   i) Find IBFS to the following L.P.P. and test whether it is an optimum by using simplex method

   Maximize $z = 2x_1 + 4x_2$

   subject to :

   $x_1 + 2x_2 \leq 5, x_1 + x_2 \leq 4$

   and $x_1, x_2 \geq 0$.

ii) A project schedule has the following activities and the time (in months) of completion of each activity.

Activity	1-2	2-3	1-3	3-4	2-5	4-5
Time	2	5	6	3	14	5

Draw the network diagram and find the minimum time of completion of the project.

iii) Find IBFS to the following transportation problem by using Vogel's Approximation Method.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

_____

SLR-C – 152

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – XII)
Hydrogeology and Remote Sensing

Day and Date : Tuesday, 15-4-2014   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) The water level in a well penetrating a confined aquifer is the elevation of
      _____ surface.

      a) Pegeometric   b) Piezometric

      c) Geometric   d) Hydrometric

   2) _____ has least porosity.

      a) Shale   b) Basalt   c) Sandstone   d) Limestone

   3) Transmissivity mainly depends on _____ of aquifer.

      a) Length   b) Depth

      c) Thickness   d) None of above

   4) Standstone is

      a) Aquifuse   b) Aquiclude   c) Aquifer   d) Aquitard

   5) _____ is a impermeable formation neither containing nor transmitting
      water.

      a) Aquifuge   b) Aquifer   c) Aquitard   d) Aquiclude

   6) _____ is an active type of sensor.

      a) MSS   b) Radar

      c) Camera and film   d) Linear scanner

P.T.O.

7) _____ μ m is the wavelength of thermal IR .

   a) 3 to 14   b) 0.4 to 0.7   c) 0.3 to 0.4   d) 0.3 to 3

8) Most common air photographs used are

   a) Vertical, and Black and White   b) Vertical and colour

   c) Oblique and colour   d) Oblique and Black and White IR

9) Texture on black and white air photographs means various arrangement of _____ elements.

   a) Drainage   b) Tonal   c) Soil   d) Shadow

10) Straight stream segments on air photographs indicate

   a) Fractures   b) Folds   c) Cleavage   d) Granite

2. Write **any five** of the following :   **10**
   a) Panchromatic Black and White air photographs.
   b) Tone.
   c) Visible spectra.
   d) Zone of saturation.
   e) Perched watertable.
   f) Porosity.

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

      a) Parameters of geological aquifers

      b) Confined aquifer

      c) Signatures of vegetation, drainage, water bodies and rocks on black and air photographs   .

   B) Concept of remote sensing.   **4**

4. Describe **any two** of the following :   **10**
   a) Alluvium deposits and volcanic rocks as geological aquifers.
   b) Groundwater basins and unconfined aquifers.
   c) Specific yield.

5. Explain **any two** of the following :   **10**
   a) Vertical and oblique air photographs.
   b) Aerial photography.
   c) Multi-spectral scanner.

_____

Seat No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XIII)
Nuclear Physics

Day and Date : Thursday, 10-4-2014　　　　　　　　　　　Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

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

　1) In synchrocyclotron, resonance condition is maintained by changing
　　a) frequency of electric field
　　b) strength of magnetic field
　　c) both frequency of electric field and strength of magnetic field
　　d) none of (a), (b) and (c)

　2) GM counter in GM plateau region is sensitive to particles which are
　　a) positively charged　　　　　　　b) negatively charged
　　c) neutral　　　　　　　　　　　　d) of any kind

　3) The counting rate of scintillation counter is _____ than GM counter.
　　a) slower　　　　b) faster　　　　c) slower or faster　d) very slow

　4) Energy equivalent to 1 a.m.u. is
　　a) 931 MeV　　　b) 931 BeV　　　c) 931 KeV　　　d) 931 eV

　5) The spin of nucleus is the resultant of the spins of
　　a) all constituent neutrons　　　　　b) all constituent protons
　　c) all constituent protons and neutrons　　d) all constituent mesons

　6) Complete the reaction $_3Li^7 + {}_1H^1 \rightarrow \left({}_4Be^{*9} \right) \rightarrow$ ——— $+ {}_0n^1$
　　a) $_2He^4$　　　b) $_3Li^6$　　　c) $_4Be^8$　　　d) $_4Be^9$

　7) The discovery of nuclear fission was made by
　　a) Einstein　　　b) Rutherford　　　c) Fermi　　　d) Dirac

P.T.O.

8) The energy released per fission of U^{235} is about
   a) 200 MeV   b) 931 MeV   c) 500 MeV   d) 100 MeV

9) The field particle in electromagnetic forces is
   a) muon   b) pion   c) photon   d) positron

10) The antiparticle of electron is
   a) proton   b) antiproton   c) photon   d) positron

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

   1) What is the principle of betatron ?

   2) Write any two advantages of bubble chamber.

   3) What are exothermic and endothermic nuclear reaction ?

   4) Define packing fraction of a nucleus.

   5) Write any one stripping reaction.

   6) What are quarks ?

3. A) Answer **any two** of the following :   **6**
   1) Sketch the labelled diagram of betatron.
   2) State the classification of elementary particles on the basis of interactions.
   3) Write in short the atomic energy programme in India.

   B) Calculate the Q value of the following reaction and comment on its result

   $$_1H^3 + {}_1H^2 \rightarrow {}_2He^4 + {}_0n^1$$
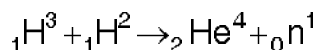
   Given : Mass of $_1H^3 = 3.0169982$ a.m.u.
   Mass of $_1H^2 = 2.0147361$ a.m.u.
   Mass of $_2He^4 = 4.0038727$ a.m.u.
   Mass of $_0n^1 = 1.0089832$ a.m.u.   **4**

4. Answer **any two** of the following :   **10**
   1) Write the principle and construction of Geiger-Muller counter.
   2) Write note on nuclear pile.
   3) Define binding energy. Explain the binding energy curve.

5. Answer **any one** of the following :   **10**
   1) Describe the construction and working of cyclotron. 'Cyclotron can not accelerate electron', why ?
   2) Discuss semi-empirical mass formula.

   _____

SLR-C – 161

B.Sc. – III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XIII)
Metric Spaces

Day and Date : Thursday, 10-4-2014   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) Consider the two statements :
       (A) The interval $(0, \infty)$ is bounded subset of IR^1.
       (B) The interval $(0, \infty)$ is bounded subset of IR_d then
       a) only (A) is true
       b) only (B) is true
       c) Both (A) and (B) are true
       d) Both (A) and (B) false

    2) The union of infinite number of closed subsets of a metric space is
       a) Open   b) Closed   c) Not closed   d) None

    3) If A is not bounded then diam A =
       a) ∞ b) $-\infty$ c) 1   d) 0

    4) If $M = IR_d$, the real line with discrete metric and if a is any point in IR_d, then
       B [a ; 1] =
       a) {a}   b) {1}   c) [a, 1]   d) IR_d

    5) Let $\langle m, \rho \rangle$ be a complete metric space, T is contraction on M, then there is
       one and only one point x in M such that
       a) Tx = x   b) T = x
       c) Tx = 0   d) None of these

    6) Every convergent sequence in a metric space is
       a) Divergent   b) Cauchy sequence
       c) Oscillatory   d) None

P.T.O.

7) If E be the subset of metric space M, then E is closed subset of M if

   a) $E = \bar{\bar{E}}$

   b) $E = \bar{\bar{E}}$

   c) $E \neq \bar{\bar{E}}$

   d) None of these

8) If $g(x) = x^2$; $(-\infty < x < \infty)$ then g attains maximum value at
   a) $x = 1$

   b) $x = 2$

   c) $x = -1$

   d) None of these

9) The mapping $\rho : \mathbb{R} \times \mathbb{R} \to \mathbb{R}$ be defined by $\rho(x, y) = |x - y|$; $\forall\, x, y \in \mathbb{R}$ then
   ρ is called
   a) discrete metric
   b) absolute value metric
   c) pseudo metric
   d) none of these

10) Every compact metric space is
    a) Complete and not bounded
    b) Complete and totally bounded
    c) Bounded and not complete
    d) Complete and not totally bounded

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

   1) Define bounded and totally bounded set.

   2) Prove that every subset of $\mathbb{R}_d$ is open.

   3) Prove that closed subset A of compact metric space $\langle M, \rho \rangle$ is compact.

   4) If $T(x) = x^2$, $\left(0 \le x \le \dfrac{1}{3} \right)$ then prove that T is contraction on $\left[0, \dfrac{1}{3} \right]$

   5) If $\lim\limits_{x \to a} f(x) = L$, $\lim\limits_{x \to a} g(x) = M$ then prove that $\lim\limits_{x \to a} [f(x) + g(x)] = L + M$

   6) Prove that $\left\{ \dfrac{1}{e^n} \right\}_{n=1}^{\infty}$ is in l^2 space.

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

   1) Prove that if E is any subset of a metric space M then $\bar{E}$ is closed .

   2) If $\lim\limits_{x \to 3} (x^2 + 2x) = 15$ then find $\delta > 0$

   3) If A and B are compact subsets of $\mathbb{R}^1$ then prove that A × B is compact subset of $\mathbb{R}^2$.

   B) Show that if ρ is metric for a set M then so is 2ρ. Is $-\rho$ is metric for M ? Justify. **4**

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

   1) Let $\langle M, \rho \rangle$ be a complete metric space. For each $n \in I$, let F_n be the closed bounded subset of M such that

      a) $F_1 \supset F_2 \supset ... \supset F_n \supset F_{n+1} \supset ...$ and

      b) diam $F_n \to 0$ as $n \to \infty$ then prove that $\bigcap\limits_{n=1}^{\infty} F_n$ contains precisely one point.

   2) State and prove Minkowski inequality in l^2 space.

   3) Let $\langle M_1, \rho_1 \rangle$ and $\langle M_2, \rho_2 \rangle$ be metric spaces and let $f : M_1 \to M_2$ is continuous on M_1. Then prove that $f^{-1}(F)$ is a closed subset of M_1 whenever F is closed subset of M_2.

5. Attempt **any one** : **10**

   1) Let $\langle M, \rho \rangle$ be a complete metric space. If T is contraction on M then prove that there is one and only one point x in M such that Tx = x.

   2) Let $\langle M, \rho \rangle$ be a metric space and let a be a point in M. Let f and g are real valued functions whose domains are subsets of M and if $\lim\limits_{x \to a} f(x) = L$, $\lim\limits_{x \to a} g(x) = N$ then prove that $\lim\limits_{x \to a} f(x) . g(x) = L.N.$

_____

SLR-C – 162

B.Sc. (Part – III) (Semester – VI) Examination, 2014
STATISTICS (Special Paper – XIII)
Statistical Inference – II

Day and Date : Thursday, 10-4-2014 　　　　　　　　　　　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 most pragmatic approach for determining $(1-\alpha)\%$ confidence interval is to find out

   a) Zero width confidence interval

   b) Equal tail confidence interval

   c) The combined area of both the tails is equal to α

   d) None of the above

   ii) For a random sample of size n from a $N(\mu, \sigma^2)$ with known μ, the degrees of freedom of $\chi^2 = \dfrac{\Sigma(x_i - \mu)^2}{\sigma^2}$ is

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

   iii) The hypothesis under test is

   a) simple hypothesis 　　　　　b) alternate hypothesis

   c) null hypothesis 　　　　　d) none of the above

   iv) If β is probability of type – II error and θ is true parameter, $1-\beta(\theta)$ is called

   a) Power of the test 　　　　　b) Power function

   c) OC function 　　　　　d) None of the above

P.T.O.

v) Neyman – Pearson lemma provides

   a) an unbiased test   b) an admissible test

   c) a most powerful test   d) minimax test

vi) Testing $H_0 : \mu = 1500$ against $H_1 : \mu < 1500$ leads to the test of

   a) one sided lower tailed   b) one sided upper tailed

   c) two-tailed   d) all the above

vii) In SPRT decision about the hypothesis is taken

   a) after each successive observation

   b) after a fixed number of observations

   c) atleast after five observations

   d) when the experiment is over

viii) Most frequently used method of breaking the tie is

   a) midrank method   b) average statistics approach

   c) to omit tied values   d) most favourable statistic approach

ix) Ordinary sign test utilizes

   a) Poisson distribution   b) Binomial distribution

   c) Normal distribution   d) None of the above

x) In Wilcoxon's sign-ranked test the statistic T^+ is distributed with variance

   a) $n(n - 1)(2n - 1)/24$ b) $n(n + 1)(2n + 1)/24$

   c) $n(2n + 1)/12$ d) $n(n - 1)(2n + 1)/12$

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

  i) Define an interval estimation.

  ii) Giving an example, define a simple hypothesis and a composite hypothesis.

  iii) Define a test statistic and give an example.

  iv) Define likelihood ratio test (L.R.T.).

  v) Giving an example, define a run in the run test.

  vi) For the median test write the testing problem.

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

    i) Based on a random sample of size n from $f(x; \theta) = \theta x^{\theta-1}$, $\theta < x < 1$, show that the best critical region (B.C.R.) for testing $H_0 : \theta = 1$ against $H_1 : \theta = 2$

    is $\underset{i=1}{\overset{n}{\pi}} x_i \geq C$.

    ii) State the properties of (L.R.T.).

    iii) Give the merits of non-parametric tests as compared to parametric tests.

  B) Write a note on two sample run test. **4**

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

    i) Obtain $100(1-\alpha)\%$ confidence interval for the mean μ of $N(\mu, \sigma^2)$, when σ^2 is known

    ii) Obtain $100(1-\alpha)\%$ confidence interval for σ^2 when μ is known of $N(\mu, \sigma^2)$.

    iii) Based on a random sample of size n from $p(x; \lambda) = \dfrac{e^{-\lambda}\lambda^x}{x!}$; x = 0, 1, 2, ...,

    show that the most powerful critical region of size not exceeding α for testing $H_0 : \lambda = \lambda_0$ against $H_1 : \lambda = \lambda_1$ is of the form

    $\overline{x} \leq A_\alpha$ if $\lambda_0 > \lambda_1$

    $\overline{x} \geq B_\alpha$ if $\lambda_0 < \lambda_1$

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

    i) Let X be a Bernoulli variate with p.m.f. $p(x, \theta) = \theta^x (1-\theta)^{1-x}$, x = 0, 1 ; $0 \leq \theta \leq 1$. Construct SPRT of strength (α, β) for testing $H_0 : \theta = \theta_0$ against $H_1 : \theta = \theta_1 (\theta_1 > \theta_0)$.

    ii) Obtain the (L.R.T.) for testing $H_0 : \mu = \mu_0$ against $H_1 : \mu \neq \mu_0$ based on a random sample from $N(\mu, \sigma^2)$ when both μ and σ^2 are unknown.

    iii) Explain in brief the median test.

———————

SLR-C – 163

B.Sc. Part – III (Semester – VI) Examination, 2014
GEOLOGY (Special Paper – XIII)
Crystallography, Principles of Stratigraphy and Earth's History

Day and Date : Thursday, 10-4-2014   Max. Marks : 50

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

Instructions : 1) **All** questions are **compulsory**, carries **equal** marks.
                  2) *Figures to the* **right** *indicate* **full** *marks.*
                  3) *Draw the figures/diagrams* **wherever** *necessary.*

1. Fill in the blanks with correct options :   **10**

    1) Flat surfaces are the elements of _____

       a) glass   b) rocks

       c) opal   d) crystal

    2) Two faces meet together to form _____

       a) face junction   b) solid angle

       c) edge   d) rock

    3) Open and closed are the types of the _____

       a) forms of crystals   b) faces of crystals

       c) types of minerals   d) rocks

    4) Inter-facial angle is measured between _____

       a) two edges   b) two solid angles

       c) two faces   d) minerals

    5) Crystallographic axis is a _____

       a) straight line   b) curved line

       c) wavy line   d) spiral line

6) In the order of superposition of strata, normally the oldest bed is always at the _____

   a) bottom   b) middle

   c) top   d) away

7) Age of the rocks is studied in _____

   a) stratigraphy   b) petrology

   c) mineralogy   d) geochemistry

8) The name J. Hutton is associated with _____

   a) petrology   b) stratigraphy

   c) mineralogy   d) crystallography

9) _____ are studied in bio stratigraphic studies.

   a) rocks   b) minerals

   c) crystals   d) fossil

10) "Present is the key to the past"; this principle is derived by _____

   a) Weller   b) Rutley

   c) Tyrrell   d) Hutton

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

  i) Describe the process of crystallization.

  ii) Define crystal.

  iii) Define law of constancy of interfacial angle.

  iv) Describe principle of order of super position.

  v) Give the explanation for; meaning of correlation.

  vi) Describe the scope of stratigraphy.

3. A) Answer **any two** of the following :   **6**
   i) Describe pinacoids of monoclinic system.
   ii) Describe cube, octahedron and Tris-octahedron.
   iii) Describe 1st, 2nd order pyramids of orthorhombic system.

  B) Describe the Index fossil and its use.   **4**

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

    i) Describe the elements of symmetry of isometric system.

    ii) Describe dodecahedron, trapzohedron, Hex-octahedron. Draw their figures.

    iii) Describe how lateral continuity of rocks can be the criteria for correlation of strata of two different locations.

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

    i) Describe the radio-active age determination for the correlation of rocks.

    ii) Describe the elements of symmetry of hexagonal system. Add note on basal pinacoid of Beryl type mineral.

    iii) Describe the domes of Triclinic system. Draw its diagrams.

———————

Seat
No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
MICROBIOLOGY
Special Paper – XIII : Microbial Genetics

Day and Date : Thursday, 10-4-2014　　　　　　　　　　　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 sentences by choosing correct answers from given alternatives.　**10**

　　i) Site directed Oligonucleotide mutagenesis is commonly employed in

　　　　a) Gene mapping　　　　　　　　b) Gene sequencing

　　　　c) Protein Engineering　　　　　　d) DNA finger printing

　　ii) _____ vector possess centromeric and telemeric regions.

　　　　a) Yacs　　　　b) BACS　　　　c) shuttle　　　　d) λ phage

　　iii) The Folded fibre model of E-coli chromosomes was proposed by

　　　　a) Pettijohn and Hetcht　　　　　b) John Cains

　　　　c) Worcel　　　　　　　　　　　d) Hershy and Chase

　　iv) When two mutations in a region of DNA cause negative Cis-trans test, that region is called as

　　　　a) Muton　　　　b) Cistron　　　　c) Gene　　　　d) Replicon

　　v) DNA fragments are joined by _____ enzyme in DNA replication.

　　　　a) DNA polymerase I　　　　　　b) DNA polymerase II

　　　　c) DNA polymerase III　　　　　　d) DNA ligase

　　vi) _____ enzyme can add phosphate group from ATP to 5' OH end of DS or SS DNA.

　　　　a) Alkaline phosphatase　　　　　b) Acid phosphatase

　　　　c) Polynucleotide kinase　　　　　d) Exonuclease

　　vii) During transcription synthesis of mRNA takes place in _____ direction.

　　　　a) $3' \rightarrow 5'$　　　　　　　　　b) $5' \rightarrow 3'$

　　　　c) $5' \rightarrow 3'$ and $3' \rightarrow 5'$　　　　d) Any

P.T.O.

viii) A base pair substitution that changes codon specific for one amino acid to codon specific for another amino acid is called _____ mutation.

    a) Silent   b) Missense

    c) Non Sense   d) Neutral

ix) ECORI enzyme is obtained from E. coli strain

    a) RI   b) Ry 12   c) Ry 13   d) Ry 1

x) Synthesis of galactosidase permease in E. coli in controlled by _____ gene.

    a) lac O   b) lac Z   c) lac Y   d) Lac a

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

    i) Write briefly on Plasmid

    ii) Write briefly on pTi

    iii) Give brief account of replacement vector

    iv) What are Okazaki fragments ?

    v) Write briefly on 'Microprojectile'.

    vi) What are suppressor mutations ?

    vii) Write briefly on Palindrome sequence.

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

    i) Write briefly on Nonsense mutation.

    ii) Draw a neat labelled diagram of pBR 322.

    iii) Draw a diagram showing structure of Lac Operon.

    B) Write short note on, 'Application of Protein Engineering'.   **4**

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

    i) Describe briefly folded fibre model of E. coli chromosome.

    ii) Describe briefly different methods used for selection of recombinant clones.

    iii) Describe briefly process of Transcription.

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

    i) Describe briefly the enzymes involved in DNA replication.

    ii) Discuss briefly 'Cis-Trans Test'.

    iii) Give brief account of DNA finger printing.

_____

Seat No.

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

Day and Date : Friday, 11-4-2014　　　　　　　　　　　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 or calculator is **allowed**.
　　　　　　　　4) **Neat** diagrams must be drawn **wherever** necessary.

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

　i) Metals are characterized by their _____ electrical and thermal conductivities.
　　a) low　　　　　b) moderate　　　　c) high　　　　d) indefinite

　ii) Brass is a combination of copper and
　　a) zinc　　　　b) tin　　　　c) nickel　　　　d) aluminium

　iii) Resistivity is measured in
　　a) Ω/m　　　b) $\Omega\,m$　　　c) $\mho/m$　　　d) $\mho m$

　iv) The metals in decreasing order of ductivity are
　　a) gold, platinum, silver　　　　　b) silver, gold, platinum
　　c) silver, platinum, gold　　　　　d) none of these

　v) During annealing ductivity
　　a) decreases　　　　　　　　　b) increases
　　c) remains constant　　　　　　d) slowly decreases

　vi) Hot working processes are carried out _____ recrystallization temperature.
　　a) at　　　　　b) below　　　　c) above　　　　d) both b and c

　vii) Thermoplastic polymers are prepared by _____ mechanism.
　　a) addition　　　　　　　　　　　b) condensation
　　c) both addition and condensation　　d) none of these

　viii) Particle size of one. nano-meter is equal to
　　a) 10^{-3}m　　　b) 10^{-6}m　　　c) 10^{-9}m　　　d) 10^{-12}m

ix) Ceramics are the phases containing _____ compound.

   a) metallic   b) non-metallic

   c) metallic and non metallic   d) organic

x) The degree of freedom when ice, water and water-vapour co-exist in equilibrium is

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

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

  i) Define degree of polymerization.

  ii) Copper has a resistivity of $17 \times 10^{-9}\,\Omega$ m. What is its conductivity ?

  iii) Explain the terms a) creep and   b) Fatigue

  iv) State any four properties of ceramic materials.

  v) Explain twinning mode of plastic deformation.

  vi) Define the terms-recrystallization and recrystallization temperature.

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

   i) What are materials ? How are they classified ?

   ii) Explain the term work hardening.

   iii) What are ceramics ? Give the classification of ceramics.

  B) If the average modulus of elasticity of steel used is 205000 MPa, by how much will a wire 2.5 mm in diameter and 3 m long be extended when it supports a load of 500 kg ? (Given $g = 9.8$ m/s^2).   **4**

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

  i) Explain cold working and hot working of metals.

  ii) Obtain the expression for critical resolved shear stress (CRSS) in case of plastic deformation within single crystal.

  iii) Explain in brief the applications of nanophase materials.

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

  i) What is phase diagram ? Draw Al_2O_3-Cr_2O_3 phase diagram and explain the different areas in it.

  ii) What is polymerization ? Explain with examples addition and condensation polymerization.

————————————

SLR-C – 169

B.Sc.-III (Semester – VI) Examination, 2014
BOTANY (Special Paper – XIV)
Systematics of Angiosperms

Day and Date: Friday, 11-4-2014   Max. Marks: 50
Time: 11.00 a.m. to 1.00 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 answer from the given alternatives :   **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) _____ flower is primitive.
      a) Epigynous   b) Hypogynous
      c) Perigynous   d) None of these

   3) Scattered vascular bundles are found in
      a) dicotyledons   b) monocotyledons
      c) gymnosperms   d) none of these

   4) The sporangial initial cell is called as
      a) archesporial cell   b) antipodal cell
      c) secondary nucleus   d) peripheral cell

   5) The development of embryosac in <u>Polygonum</u> is _____ type.
      a) monosporic   b) bisporic
      c) tetrosporic   d) trisporic

6) In typical type of embryosac of Angiosperms the secondary nucleus, is
   a) haploid
   b) diploid
   c) triploid
   d) tetraploid

7) The flowers pollinated by insects are called as
   a) malcophelous
   b) ornithophelous
   c) entemophelous
   d) hydrophelous

8) The development of endosperm in which free nuclear divisions are occurring in _____ endosperm.
   a) helobial
   b) cellular
   c) nuclear
   d) none of these

9) In orchids the seeds are dispersed by
   a) water
   b) wind
   c) animal
   d) none of these

10) <u>Clematis paniculata</u> belong to family
   a) Ranunculaceae
   b) Rutaceae
   c) Fabaceae
   d) Myrtaceae

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

   1) Give primitive characters of flower.

   2) Define flower primordia.

   3) Write in short on tapatum.

   4) Sketch and lebell orthotropous ovule.

   5) Define homogamy.

   6) Give distinguishing characters of cucurbitaceae.

3. A) Answer **any two** of the following : **6**
   1) Describe Anthostrobilus (Bennettitalean) theory of angiosperms.
   2) State role of embryology in relation with taxonomy.
   3) Describe cellular endosperm.

   B) Describe the bisporic embryo sac with suitable example. **4**

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

   1) Give silent features of Engler and Prantl's system of classification.

   2) Write on wind dispersal mechanism in seeds.

   3) Assign **any one** of the given plants to their respective family giving reasons and give its economic use.
      a) Butea monosperma
      b) Callistemon rigidus.

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

   1) What is meant by microsporogenesis ? Add a note on development of male gametophyte.

   2) Give agencies of pollination.

   3) Describe the development of embryo in capsella.

_____

Seat No.

B.Sc. – I (Semester – I) Examination, 2014
Paper – II : BOTANY (Old)
Plant Biochemistry and Horticulture

Day and Date : Thursday, 12-6-2014　　　　　　　　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 the right indicate **full** marks.

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

　　1) Cytoplasm is composed of an aqueous solution is called
　　　　a) Nucleic acid　　　　　　　　b) Protoplast
　　　　c) Cytosol　　　　　　　　　　d) Protoplasm

　　2) The pH value of solution is '7' which is _____ in nature.
　　　　a) Acidic　　　b) Alkaline　　　c) Neutral　　　d) Basic

　　3) Boiling point of water molecule is
　　　　a) $50°$ C　　　b) $100°$ C　　　c) $150°$ C　　　d) $200°$ C

　　4) The structure of ATP and role in energy transfer was studied by
　　　　a) Fiske　　　　　　　　　　b) Rubba row
　　　　c) Lipmann　　　　　　　　　d) Sorenson

　　5) The internation union of biochemistry has recognized _____ major classes of enzyme.
　　　　a) 5　　　　　　b) 6　　　　　　c) 7　　　　　　d) 8

　　6) The study of cultivation and production of vegetables is called
　　　　a) Floriculture　　　　　　　　b) Pomoculture
　　　　c) Olericulture　　　　　　　　d) Preservation

　　7) In arch grafting is known as
　　　　a) Whip grafting　　　　　　　b) Approach grafting
　　　　c) Sadal grafting　　　　　　　d) Cleft grafting

P.T.O.

8) 'Induced fit theory' of mechanism of an enzyme action was proposed by
_____ in 1966.

   a) E. Fischer
   b) D.D. Woods

   c) D. Koshland
   d) Mayrback

9) Onion is naturally propagated by

   a) Bulbs
   b) Suckers

   c) Runners
   d) Tubers

10) 'Air-layering' is also known as _____ layering.

   a) Marcottage
   b) Trench

   c) Simple
   d) Tip

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

   i) Define the cell.

   ii) Define pH.

   iii) Enlist the classes of enzyme.

   iv) Define culting.

   v) Enlist the branches of horticulture.

   vi) What is the effect of stock on seion

3. A) Answer **any two** of the following :   **6**
   i) Explain the patch budding.
   ii) Write short note on landscape gardening.
   iii) Describe the biological significance of water.

   B) Describe the struture of ATP.   **4**

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

   i) Describe the mechanism of enzyme action by lock and key hypothesis.

   ii) Describe in brief cell as biochemical entity.

   iii) Describe in brief, sexual plant progration method.

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

   i) Describe the pH scale with suitable examples.

   ii) Explain the air-layering method of vegetative plant propagation.

   iii) Describe in brief scope and importance of hoticulture.

_____

Seat
No.

B.Sc. Part – III (Semester – VI) Examination, 2014
ZOOLOGY
Special Paper – XIV : Endocrinology, Environmental Biology and Toxicology

Day and Date : Friday, 11-4-2014　　　　　　　　　　　　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** labelled diagrams **wherever** necessary.

1. Select the appropriate answer from **each** of the following and rewrite the
   sentence. **10**

   1) The hormone responsible for regulation of calcium and phosphorus metabolism
      is secreted by
      a) Pancreas　　　　　　　　　　b) Adrenal
      c) Thymus　　　　　　　　　　　d) Parathyroid

   2) _____ gland is both exocrine and endocrine gland.
      a) Pituitary　　　　　　　　　　b) Thyroid
      c) Pancreas　　　　　　　　　　d) Parathyroid

   3) Insulin is secreted by
      a) α-alpha cell of islets　　　　b) β-beta cell of islets
      c) γ-gamma cell of islets　　　d) ρ-rho cell of islets

   4) Calcitonin, a thyroid hormone helps to
      a) elevate Ca^+ level in blood　　b) lower Ca^+ level in blood
      c) elevate K^+ level in blood　　　d) decrease K^+ level in blood

   5) Exophthalmic goiter is due to
      a) hyposecretion of thyroxine　　b) hypersecretion of thyroxine
      c) hyposecretion of calcitonine　d) hypersecretion of calcitonine

P.T.O.

6) Conservation of animals and plants in Zoo's, botanical garden's and laboratories is known as _____ conservation.

   a) In situ   b) Ex situ

   c) In exo   d) Ex vivo

7) Mytilus, an intertidal rocky shore marine molluscan fauna has _____ adaption to its habitat.

   a) Plough like foot   b) Byssal threads

   c) Chitin plate   d) Hooked oral arms

8) Majority of pesticides can be degraded by

   a) aquatic animals   b) aquatic plants

   c) bacteria and fungi   d) amphibians

9) Excess intake of substance than organisms ability to remove it from the body is known as

   a) bioremeadiation   b) bioaccumulation

   c) biodynamics   d) contamination

10) DDT, aldrin and dialdrin are _____ pesticides which are extremely persistent and accumulation in various tissue.

   a) organo phosphorus   b) carbonate

   c) pyrethroid   d) organo chlorine

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

   i) Cretinism

   ii) Role of parathormone

   iii) Pesticides

   iv) TRH

   v) Deciduous forest

   vi) Adaptation in desert animals.

3. A) Answer **any two** of the following : **6**
   i) Regulation of thyroid hormones.
   ii) Solid waste management.
   iii) Biomagnification.

   B) Hormones of islets of Langarhans. **4**

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

   i) Rain water harvesting.

   ii) Characteristics of terrestrial habitat.

   iii) Disorders of thyroid gland.

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

   i) Explain structure and disorders in adrenal gland hormonal secretion.

   ii) Write an account on adaptation of animals to fresh water habitat.

——————

B.Sc. (Part – III) (Semester – VI) Examination, 2014
STATISTICS
Design of Experiments (Special) (Paper – XIV)

Day and Date : Friday, 11-4-2014　　　　　　　　　　　Max. Marks : 50

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

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

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

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

   i) Randomization is a process in which the treatments are allocated to the experimental units.

   a) at the will of the investigator　　　b) in a sequence

   c) with equal probability　　　　　　d) none of these

   ii) If σ_1^2 is the error variance of design-I and σ_2^2 of design-II in the same experiment, the efficiency of design-I over II is

   a) $\dfrac{1}{\sigma_1^2} \Big/ \dfrac{1}{\sigma_2^2}$　　　　　　　　b) $\dfrac{1}{\sigma_2^2} \Big/ \dfrac{1}{\sigma_1^2}$

   c) σ_1 / σ_2　　　　　　　　　d) none of these

   iii) A completely randomized design is also known as

   a) unsymmetric design　　　　　b) non-restrictional design

   c) single block design　　　　　d) all of these

   iv) Randomized block design is a

   a) three restrictional design　　　b) two restrictional design

   c) one restrictional design　　　　d) none of these

   v) Error sum of squares in RBD as compare to CRD using the same material is

   a) more　　　　　　　　　　b) less

   c) equal　　　　　　　　　　d) none of these

vi) Latin Square Design (LSD) possesses
   a) one way classification
   b) two way classification
   c) incomplete three way classification
   d) none of these

vii) The additional effect gained due to combined effect of two or more factors is known as
   a) main effect
   b) interaction effect
   c) either a) or b)
   d) neither a) nor b)

viii) If the same factorial effect is confounded in all the replications, it is known as
   a) partial confounding
   b) complete confounding
   c) conservative confounding
   d) none of these

ix) A split plot design can involve only
   a) two factors
   b) three factors
   c) many factors
   d) none of these

x) If in a Randomized Block Design (RBD) having five treatments and 4 replications a treatment is added, the increase in error degrees of freedom will be
   a) 2
   b) 3
   c) 4
   d) none of these

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

   i) Explain an experimental unit.

   ii) Define a treatment.

   iii) Give situation where missing plot technique is applicable.

   iv) Define main effects in 2^2 factorial experiment.

   v) Explain interaction effects in 2^2 factorial experiment.

   vi) Give real life situations where CRD is used.

3. A) Answer **any two** of the following : **6**
   i) Explain principles of randomization.
   ii) Describe principles of replication in an experiment.
   iii) Explain principles of local control.

   B) What is Latin square design ? Give its layout. **4**

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

   i) What is Randomized Block Design (RBD) ? Give the analysis of variance table for RBD.

   ii) Obtain the formula of estimating efficiency of RBD over the corresponding completely randomized design.

   iii) Explain the concept of confounding in a factorial experiment. Distinguish between total and partial confounding.

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

   i) Describe Completely Randomized Design (CRD). Give the mathematical model and analysis of variance table for CRD.

   ii) Explain the term 'missing plot technique'. Obtain the formula of one missing observation in case of RBD.

   iii) Give the layout of a 2^3 factorial experiment where all the interactions are partially confounded. Give its analysis of variance table.

_____

Seat
No.

B.Sc. – III (Semester – VI) Examination, 2014
ELECTRONICS (Special Paper – XIV)
Advanced Communication

Day and Date : Friday, 11-4-2014
Time : 11.00 a.m. to 1.00 p.m.

Max. Marks : 50

Instructions : 1) *All* questions are *compulsory*.
2) *Figures to the* **right** *indicates* **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) Each cell contains
   a) repeater   b) direct link to branch office
   c) control computer   d) touch tone processor

   ii) The distance of synchronous satellite from earth surface is
   a) 333 Km   b) 36,000 Km   c) 10,000 Km   d) 100 Km

   iii) Permanent bond in OFC is
   a) splicing   b) joinder   c) connector   d) finder

   iv) Start and stop bit are used with _____ data.
   a) synchronous   b) asynchronous
   c) random   d) none

   v) A rule that defines how data transmitted is
   a) hand shake   b) error detection
   c) protocol   d) data specification

   vi) A suitable satellite transmitter frequency is
   a) 30 KHz   b) 30 MHz   c) 3 KHz   d) 300 KHz

   vii) In Klystron amplifier I/P is applied to
   a) catcher   b) buncher   c) stretcher   d) reflexer

P.T.O.

viii) One numaticle mile is _____ statute mile.

    a) 2   b) 1.15   c) 2.15   d) 3.15

ix) _____ is used as a source in OFC.

    a) diode   b) laser diode   c) transistor   d) FET

x) In Avalanche photo diode _____ intrinsic layer is present.

    a) π b) T   c) i   d) L

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

   i) What are the sources and detectors used in OFC ?

   ii) What is communicable satellite ?

   iii) Define transmission line. What are its types ?

   iv) What is modem ? What are its types.

   v) Draw block diagram of mobile transmitter.

   vi) Define bandwidth and channel capacity.

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

     i) Explain with block diagram transmitter used in OFC.

     ii) Explain satellite transponder.

     iii) Write a note on e-mail.

   B) Explain Gunn diode used for microwave communication.   **4**

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

   i) Explain the applications of satellite.

   ii) Explain QAM modem.

   iii) Explain control unit used in cell phone.

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

   i) a) Explain types of optical fiber cables.

      b) List any five applications of radar.

                 OR

   ii) Explain satellite communication system. With the help of necessary block diagram.

_____

Seat
No.

B.Sc. – III (Semester – VI) Examination, 2014
ELECTRONICS (Special Paper – XV)
Embedded system Design

Day and Date : Saturday, 12-4-2014   Total 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 calculators are **allowed**.
4) Draw neat labelled diagram, **wherever** necessary.

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

   1) An embedded system consists of _____ as essential parts.
      a) Hardware   b) Software
      c) Hardware and software   d) None of these

   2) In system programming is the technique of
      a) embedding firmware into target device
      b) developing firmware
      c) simulation of results
      d) none of these

   3) On execution of the statement c = a/b, where a = 10 and b = 3, the value returned to c is _____. All variables are integers.
      a) 3   b) 3.3   c) 1   d) 30

   4) Which of the following is correct ?
      a) unsigned int BCD (int P)   b) unsigned int BCD (int)
      c) unsigned int (int P)   d) none of these

   5) _____ of the following embedded C statement is used to configure I/O port in input mode.
      a) port 0 = 0 × 00H   b) port 0 = FFH
      c) port 0 = 0×FF   d) none of these

6) The _____ is checked to identify the completion of the count.

   a) TF flag   b) TI flag   c) EI flag   d) None of these

7) To communicate from microcontroller to PC through RS 232 the line driver is

   a) 74244   b) 8255   c) Max 232   d) None of these

8) To display the data on LCD, it should be converted into _____ code.

   a) ASCII   b) BCD   c) Hex   d) None of these

9) For designing of an embedded system to measure temperature _____ is essential.

   a) Calibration to temperature scale

   b) Calibration to voltage scale

   c) Calibration to current scale

   d) None of these

10) To generate triangular wave _____ should be interfaced to microcontroller.

   a) V to F converter

   b) DAC

   c) ADC

   d) None of these

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

  i) Define the term " An embedded system.

  ii) What do you mean by superloop ?

  iii) Define the term "constants".

  iv) Draw block diagram for embedded system to generate triangular wave.

  v) List five format specifiers used to format the print data.

  vi) Give the structure of IF statement.

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

    i) Write embedded C program for blinking of the LED.

    ii) What are characteristics of an embedded system ?

    iii) Write a note on user's defined functions.

  B) Discuss the steps involved in programming of microcontroller 8951 by using flash magic tool. **4**

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

  i) What do you mean by structure of C programming ? Write a note on printf () function.

  ii) Draw block diagram and explain hardware of an embedded system designed for temperature measurement.

  iii) Describe the designing of an embedded system for generation of square wave.

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

  i) a) Give the classification of an embedded system.

    b) Write embedded C program for PWM output at any port pin of microcontroller 8951.

        OR

  ii) Describe in detail the designing of an embedded system for measurement of humidity.

Seat
No.

B.Sc. III (Semester – VI) Examination, 2014
CHEMISTRY (Special Paper – XVI)
Analytical and Industrial Organic Chemistry

Day and Date: Tuesday, 15-4-2014   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**, labeled diagrams and give equations **wherever** necessary.

1. Select the most correct alternative from those given below and rewrite the sentence. **10**

   i) Deriphat is a _____ detergent.
      a) ampholytic   b) anionic
      c) cationic   d) none of these

   ii) _____ is an example of synthetic fibre.
      a) cotton   b) wool   c) silk   d) polyester

   iii) Percentage of water present in syrup is _____
      a) 9 – 11   b) 85   c) 35   d) 50

   iv) _____ material becomes permanently hard when heated above the critical temperature.
      a) Thermosetting   b) Thermoplastic
      c) Elastomer   d) Rubber

   v) Bio-catalysts are _____ in action.
      a) highly specific   b) non-specific
      c) stereospecific   d) both a and c

   vi) Alkaline hydrolysis of _____ is called saponification.
      a) nitriles   b) carbohydrates
      c) fats and oils   d) proteins

P.T.O.

vii) Bio-catalysts have following disadvantage/s.

   a) They are not available on large scale

   b) They are heat and pH sensitive

   c) Their repeated use is not possible

   d) All the above three

viii) R_f value depends on _____

   a) solvent system

   b) temperature of environment

   c) size of the vessel in which chromatogram is developed

   d) all the three above

ix) _____ impart flexibility and smoothness to the warp threads.

   a) Lubricants   b) Brightners   c) Starch   d) Adhesives

x) In paper chromatography _____ is the mobile phase.

   a) eluting solvent

   b) water absorbed in cellulose fibres

   c) solvent in which solute is dissolved

   d) helium gas

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

  i) Explain, hydrophilic and hydrophobic molecules.

  ii) Sugarcane is milled immediately after its cutting. Explain.

  iii) What are antistatic and antifoaming agents ?

  iv) What is compound imbibition process ?

  v) Explain the terms – desizing and singeing.

  vi) Explain different types of soaps.

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

   i) What is R_f value and explain why R_f value is less than 1 (one) ?

   ii) What is polystyrene ? Give its preparation and uses.

   iii) How is juice extracted from cane in sugar industry ?

  B) Give classification of chromatographic methods based on nature of the mobile phase and stationary phase.   **4**

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

   i) What are soaps ? Discuss the various types of soaps.

   ii) Give preparation and uses of urea-formaldehyde resin.

   iii) Define fermentation and explain the following terms :
      a) Rectified spirit
      b) Denatured spirit
      c) Absolute alcohol
      d) Power alcohol

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

   i) What is sizing process and discuss different ingredients used for sizing ?

   ii) State twelve principles of green chemistry and explain in detail atom economy and design for energy efficiency.

   iii) State the principle of paper chromatography and discuss the types of paper chromatography.

_____

Seat
No.

B.Sc. III (Semester – VI) Examination, 2014
BOTANY (Special Paper – XVI)
Molecular Biology and Biotechnology

Day and Date : Tuesday, 15-4-2014   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) Draw **neat** and labelled diagrams **wherever** necessary.

I. Write the correct alternatives :   **10**

   1) Lac operon was explained by
      a) Jacob and Monad   b) Holley et.al.
      c) Robert Phillips   d) H.G. Khorana

   2) _____ enzymes are known as molecular scissors.
      a) DNA ligase   b) DNA polymerase
      c) DNA gyrase   d) DNA endonucleases

   3) Protoplast fusion is carried out by using
      a) PEG   b) $NaNO_2$ c) $CaOCl_2$ d) All of these

   4) For production of secondary metabolites _____ culture technique is used.
      a) anther   b) protoplast   c) cell suspension   d) ovule

   5) Agrobacterium tumefaciens does not contain
      a) Ti plasmid   b) Ri plasmid   c) T-DNA   d) Vir region

   6) In eukaryotes _____ different types of DNA polymerases have been identified.
      a) 2   b) 3   c) 4   d) 5

   7) D-loops have been observed in replicating _____ DNA.
      a) viral   b) mitochondrial   c) prokaryotic   d) eukaryotic

8) The credit of discovery of split gene was given to
   a) Phillip Sharp and Richard Roberts   b) Hogness et.al
   c) Chambon et.al   d) Watson and Crick

9) In prokaryotes, the promoter on DNA is sequence of _____ bases called pribnow box.
   a) 6   b) 8   c) 10   d) 12

10) Blotting technique is used to separate
    a) DNA   b) RNA   c) Proteins   d) All of these

II. Answer **any five** of the following :   **10**
   1) Which plasmids are present in agrobacterium and what is their role ?
   2) Give the names of any two transgenic plants.
   3) Define protoplast and somatic hybridization.
   4) Which enzymes are involved in DNA recombinant technology ?
   5) What is gene ? Differentiate between prokaryotic and eukaryotic genes.
   6) Give full form of DNA and its chemical composition.

III. A) Answer **any two** of the following :   **6**
       1) Enlist the enzymes involved in DNA replication.
       2) Mention various gene regulatory mechanisms in eukaryotes.
       3) State the steps in micropropagation technique.

   B) Explain genetic recombination with the help of hybrid DNA model.   **4**

IV. Answer **any two** of the following :   **10**
   1) What is Operon ? Explain Lac-Operon.
   2) What is totipotency ? Describe the technique of anther culture.
   3) What is genetic engineering ? Describe physical methods of gene delivery.

V. Answer **any two** of the following :   **10**
   1) Describe in brief the mechanism of semi conservative mode of DNA replication.
   2) Give the sterilization methods followed in tissue culture.
   3) What is PCR ? Describe the different steps of PCR technique.

_____

SLR-C – 192

B.Sc. (Part – III) (Semester – VI) Examination, 2014
STATISTICS (Special Paper – XVI)
C-Programming

Day and Date : Tuesday, 15-4-2014　　　　　　　　　　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 has been developed at

　　　a) Microsoft Corp., USA　　　　　b) AT & T Bell Labs, USA

　　　c) Borland International, USA　　　d) IBM, USA

　 ii) The expression, a = 7/14*(4.6 + 2)*2/8; evaluates to

　　　a) 0.825　　　　b) 2.8　　　　c) 4.6　　　　d) 0

　 iii) If b is an integer then b = 8% – 3; will return a value

　　　a) 2.66　　　　b) –2.66　　　　c) 2　　　　d) – 2

　 iv) The C-program execution always begin with the function

　　　a) main ( )　　　b) scanf ( )　　　c) printf( )　　　d) none of these

　 v) Which of the following statement is used to jump out of a loop instantly, without waiting to get back to the conditional test in a C-program ?

　　　a) continue　　　b) break　　　c) goto　　　d) none of these

　 vi) The following assignment statement :

　　　x = x * a; can be expressed in compound assignment operator as

　　　a) x * = a;　　　b) x = *a;　　　c) x% = a;　　　d) x *a =;

P.T.O.

vii) If P1 is an integer pointer with an initial value, say 2012, then after the operation P1 = P1 – 1; the value of P1 will be

    a) 2011   b) 2010   c) 2008   d) none of these

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 = strcmp (string1, 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 writing 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 integer constants ?

  ii) Explain the ternary (conditional) operator in C-program.

  iii) Explain if statement in C-programming.

  iv) Explain the use of pointer in C-programming.

  v) Explain puts() with illustration.

  vi) Explain '\n' and '\t' of escape sequence.

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 = 7, b, c;
     b = a++;
     c = ++a;
    printf ("\n a = %d \n b = %d \n c = %d", a, b, c);
  }
```

    ii) Explain closing a file with illustrations.

    iii) Explain scope rule of function in C-program.

  B) Write a C-program to determine whether the given number is prime or not.   **4**

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

   i) Explain do-while statement with illustration.

   ii) State the general form of array declaration in one-dimensional arrays. Write a C-program to find average marks obtained by a class of 20 students in a test by using an array.

   iii) Explain passing pointer as parameters (arguments) of function.

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

   i) Explain the scanf function with illustration

   ii) Explain recursion with illustration

   iii) The marks obtained by a student in a particular subject is input through the key board. The student gets a grading according to the following rules :

Marks	Grade
80 to 100	O
60 to 79	A
50 to 59	B
40 to 49	C
0 to 39	D

   Write a C-program that the grade obtained by the student, using switch statement.

——————————

Seat No.

B.Sc. – III (Semester – VI) Examination, 2014
ELECTRONICS(Special Paper – XVI)
Advanced Electronics Technology

Day and Date : Tuesday, 15-4-2014   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** labelled diagrams **wherever** necessary.

4) **Use** of log table and calcular is **allowed**.

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

1) In direct bandgap semiconductor bottom of conduction band occurs at _____

   a) $K = 0$ b) $K \# 0$ c) $K > 0$ d) $K < 0$

2) Si and Ge are _____ semiconductor materials.

   a) Organic   b) Inorganic

   c) Bad conducting   d) None of these

3) CPLD logic blocks are same as that of _____

   a) PAL   b) PLA   c) FPGA   d) PROM

4) NEMS is acronym for _____

   a) Nano electro mechanical system

   b) Nano electrical mechanical system

   c) Non electrical mechanical system

   d) Non electro mechanical system

5) CNTFET utilizes _____ of carbon nanotubes as the channel materials.

   a) Single   b) Array

   c) Single or array   d) None of these

6) Logic blocks of FPGA contains

   a) Logic element   b) Macro cell

   c) PIA   d) None of these

7) The _____ programming language is a common tool for GSD model.
   a) C   b) G   c) C$^+$ d) C^{++}

8) The front panel is the _____ interface of the VI.
   a) User   b) Backend   c) Internal   d) All of these

9) For two input NAND gate the output statement is Y < = _____
   a) A NAND B   b) NOT (A AND B)
   c) (A AND B) NOT   d) NOT (A NAND B)

10) VHDL is used to model _____ systems.
   a) Analog   b) Digital
   c) Both analog and digital   d) None of these

2. Answer **any five** (**2** marks **each)** :   **10**

   1) State the purpose and type of palettes.

   2) Write the VHDL code for OR gate entity.

   3) State the features of VHDL.

   4) Draw the block diagram of PLA.

   5) Explain carbon nanotube.

   6) Draw the basic structure of RTD.

3. A) Answer **any two** (**3** marks **each**) :   **6**

   1) Explain the advantages of lab VIEW.

   2) Explain organic semiconductor.

   3) Explain the structure of VHDL.

   B) Draw the block diagram of CPLD.   **4**

4. Answer **any two** (**5** marks **each**) :   **10**

   1) Explain the single electron device.

   2) Explain semiconductor heterostructurer.

   3) Write the VHDL code for 4-bit shift register.

5. Answer **any one** :   **10**

   1) Explain SPLD in detail.

   2) Explain the graphical system design model.

_____

Seat No.

B.Sc. (Semester – VI) Examination, 2014
ENVIRONMENTAL STUDIES (Comp.)

Day and Date : Sunday, 27-4-2014
Time : 11.00 a.m. to 1.00 p.m.

Max. Marks : 50

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

1. Multiple choice questions : **10**

   I) Earth day is celebrated on _____.
   　A) 22nd Jan.　　B) 22nd Feb.　　C) 22nd March　　D) 22nd April

   II) 'Sahara' is an example of _____ ecosystem.
   　A) Desert　　B) Forest　　C) Marine　　D) Grassland

   III) Marine life is in danger due to _____ pollution.
   　A) Air　　B) Water　　C) Land　　D) Noise

   IV) _____ gas is responsible for ozone depletion.
   　A) CFC　　B) CO_2　　C) SO_2　　D) O_2

   V) In India Wildlife Protection Act passed in _____.
   　A) 1962　　B) 1972　　C) 1982　　D) 1992

   VI) The main source of air pollution in India is _____.
   　A) Automobiles　　　　　　B) Industrialization
   　C) Forest fire　　　　　　D) Nuclear explosion

   VII) _____ percent of earth geographical area is under water.
   　A) 60%　　B) 61%　　C) 70%　　D) 71%

   VIII) Need for public awareness is important for the _____.
   　A) AIDS　　B) Malaria　　C) Filariasis　　D) Elephantiasis

   IX) The primary source of energy is _____.
   　A) Wind　　B) Sun　　C) Hydal energy　　D) Tidels

   X) Lion is _____ consumer in the ecosystem.
   　A) Primary　　B) Secondary　　C) Tertiary　　D) Heterotrophs

2. Write short answers of the following (**any four** out of six) :   **8**

   a) Definition of environment

   b) Food chain of ecosystem

   c) Causes of water pollution

   d) Causes of generation of solid waste

   e) Biodiversity in Western Ghat

   f) Causes of population growth.

3. Write short notes of the following (**any four** out of six) :   **12**

   a) Forest ecosystem

   b) Uses of minerals

   c) Nuclear Hazards

   d) Remedies of water pollution

   e) Effects of water pollution

   f) Causes of noise pollution.

4. a) What is Forest resources ? Describe how forest resources can be conserved.

          10

          OR

   b) What is pollution ? Discuss the causes, effects and preventive measures of air pollution.

5. Define global warming. Explain the causes and effects of it.   **10**

_____

Seat
No.

B.Sc. – I (Semester – II) Examination, 2014
ENGLISH COMPULSORY (Old)
Realms of Gold

Day and Date : Thursday, 8-5-2014   Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

   i) Vivekananda presented Hinduism as

   a) the only true religion   b) the best of all religions

   c) the mother of all religions   d) the only good religion

   ii) _____ is the planet nearest to the sun.

   a) Earth   b) Venus

   c) Mercury   d) Mars

   iii) The scientific point of view must come out of the

   a) Religion   b) Library

   c) Laboratory   d) Scriptures

   iv) Ballad of the landlord is written by

   a) Langston Hughes   b) Oliver Goldsmith

   c) A. K. Ramanujan   d) Miller Goldsmith

   v) The Champak tree is as old as

   a) uncle   b) brother

   c) sister   d) mother

   vi) The Parliament of religion was opened on

   a) 12 Sept. 1893   b) 11 June 1893

   c) 11 July 1893   d) 11 Sept. 1893

   vii) Rashmi _____ history since morning.

   a) is studying   b) studies

   c) studied   d) will study

P.T.O.

viii) The conference _____ to a close half an hour ago.

   a) come   b) came

   c) will come   d) shall come

 ix) The doctor is busy now but he _____ you after an hour.

   a) sees   b) shall see

   c) will see   d) saw

 x) James _____ cricket when he was in school.

   a) was played   b) is playing

   c) played   d) will play

2. Write short answers of the following (**any five**) :   **10**

   1) How did fate help Vivekananda in returning back to Chicago from Bostan ?

   2) What characteristic features does mercury have ?

   3) Name two ways in which science affects the average man or woman.

   4) Why did the young Vivekananda journey to Chicago ?

   5) What, according to the mother, is the story of the origin of the champak tree ?

   6) Why do the police arrest the Nergo ?

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

   i) Describe the appearance, the personality and the attitudes of Vivekananda as appeared in Vivekananda; The Great Journey to the West.

   ii) What common feature do Venus and Earth share ?

   iii) Describe how the landlord respond to his tenant's request to have his place repaired.

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

   i) How does heat energy help the world ?

   ii) How is science 'ethically neutral' ?

   iii) Comment on the appropriateness of the title 'Ecology'.

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

1) Read the following graph and transfer the information into paragraph :

CLOUDY PICTURE

Rainfall this decade, between 1999 and 2009, has been the lowest in the last eight decades.

Rainfall (mm)

9,600 —
9,400 —
9,200 —
9,000 —
8,800 —
8,600 —
8,400 — 8,402.7
8,200 —
8,000 —
7,800 —

9,497.4
6.6

8,435.8

-5.6

-5.2

% deviation (Right-hand scale)
— 8
— 6
— 4
— 2
— 0
— -2
— -4
— -6
— -8

1900- 1910- 1920- 1930- 1940- 1950- 1960- 1970- 1980- 1990- 2000
1909 1919 1929 1939 1949 1959 1969 1979 1989 1999 2009

Figures for this decade are updated till 19 August

Source: India Meteorological Department

Graphics: Ahmed Raza Khan / Mint

Graphics : Ahmed Raza Khan/Mint.

2) Read the following paragraph carefully and make a note on it.

Animals living in modern zoos enjoy several advantages over animals in the wild; however, they must so suffer some disadvantages. One advantage of living in the zoo is that the animals are separated from their natural predators; they are protected and can, therefore, live without risk of being attached. Another advantage is that they are regularly fed a special, well-balanced diet; thus, they do not have to hunt for food or suffer times when food is hard to find. On the other hand, zoo animals face several disadvantages. The most important disadvantage is that since they do not have to hunt for food or face their enemies, some animals became bored, discontented or even nervous. Another disadvantage is that zoo visitors can endanger their lives. Some animals can pick up airborne diseases from humans.

5. Draft out an advertisement of a newly launched mobile phone. **10**

_____

SLR-C – 28

Seat No.	

B.Sc. I (Semester – II) Examination, 2014
COMPUTER SCIENCE (Paper – III) (Old)
Computer Fundamentals – II

Day and Date : Friday, 9-5-2014   Max. 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** place indicate **full** marks.

1. Choose correct alternatives.   **10**

   1) Windows operating system provide

      a) Graphical user interface   b) Command line interface

      c) Text line interface   d) None of these

   2) _____ is a storage place for deleted files.

      a) Recycle bin   b) My computer   c) Desktop   d) My document

   3) IIs stands for

      a) Internet Information Services   b) Internet Interface Services

      c) Internet Interphase Services   d) All of above

   4) LAN communication speed ranges from

      a) 100 mbps to 200 mbps   b) 10 mbps to 20 mbps

      c) 10 mbps to 100 mbps   d) 10 to 1000 mbps

   5) In internet, the device used to connect two or more network is a

      a) Geteway   b) Telnet   c) Routers   d) Modem

   6) _____ companies developed MS-Office.

      a) Microsoft   b) Novell   c) Coral   d) IBM

P.T.O.

7) Excel files have a default extension of

   a) .XLS   b) .XLW   c) .WKL   d) .XLO

8) Which attribute is used to define the alternate text for an image ?

   a) src   b) alt   c) href   d) link

9) _____ is not a HTML Tag.

   a) <marquee>   b) <B>   c)
      d) <P>

10) To change the fonts and their sizes _____ Toolbar is used.

   a) standard   b) formatting   c) print preview   d) status bar

2. Write the answer of the following question **(any five)**.   **10**

1) What is time quantum ?

2) What is a word processor ?

3) Define one computer network.

4) What is attribute ?

5) Explain the use of Link tag.

6) Define the term microsoft word.

3. A) Write the answer of following questions **(any two)**.   **6**

   1) What is windows operating system ? Explain features of windows O.S.

   2) What is process ? Explain time sharing.

   3) Explain the use of font tag with various attributes.

  B) Write note on CSS ?   **4**

4. Write answer of the following **(any two)**.   **10**

 i) What is internet ? Explain the uses and benefits of internet.

 ii) Explain briefly the contents of the control panel.

 iii) Explain the Hyperlink and image tag with example.

5. Write answer of the following **(any two)**.   **10**

 i) Explain the features of MS-EXCEL.

 ii) What is Javascript ? Explain advantages and disadvantages of Javascript.

 iii) Write the HTML code to display the college/company profile.

_____

SLR-C – 29

B.Sc. (Part – I) (Sem. – II) (Old) Examination, 2014
CHEMISTRY (Paper – IV)
Analytical Chemistry

Day and Date : Saturday, 10-5-2014　　　　　　　　　　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. Wts. H = 1, C = 12, 0 = 16, N = 14, Na = 23, Cl = 35.5]

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

　　1) When the solute undergoes dissociation in second solvent the K is

　　　a) $\dfrac{C_1}{\sqrt{C_2}}$　　　　　　　　　　b) $K = \dfrac{C_1}{C_2}$

　　　c) $K = \dfrac{C_1}{C_2(1 - \alpha)}$　　　　　　d) None of these

　　2) In case of distribution law if $\dfrac{C_A}{C_B}$ is constant then this constant k is called

　　　a) Partition coefficient　　　　b) Van't Hoff factor
　　　c) Velocity constant　　　　　d) None of these

　　3) Rise of liquid in capillary is due to
　　　a) Osmosis　　　　　　　　　b) Surface tension
　　　c) Viscosity　　　　　　　　　d) Diffusion

　　4) Poise is unit of
　　　a) Surface tension　　　　　　b) Parachor
　　　c) Viscosity　　　　　　　　　d) None of these

5) _____ is defined as variability among the replicate measurements.

   a) Error   b) Accuracy

   c) Precision   d) None of these

6) In Kjeldahl's method the nitrogen content of organic compound is quantitatively converted into

   a) HNO_3 b) NH_4OH

   c) NH_4NO_3 d) None of these

7) The dry air passed through combustion tube during the estimation of carbon and hydrogen must be free from

   a) N_2 b) O_2

   c) CO_2 d) None of these

8) The constituent in the wrong amount, at the wrong time, at the wrong place is called

   a) a particulate   b) pollutant

   c) contaminant   d) none of these

9) _____ antacid is used as an anticancer drug.

   a) $AlPO_4$ b) Na_2CO_3

   c) cis-platin   d) $Al(OH)_3$

10) Boron is _____ essential nutrient for plant.

   a) Major   b) Minor

   c) Trace   d) None of these

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

   i) Define additive and constitutive properties. Give one example of each.

   ii) Define an error and accuracy.

   iii) Give the principle of Lassaigne's test for detection of elements.

   iv) Draw a neat and labelled diagram for detection of Carbon and hydrogen by combustion method.

   v) What is green house effect ?

   vi) How will you detect the presence of sugar and starch in the milk ?

3. A) Attempt **any two** of the following : **06**

    i) Give any three methods of minimisation of error.

    ii) Explain the determination of molecular weight of acid by titration method.

    iii) What is air pollution ? Give the health effects of oxides of sulphur.

  B) Solve the problem. **4**

An organic acid has its normal molecular weight in water. In the distribution of the acid between water and benzene, the concentration were found to be as follows :

C_{H_2O} (g.mole/lit)   0.0150   0.0195   0.0296

$C_{C_6H_6}$ (g.mole/lit) 0.242   0.412   0.970

Find the molecular condition of acid in benzene.

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

  i) What is viscosity ? Describe the method of finding the viscosity of a liquid by using Ostwald's viscometer.

  ii) What is an antacid ? Give the properties and functions of Aluminium hydroxide as an antacid.

  iii) 1.8×10^{-4} Kg of organic compound when subjected to combustion method produced 1.08×10^{-4} Kg of H_2O and 2.64×10^{-4} Kg CO_2. Calculate percentage of carbon and hydrogen.

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

  i) Describe the drop-weight method for the determination of surface tension.

  ii) What are the limitations of distribution law ?

  iii) Give the sources of essential nutrients for plants.

_____

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
COMPUTER SCIENCE (Old)
Computer Fundamentals – I (Paper – I)

Day and Date : Wednesday, 4-6-2014   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.

1. Choose correct alternative :   **10**

    1) Floppy disk contains

       a) Circular tracks only   b) Sectors only

       c) Both circular tracks and sectors   d) None of these

    2) _____ does represent an input device.

       a) Speaker   b) Printer   c) Plotter   d) Keyboard

    3) The second generation of computers used

       a) IC-Chip   b) Transistors   c) Vacuum tubes   d) None of these

    4) Laptop PC's are also known as _____ computers.

       a) Mainframe   b) Super   c) Notebook   d) None of these

    5) The number system that we use in our day to day life is called _____ number system.

       a) Octal   b) Binary   c) Hexadecimal   d) Decimal

    6) _____ command is used to display contents of file.

       a) Display   b) View   c) Type   d) Show

    7) The earliest calculating device is

       a) calculator   b) clock   c) abacus   d) computer

    8) A kb is

       a) 1024 bits   b) 1024 bytes   c) 1024 mb   d) 1024 gb

P.T.O.

9) After counting 0, 1, 10, 11, the next number is

   a) 12   b) 100   c) 101   d) 110

10) Multiple choice examination answer sheets can be evaluated automatically by

   a) OMR   b) OCR

   c) MICR   d) Magnetic tape reader

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

   1) MSI and VLSI stands for

   2) What is software ?

   3) Define bit and byte.

   4) $(1110111)_2 * (1011)_2 = (?)_2$

   5) $(111101)_2 + (111111)_2 = (?)_2$

   6) $(6345)_8 = (?)_2$

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

     1) Write a note on secondary memory.

     2) Write advantages and disadvantages of first generation of computer.

     3) Write a note on high level language.

  B) What is input device ? Explain keyboard in detail.   **4**

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

   1) What is printer ? Explain dot matrix printer.

   2) What is operating system ? Explain single user operating system.

   3) Explain different characteristics of computer.

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

   1) Write any five Dos-Commands with example.

   2) Write different applications of the computer.

   3) Write a note on mini computer and main frame computer.

———————————

Seat
No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
PHYSICAL GEOGRAPHY (Paper – III) (Old)
Geomorphology

Day and Date : Monday, 12-5-2014   Max. Marks : 50

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

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

2) **Neat** diagrams and maps must be drawn **whereve**r 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) Dyke is an example of _____ rock.
   a) Igneous   b) Sedimentary   c) Metamorphic   d) Basalt

2) Quartzites are generally formed from
   a) Sandstone   b) Limestone   c) Basalts   d) Granite

3) Marble is a metamorphic rock that form from
   a) Granite   b) Limestone   c) Sandstone   d) Shale

4) Which of the following process causes metals to rust ?
   a) Hydration   b) Carbonation   c) Oxidation   d) Hydrolysis

5) Hydration is the process of _____ weathering.
   a) Biological   b) Physical   c) Mechanical   d) Chemical

6) Animal, plants and men are the agents of _____ weathering.
   a) Chemical   b) Biological   c) Mechanical   d) Physical

7) Which of the following land-form is associated with wind deposition ?
   a) Loess   b) Zeugen   c) Ventifacts   d) Blowout

8) Which of the following land-form is associated with river erosion ?
   a) Flood plain   b) Deltas   c) An Ox-bowlake d) Water fall

9) Tropical hot and humid climate is good for _____ crop.
   a) Wheat   b) Maize   c) Coffee   d) Apple

10) Flat Roof settlements are generally found in _____ region.
   a) Tundra   b) Desert
   c) Tropical rain forest   d) European

2. Answer **any five** questions from the following :   **10**

   1) What is metamorphic rock ?

   2) Mention major rock types.

   3) What are the components of chemical weathering ?

   4) What is erosion ?

   5) State the importance of deltas.

   6) Describe relation between plain regions and settlements.

3. A) Answer **any two** questions from the following :   **6**
   1) Draw a neat diagram of 'Mushroom Rock'.
   2) State the types of weathering.
   3) Components of biological weathering.

   B) Describe major land-forms of the upper course of the river.   **4**

4. Answer **any two** questions from the following.   **10**

   1) Describe major characteristics of sedimentary rocks.

   2) Describe the factors that are responsible for mechanical weathering.

   3) Explain lower course of river and the relief features associated with it.

5. Answer **any two** questions from the following.   **10**

   1) Describe major land-forms produced by wind deposition.

   2) Explain the characteristics and types of igneous rocks.

   3) Explain the relationship between geomorphology with agriculture.

_____

Seat
No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
Paper – IV : ZOOLOGY (Old)
Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Friday, 16-5-2014   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** labeled diagrams **wherever** necessary.

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

   i) The structural and functional system of communities with their environment
      is called as
      a) Biosystem   b) Ecosystem
      c) Microsystem   d) Atmosphere

   ii) The first attempt of scientific study of relationship between soil and earthworm
      was made by
      a) Charles Darwin   b) Charles William
      c) Charles Prince   d) Charles Nepoleon

   iii) _____ is the vestigial organ of man
      a) Limb bone   b) Ileum
      c) Tongue   d) Nictitating membrane

   iv) The worker bees are _____
      a) Sterile females   b) Fertile females
      c) Sterile males   d) Fertile males

   v) The study of behavioural characteristic is called

      a) Ecology   b) Economics   c) Ethology   d) Evolution

   vi) The behavior of disguise of animals in a suitable background for protection
      is called
      a) Suppression   b) Camouflage
      c) Modelling   d) Aggression

                                                                        P.T.O.

vii) _____ is also called as primary consumers.

    a) Carnivores   b) Decomposers

    c) Scavengers   d) Herbevores

viii) _____ is an abiotic factor of an ecosystem.

    a) Water   b) Bacteria   c) Protozoans   d) Fungi

ix) Sting apparatus are not found in _____

    a) Queen bee   b) Drone bee

    c) Worker bee   d) None of all above

x) The fossil study is called as _____

    a) Paleontology   b) Litonology

    c) Osteology   d) Paleogeography

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

    i) Vermiwash

    ii) Mimicry

    iii) Decomposers

    iv) Fossils

    v) Biosphere

    vi) Consumers

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

    i) Describe the ecological pyramids.

    ii) Describe the types of fossils.

    iii) Describe the methods of culturing of earthworm.

  B) Describe the structure of a typical pond ecosystem.   **4**

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

    i) Explain the abiotic factors.

    ii) Describe the energy flow in ecosystem.

    iii) Trace the anatomical evidences of evolution.

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

    i) Give an account of bee hive. Comment on swarming behaviour of bees and add a note on beeway.

    ii) Define the term ecology and give its aims and scope.

_____

Seat
No.

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

Day and Date : Thursday, 5-6-2014 　　　　　　　　　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.

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

　　i) The H-N-H bond angle in NH_3 molecule is
　　　a) 104°28'　　　　b) 107°28'　　　　c) 109°28'　　　　d) 120°

　　ii) Geometry of CsCl is
　　　a) Trigonal　　　　　　　　　　b) FCC
　　　c) bcc　　　　　　　　　　　　d) None of these

　　iii) Froth floatation process is used for concentration of _____ ore.
　　　a) Chloride　　　b) Oxide　　　c) Carbonate　　　d) Sulphide

　　iv) The general electronic configuration of p-block elements is
　　　a) ns^2np^{1-6}　　　b) ns^2np^6　　　c) ns^1np^{1-6}　　　d) $ns^{1-2}np^6$

　　v) Melting point of pure iron is
　　　a) 1535°c　　　　b) 1340°c　　　　c) 1222°c　　　　d) 1278°c

　　vi) Higher is the bond order
　　　a) Weaker is the bond　　　　　b) Stronger is the bond
　　　c) Bond is not formed　　　　　d) None of these

　　vii) The crystal structure is linear, if radius ratio is in between
　　　a) 0 – 0.155　　　　　　　　　b) 0.155 – 0.225
　　　c) 0.225 – 0.414　　　　　　　d) 0.414 – 0.732

　　viii) The haematite is an ore of
　　　a) Aluminium　　　b) Iron　　　c) Magnesium　　　d) Barium

P.T.O.

ix) S-orbital has _____ shape.
   a) Square   b) Dumb-bell   c) Spherical   d) Trigonal

x) The ionic solids in molten state are
   a) Semiconductors   b) Insulators
   c) Good conductors   d) None of these

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

   i) Explain Py-Py overlap.

   ii) Define coordination number and unit cell.

   iii) State Hund's rule.

   iv) Draw orbital diagram for NH_3 molecule using VSEPR theory.

   v) Write ground state electronic configuration of fluorine.

   vi) Define ore and mineral.

3. A) Answer **any two** of the following :   **6**
   i) Give any three differences between bonding and antibonding molecular orbitals.
   ii) Define atomic radius and explain its trend in periodic table.
   iii) Draw unit cell structure of NaCl.

   B) What are the conditions for successful overlap ?   **4**

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

   i) Explain gravity separation method for concentration of ore.

   ii) Explain Born-Haber cycle for alkali metal halide.

   iii) Define alkali metals. Give detail electronic configuration of IA group elements.

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

   i) Use MOT and predict bond order, magnetic character of N_2 molecule.

   ii) Distinguish between calcination and roasting.

   iii) Explain structure of H_2O molecule on the basis of VSEPR theory.

_____

SLR-C – 43

B.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Old)
Basic Electronics (Paper – III)

Day and Date : Tuesday, 20-5-2014   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 **neat** and labelled diagram **wherever** necessary.

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

   i) A pentavalent impurity has _____ valence electrons.

     a) 3   b) 4

     c) 5   d) 6

   ii) A bridge full wave rectifier uses _____ diodes.

     a) 4   b) 2

     c) 1   d) none

   iii) In depletion region contains only

     a) holes   b) free electrons

     c) ions   d) none of these

   iv) The purpose of a filter is to

     a) minimise variations in ac input signal

     b) supress harmonics in rectified output

     c) remove ripples from the rectified output

     d) stabilize dc output voltage

   v) The β of a transistor is 99, then the value of α is

     a) 9.9   b) 0.99

     c) 99   d) 100

P.T.O.

vi) The phase difference between the input and output voltage in a common base configuration is

    a) 180°   b) 90°

    c) 270°   d) 0°

vii) The operating point on a load line is also called the

    a) cutoff point   b) saturation point

    c) quiescent point   d) none of these

viii) A JFET is a _____ driven device.

    a) voltage

    b) current

    c) both voltage and current

    d) none of these

ix) Barrier potential of PN junction decreases by _____ per degree rise in temperature.

    a) 2 mV   b) 2 V

    c) 20 mV   d) 20 V

x) In a n channel JFET, the charge carriers are

    a) electrons

    b) holes

    c) both electrons and holes

    d) ions

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

  i) Draw a symbol of zener diode and photo diode with labels.

  ii) Explain the effect of temperature on extrensic semiconductor.

  iii) Draw a circuit diagram of half wave rectifier with input and output wave forms.

  iv) A typical transistor has β = 99. Calculate the value of α.

  v) State different types of transistor biasing.

  vi) Why MOSFET is also called as an insulated gate FET ?

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

    i) Define transconductance of FET. Find the value of transconductance if $\mu = 80$ and $r_d = 400\ k\Omega$.

    ii) Write a short note on N-type semiconductor.

    iii) Write a short note on dc load line.

  B) Write a short note on photodiode.   **4**

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

    i) Show that the maximum efficiency of full wave rectifier is 81.2%.

    ii) With the help of suitable circuit diagram, explain IV characteristics of PN junction diode.

    iii) Describe transistor action in detail.

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

    i) Explain temperature compensation using single diode.

    ii) Explain output characteristics of transistor in CE configuration.

    iii) Write a short note on capacitor filter.

_____

Seat No.

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

Day and Date : Tuesday, 27-5-2014   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) If X is a random variable having it p.d.f. f(x), the E(X) is called

     a) arithmetic mean   b) geometric mean

     c) harmonic mean   d) none of these

   2) Two random variables X and Y are said to be independent ; if

     a) $E(XY) = 1$ b) $E(XY) = 0$

     c) $E(XY) = E(X)E(Y)$ d) None of these

   3) If $F_X(x)$ is the cumulative distribution function (cdf) of a continuous r.v.X, then it is

     a) decreasing function of X   b) non-decreasing function of X

     c) both a and b   d) none of these

   4) If M is the median of continuous r.v.X with p.d.f. f(x), then $\int_{-\infty}^{M} f(x)\,dx$ will be equal to

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

   5) M.G.F. of sum of independent r.v.'s is equal to

     a) sum of their m.g.f.   b) product of their m.g.f.

     c) both a and b   d) none of these

6) If X and Y are independent r.v.'s then the c.d.f $F_{X,Y}(x, y)$ is equal to

   a) $F_X(x) \cdot F_Y(y)$

   b) $P(X \leq x) \cdot P(Y \leq y)$

   c) both a and b

   d) none of these

7) If $X \sim U(0, 1)$, then E(X) is equal to

   a) 0
   b) 1
   c) $\dfrac{1}{2}$
   d) none of these

8) The distribution function of a continuous uniform distribution of a variable X lying in the interval (a, b) is

   a) $\dfrac{1}{b-a}$
   b) $\dfrac{X-a}{b-a}$
   c) $\dfrac{b-a}{X-a}$
   d) none of these

9) If $X \sim \exp(\theta)$, then the Var(X) will be equal to

   a) $\dfrac{1}{\theta}$
   b) $\dfrac{1}{\theta^2}$
   c) θ
   d) none of these

10) Memoryless property holds in case of

   a) uniform distribution

   b) exponential distribution

   c) both a and b

   d) none of these

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

   For a continuous random vector (X, Y), define :

   i) Marginal p.d.f. of X and Y

   ii) Conditional distribution of X given Y = y

   iii) Expectation of a function g(X, Y)

   iv) Conditional expectation of X given Y = y

   v) Conditional variance of X given Y = y

   vi) Cov (X, Y).

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

   i) Let the r.v.X with p.d.f. f(x) given by

   $f(x) = kx \,; 0 \leq x \leq 1$

   $\quad\;\; = 0 \,; \quad 0\omega$

   Find k and mean of X.

ii) For given the joint p.d.f. of (X, Y)

$$f(x,y) = \frac{3}{2}y^2 \; ; \; 0 \le x \le 2, \; 0 \le y \le 1$$
$$= 0 \qquad ; \; 0\omega$$

Are X and Y are independent ?

iii) If $f(x) = \frac{1}{\pi} ; \; \frac{-\pi}{2} \le x \le \frac{\pi}{2}$

$$= 0 ; \; 0\omega$$

Find the p.d.f. of Y = tanx.

B) State and prove the multiplication theorem of expectation. **4**

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

i) The p.d.f. of a continuous r.v.X is given by

$$f(x) = 3x^2 ; \; 0 \le x \le 1$$
$$= 0 ; \qquad 0\omega$$

Find mean and vraince of X.

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

$$f(x, y) = 12xy(1-y) ; \; 0 < x < 1$$
$$0 < y < 1$$
$$= 0 \qquad ; \; 0\omega$$

Show that X and Y are independent.

iii) Define uniform distribution over (a, b). Obtain the variance of distribution.

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

i) Probability density function (p.d.f) of r.v.X is given by

$$f(x) = \frac{x}{2} ; \; 0 < x < 2$$
$$= 0 ; \; 0\omega$$

Find variance and median of X.

ii) If X has uniform distribution over (0, 1). Find the distribution of $Y = -2\log_e X$.

iii) If $X \sim \exp(\theta)$, then find its m.g.f. and hence E(X).

———————

Seat No.

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

Day and Date : Saturday, 7-6-2014　　　　　　　　　　　　　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) Use of calculator or log table is **allowed**.
　　　　　　　　4) 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 $\dfrac{R_1}{R_2}$ =

　　a) $-\dfrac{1}{6}$　　　　　　　　　　　b) $\dfrac{2}{3}$

　　c) $\dfrac{3}{2}$　　　　　　　　　　　　d) $\dfrac{1}{4}$

　3) Huygen'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 centre of Newton's rings due to reflected light is

    a) bright
                    b) dark

    c) coloured
               d) bright or coloured

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) The condition of diffraction in plane diffraction grating is

    a) $2d \sin\theta = n\lambda$
        b) $d \cos\theta = n\lambda$

    c) $d \sin\theta = n\lambda$
        d) $2d \cos\theta = n\lambda$

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) Light travels in the form of _____ waves.

    a) plane
              b) transverse

    c) longitudinal
        d) transverse as well as longitudinal

10) Brewster's law gives the relation between refractive index and

    a) angle of reflection
       b) angle of refraction

    c) polarizing angle
        d) angle of diffraction

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

  i) What is spherical aberration ?

  ii) Define chromatic aberration.

  iii) Draw a ray diagram for wedge shaped air film.

  iv) Which are the common types of eyepiece ?

  v) Define exit pupil.

  vi) What is polarization of light ?

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

   i) Explain any two methods to minimize spherical aberrations in lenses.

   ii) Compare grating spectra and prism spectra.

   iii) Explain with neat diagram the working of pile of plates.

  B) In a plane diffraction grating, there are 5000 lines per cm. The angle of diffraction for the 2nd order maxima is $36° \ 5'$. Determine the wavelength of light used. (Given sin $36° \ 5' = 0.5890$). **4**

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

   i) With neat diagram explain Ramsden's eyepiece.

   ii) State and prove Brewster's law.

   iii) Describe the experiment to determine the wavelength of light by using a plane diffraction grating.

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

   i) Obtain an expression for radius of nth dark ring in Newton's rings produced by reflected monochromatic light.

   ii) Explain the Foucault's method for determination of velocity of light.

—————————

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

Day and Date: Saturday, 26-4-14   Max. Marks: 50
Time: 11.00 a.m. to 1.00 p.m.

Instructions : 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) The rapid change in pH of titration is shown by parallel line to the pH-axis in the neutralisation curve is known as _____
        a) titration break   b) end point
        c) equivalence point   d) all of above

    2) The particle size of curdy precipitate is _____
        a) 10^{-9} to 10^{-6} m   b) 10^{-10} to 10^{-9} m
        c) 10^{-6} to 10^{-5} m   d) 10^{-2} to 10^{-3} m

    3) The organic dyestuffs which are chelating agent themselves forms complexes with metal ion and show change in colour with change in concentration of metal ion is known as _____
        a) indicator   b) redox indicator
        c) acid-base indicator   d) metallochromic indicator

    4) Coagulation and _____ are reversible to each other.
        a) crystallization   b) peptization
        c) neutralization   d) neucleation

    5) In the hydrogenation of vegetable oil _____ is used as a catalyst.
        a) Al   b) Cu   c) Ni   d) Pt

P.T.O.

6) To destroy pathogenic microbes in potable water commonly _____ is used.

   a) chlorine   b) fluorine   c) iodine   d) all of these

7) All available resources of water _____ is the purest form of water.

   a) river   b) lake   c) pond   d) rain

8) The _____ is known as king of chemicals.

   a) NH_3 b) H_2SO_4 c) HNO_3 d) HCl

9) The properties of different varieties of steel depend on _____

   a) percentage of carbon   b) metal other than iron

   c) method of preparation   d) all of these

10) Chromium-Nickel steel is used for construction of bridge in sea because it is _____

   a) cheap

   b) easily available

   c) resistant to corrosive action of sea water

   d) all of these

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

   i) What is primary standard ? Give any two examples.

   ii) Precipitation must be carried out from hot and dilute solutions. Why ?

   iii) Explain the role of promoters in catalysis.

   iv) What are the parameters of potability of water ?

   v) Write balanced chemical reactions in the manufacture of sulphuric acid by contact process.

   vi) Why cast iron is converted into steel ?

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

   i) Write note on Quinoid theory of acid-base indicator.

   ii) Distinguish between co-precipitation and post-precipitation.

   iii) Give any three industrial applications of catalysis.

   B) Explain the effect of temperature and pressure in the manufacture of H_2SO_4 by contact process.   **4**

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

   i) Types of catalysis.

   ii) Ion exchange process.

   iii) L.D. process.

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

   i) With the help of neutralisation curve explain the choice of indicator for titration of strong acid and weak base.

   ii) Explain the characteristics of organic precipitants in gravimetric analysis.

   iii) Draw a neat labelled diagram for the manufacture of ammonia by Haber's process. Give the optimum conditions involved in it.

———————————

Seat No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
PHYSICS
Electronics (Paper – VII)

Day and Date : Monday, 28-4-2014   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 drawn **whenever** necessary.
        4) **Use** of log table and calculator is **allowed**.

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

   i) When the transistor is operated in the saturation region then V_{CE} is

     a) OV   b) V_{CC} c) $\dfrac{V_{CC}}{2}$ d) $\dfrac{V_{CC}}{3}$

   ii) The slope of a.c. load line is _____ that of d.c. load line.
     a) Same as   b) More than
     c) Less than   d) Half of

   iii) In oscillator circuit _____ type feedback is used.
     a) Positive   b) Negative   c) Voltage   d) Current

   iv) When the value of C is increased four times then frequency of oscillation of Hartley oscillator is
     a) Increased two times
     b) Decreased two times
     c) Increased four times
     d) Decreased four times

v) When the reverse bias at Gate of FET is increased then drain current

   a) Decreases   b) Increases

   c) Remains constant   d) Becomes zero

vi) Between the peak point and the valley point of UJT emitter characteristic, the region is

   a) Cut off   b) Active

   c) Saturation   d) Negative resistance

vii) $Y = \overline{A + B}$ is the Boolean equation of

   a) NOR gate   b) NAND gate

   c) EX-OR gate   d) NOT gate

viii) Flip-flop is called

   a) Bi-stable   b) Astable

   c) Monostable   d) Adder

ix) Output of EX-OR gate is logic 1 when

   a) Both inputs are same

   b) Both inputs are different

   c) Both inputs are logic 0

   d) Both inputs are logic 1

x) Time base circuit of CRO generates _____ waveform.

   a) Triangular   b) Sawtooth

   c) Sine   d) Square

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

   i) Describe the function of coupling capacitors used in the circuit of a transistor amplifier.

   ii) State the condition for sustained oscillations in the oscillator.

   iii) Explain the function of attenuator circuit used in CRO.

   iv) Draw the equivalent circuit of :UJT.

   v) Using NAND gates, construct OR gate.

   vi) Calculate I_B of a transistor having $\beta = 100$ and $I_C = 10$ mA.

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

    i) Describe frequency response curve of a single stage CE transistor amplifier.

    ii) Draw the circuit diagram of phase shift oscillator.

    iii) Explain the working of RS Flip-Flop.

  B) Draw the logical circuit of Full-Adder and explain the working of Full-Adder. **4**

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

  i) Describe the working of the crystal oscillator.

  ii) Explain the uses of CRO.

  iii) Draw a logical circuit of the JK Flip-Flop and explain the working of JK Flip-Flop.

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

  i) Explain the working of UJT voltage sweep generator and derive an expression for the frequency of the oscillations.

  ii) Describe voltage divider bias circuit and draw d.c. load line for circuit consisting : $R_1 = 10\ k\Omega$, $R_2 = 5\ k\Omega$, $R_C = 1\ k\Omega$, $R_E = 2\ k\Omega$ and supply voltage $V_{CC} = 15$ V.

_____

Seat No.

B.Sc. II (Semester – IV) Examination, 2014
PLANT PROTECTION (Paper – III)
Introduction to Weeds and non Insect Pests

Day and Date : Monday, 28-4-2014   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** must.
     3) Figures to **right** indicate **full** marks.

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

   1) Plants growing in field, which are not useful at all to man are called
     a) Crop plants   b) Vegetables   c) Weeds   d) Herbs

   2) Dicot weeds are effectively controlled by _____
     a) Atrazine   b) Simazine   c) 2,4-D   d) Glyphosate

   3) Weeds _____ value of land.
     a) Increase   b) Decrease   c) Keep as it is   d) None of above

   4) Weeds _____ soil erosion by rainfall.
     a) Increase   b) Check
     c) Remains as it is   d) None of above

   5) Loranthus is _____ weed.
     a) Total parasite   b) Semiparasite
     c) Stem parasite   d) None of these

   6) Striga is _____ parasitic weed.
     a) Stem   b) Root   c) Leaf   d) None of these

   7) In cuscuta _____ are water absorbing organs.
     a) Roots   b) Suckers   c) Haustoria   d) Hanging roots

   8) Orobanche grows on roots of
     a) Tomato   b) Jowar   c) Maize   d) Gram

P.T.O.

9) <u>Argemone</u> <u>mexicana</u> weed is introduced to India from _____.
   a) Peru   b) Mexico   c) Brazil   d) Chili

10) Weed the field and _____ the Yield.
   a) Increase   b) Reduce   c) Double   d) None of above

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

   i) Give only classification of weedicides

   ii) Give an account of losses caused by Birds

   iii) Losses caused by rhodents

   iv) Losses caused by nematodes

   v) Simazine or Atrazine

   vi) Mulching.

3. A) Answers **any two** of the followings :   **6**
   i) Harrowing
   ii) Hand weeding by khurupi
   iii) Use of weedicides for weed control

   B) Write a note on :   **4**

   Parthenium reproduction, seed disper sal, & control.

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

   i) Mechanical methods of Rat control

   ii) Biological methods of weed control

   iii) Role of cover crop in weed control.

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

   i) Aquatic weeds

   ii) Losses caused by weeds, give any five points

   iii) Poisonous weeds.

———————————

Seat
No.

B.Sc. – II (Semester – IV) Examination, 2014
Paper – III : METEOROLOGY
Applied Climatology

Day and Date : Wednesday, 30-4-2014   Max. Marks : 50

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

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

              2) Draw **neat** diagrams and maps.

              3) **Use** of stencil is **allowed**.

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

    1) The body temperature of healthy human varies a little around _____ ° C.

       (27° C, 35° C, 37° C, 38° C)

    2) _____ is the name given to air moving horizontally over the earth.

       (Wind, Pressure, Temperation, Current)

    3) Surface pressure vary routinely from about _____ mb to 1050 mb.

       (950, 955, 960, 965)

    4) The WMO is headquartered in _____

       (Washington D.C, Geneva, Pune, Melborne)

    5) The last TIROS was launched in _____

       (1960, 1965, 1970, 1975)

    6) Statistical methods are of great value in _____ range forecasting.

       (long, short, medium, synoptic)

    7) The effective temperature index below _____°C is considered as uncomfortable cooling.

       (16.1°C, 17.4°C, 18.9°C, 20°C)

    8) The most commonly used effective temperature index was given by _____ in 1959.

       (Thom, Robinson, Chritchfield, Trewartha)

P.T.O.

9) Along the eastern coast of subtropics upwelling of sea water by _____ surface.

(Weak, Steady, Moderate, Strong)

10) Prevailing winds determine the best orientation of _____

(Roads, Rails, Ropeway, Runway)

2. Answer in short (**any five**) : **10**

1) Human body comfort.

2) What is physiological response ?

3) Importance of urban climate.

4) Medium range forecasting.

5) What is a local wind ?

6) What is meant by pressure gradient ?

3. A) Answer in short (**any two**) : **6**

1) What are the rotational forces ?

2) Statistical weather forecasting method.

3) State the effect of local wind.

B) State the importance of temperature in physiological response. **4**

4. Answer the questions (**any two**) : **10**

1) Explain long range forecasting.

2) Describe the importance of weather in a rail transport.

3) State the importance of air operations in marine activities.

5. Answer the questions (**any two**) : **10**

1) Explain the importance of marine fishing.

2) Explain the importance of climatic studies in industrial development.

3) Types of weather forecasting.

_____

Seat
No.

B.Sc. II (Semester – IV) Examination, 2014
GEOCHEMISTRY
Principles of Geochemistry (Paper – III)

Day and Date : Wednesday, 30-4-2014   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. Select the most correct alternative from **each** of the following :   **10**

    1) Chemical equilibrium is _____ in nature.
       a) static   b) dynamic   c) elastic   d) none of these

    2) Na_2CO_3 is _____ in nature.
       a) basic   b) acidic   c) neutral   d) hypotonic

    3) Organic acid contains _____ group.
       a) —COOH   b) >c = 0   c) —OH   d) —NH_2

    4) Silica is a _____ clay mineral.
       a) positive   b) neutral   c) negative   d) zero

    5) The rate constant "K" for the reaction

       $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ is _____

       a) $K = \dfrac{[2NH_3]}{[N_2][3H_2]}$ b) $K = \dfrac{[NH_3]}{[N_2][H_2]}$

       c) $K = \dfrac{[NH_3]^2}{[N_2][H_2]^3}$ d) None of these

    6) The formation of petroleum is from _____ rocks.
       a) Sedimentary   b) Igneous   c) Metamorphic   d) Besalt

    7) Brownian movement is _____ property of colloidal solution.
       a) mechanical   b) electrical   c) optical   d) chemical

8) Acid rock contains high percentage of
   a) SiO_2 b) MgO c) CaO d) FeO

9) The formula of Olivine is
   a) $[SiO_4]^{-4}$ b) $[SiO_4]^{-7}$ c) $[SiO_4]^{-3}$ d) $[Si_2O_7]^{-6}$

10) The name of $CaSO_4$ is _____.
    a) gypsum b) mica c) quartz d) beryl

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

   i) Define : emulsion. Give one example.

   ii) Write the structure of
       a) Cyclohexane
       b) Glycine

   iii) Give the geological uses for acids and bases (any two).

   iv) Discuss the effect of temperature on the reaction between CO_2 and H_2O.

   v) Discuss : Bredig's Arc method for the preparation of gold sol.

   vi) Define hydrolysis. Write hydrolysis reaction only for Na_2CO_3 hydrolysis.

3. A) Answer **any two** of the following :   **6**
      i) Explain : clay minerals as colloids
      ii) Discuss the conventions of chemical equilibrium
      iii) Draw the structure of :
           a) Hemimorphite
           b) Beryl

   B) Distinguish between true solution and colloidal solution.   **4**

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

   i) Explain : The origin of coal

   ii) State and explain Lechatalier's principle

   iii) Write a short note on "Occurrence of carbon in rock".

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

   i) Explain : origin of petroleum

   ii) Discuss : Tyndall effect

   iii) Explain the stability of colloidal solution.

Seat
No.

B.Sc. – II (Semester – IV) Examination, 2014
METEOROLOGY (P – IV)
Meteorological instruments

Day and Date : Friday, 2-5-2014   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. Multiple choice questions :   **10**

   i) The rain fall is measured in
      a) mm or inches   b) °C   c) g/cc   d) mb

   ii) The automatic siphon gauge is used to measure
      a) wind velocity   b) rain fall
      c) temperature   d) humidity

   iii) A temperature of 104° F is equal to _____ °C.
      a) 10   b) 20   c) 30   d) 40

   iv) On Rankin scale the ice point is _____ °Ra.
      a) 180   b) 672   c) 492   d) 32

   v) The unit of pressure used by meteorologists is
      a) pascal   b) hecto-pascal
      c) dobson   d) millibars (mb)

   vi) _____ is used to measure atmospheric pressure.
      a) Barometer   b) Thermometer
      c) Anemometer   d) Hygrometer

   vii) The instrument used for automatic recording of wind speed is known as
      a) Barograph   b) Anemograph
      c) Thermograph   d) Hygrograph

viii) Hooke's anemometer is used to measure
   a) temperature   b) wind velocity   c) pressure   d) humidity

ix) Hair hygrometer is used to measure
   a) temperature   b) absolute humidity
   c) relative humidity   d) rain fall

x) The arrangement of two dissimilar metals forming two junctions is known as
   a) thermocouple   b) thermophile   c) thermograph   d) barograph

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

   i) What is a self recording rain guage ?

   ii) Distinguish between mercury thermometer and six's thermometer.

   iii) How atmospheric pressure is measured using Fortin's barometer ?

   iv) What is an anemometer ?

   v) State and explain Seebeck effect.

   vi) What are advantages of Aneroid barometer over Fortin's barometer ?

3. A) Answer **any two** of the following :   **6**
   i) Draw neat diagram of mercury thermometer.
   ii) Draw neat diagram of mercury barometer. Explain its construction in brief.
   iii) Draw neat diagram of cup anemometer.

   B) With neat diagram explain construction and working of Crooke's Radiometer.   **4**

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

   i) With neat diagram explain construction and working of Barograph.

   ii) With neat diagram explain construction and working of ordinary rain guage.

   iii) With neat diagram explain wind vane.

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

   i) Draw neat diagram of float gauge.

   ii) Write a note on 'different temperature scales'.

   iii) Write a note on Radiation Pyrometer.

_____

Seat No.	

B.Sc. – I (Sem. – I) (New) Examination, 2014
ENGLISH (Compulsory)
'On Track' English Skills for Success

Day and Date : Tuesday, 3-6-2014   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. Rewrite the following sentences by choosing the correct alternative :   **10**

   1) What did the policeman on the beat constantly do ?

       a) twirl his stick   b) interrogate people on his beat

       c) smoke a cigar   d) unlock doors

   2) The writer and Miss. Krishna

       a) were at school together   b) met at an exhibition

       c) met at a tea party   d) were neighbours

   3) When the writer invited her to stay with her for a while, Miss. Krishna agreed

       a) reluctantly   b) shyly

       c) readily   d) with little enthusiasm

   4) The word 'intelligence' is derived from the Latin word

       a) intellegere   b) intellectual

       c) intellect   d) none of these

   5) Where are the bangle sellers carrying their wares ?

       a) to a married woman's   b) to the house of a maiden woman

       c) to a temple fair   d) to the streets

   6) An Irish Airman Foresees His Death is written by

       a) W. B. Yeats   b) W. B. Keats

       c) John Milton   d) Sarojini Naidu

P.T.O.

7) Mina is fond _____ reading.

   a) of   b) to

   c) on   d) by

8) We flew over _____ Pacific Ocean.

   a) the   b) a

   c) an   d) no article

9) Let me give you _____ umbrella.

   a) a   b) the

   c) an   d) no article

10) There is a <u>mob</u> on the road. The underlined word is _____ noun.

   a) common   b) mass

   c) proper   d) collective

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

   1) What was the nickname for Bob that the plain-clothes Policeman used ?

   2) What is the narrator's initial opinion of Miss. Krishna ?

   3) Why can computers not 'think' in the same way as human beings ?

   4) Which colours of bangles are suitable for a maiden's wrists ?

   5) How does the speaker imagine he will die ?

   6) What are the bangles 'token' of ?

3. A) Write short answers of **any two** of the following :   **6**
   1) What kind of person was Jimmy Wells ? Describe his character with suitable evidence from the story.
   2) What is the shocking discovery made by Miss. Krishna's sister and the narrator together ? How does this reveal Miss. Krishna's character ?
   3) What are the myths regarding the intelligence of the computers ?

   B) Answer **any two** of the following questions briefly :   **4**
   1) Describe the different types of bangles which the bangle sellers carry.
   2) What is the Irish Airman's attitude towards the war he is fighting in ?
   3) How does the poet describe the faithful wife who is now middle-aged ?

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

   1) Write an essay on the impact of mobile phones on the lives of young people in the present day.

   2) Write paragraphs of **five** or **six** sentences on **each** of the following :
      a) solar energy
      b) my family.

5. Read the following passage and make notes of it. Use an appropriate title for your notes. **10**

There are different forms of environmental pollution. Air pollution is caused by the burning of coal and oil. It can damage the earth's vegetation and cause respiratory problems in humans. A second type of pollution is noise pollution. It is the result of the noise of aircraft and heavy traffic. Further, loud music is also a cause of noise pollution, which has been seen to affect people's hearing and give them severe headaches and high blood pressure. Another source of pollution is radioactivity, which occurs when there is a leak from a nuclear power station. Radioactivity is a deadly pollutant, which kills and causes irreparable harm to those exposed to it. Land and water pollution is caused by the careless disposal of huge quantities of rubbish, sewage and chemical wastes. Pollution of rivers and seas kills fishes and other marine life and also becomes the cause of water – borne diseases. Land pollution, on the otherhand, Poisons the soil, making the food grown in it unfit for consumption.

_____

Seat No.

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

Day and Date : Thursday, 5-6-2014   Max. Marks : 50

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

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

ii) Draw ***neat***, 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) _____ is the most electropositive element in periodic table.
       a) Magnesium   b) Caesium   c) Carbon   d) Oxygen

    ii) The general electronic configuration of P-block element is
       a) ns^2np^6 b) ns^1np^{1-6} c) ns^2np^{1-6} d) $ns^{1-2}np^6$

    iii) M.O.T. was proposed by
       a) Hund and Mulliken   b) Hund and Pauling
       c) Hund and Huckel   d) Hund and Slatter

    iv) Limiting radius ratio for octahedral geometry is
       a) 0.732   b) 0.414   c) 0.225   d) 0.175

    v) Type of hybridisation in PCl_5 molecule is
       a) SP   b) SP^3d c) SP^3 d) SP^3d^2

    vi) If bond length increases, stability of molecule
       a) Increases   b) Enhances
       c) Decreases   d) None of these

    vii) Ionic size of positive ion (cation) is
       a) Smaller than its atomic size   b) Greater than its atomic size
       c) Equal to its atomic size   d) None of these

viii) VSEPR theory was proposed by
   a) G.N. Lewis
   b) Pauling and Slatter
   c) Heitler and London
   d) Sidgwick and Powell

ix) Ionic solids in molten state are
   a) Good conductors
   b) Insulators
   c) Semiconductors
   d) Superconductors

x) Geometry of CSCl is
   a) Trigonal
   b) Pentagonal
   c) Body centered cubic
   d) None of these

2. Answer **any five** of the following :   **10**
   i) State Hund's rule.
   ii) Explain S-S overlap.
   iii) Define the term coordination number and radius ratio.
   iv) Draw M.O. diagram of H_2 molecule.
   v) Define atomic radius and give its trend in periodic table.
   vi) Explain lattice energy.

3. A) Answer **any two** of the following :   **6**
   i) Write assumptions of VSEPR theory.
   ii) State any six properties of ionic solids.
   iii) Explain bond order, stability of Li_2 molecule on the basis of M.O. diagram.

   B) State and explain Pauli's exclusion principle.   **4**

4. Answer **any two** of the following :   **10**
   i) Write names, symbol and electronic configuration of halogen group elements.
   ii) What is hybridisation ? Explain formation of BF_3 molecule on the basis of hybridisation.
   iii) Distinguish between bonding and anti bonding M.O.

5. Write notes on **any two** of the following :   **10**
   i) Born-Haber cycle for alkali metal halides.
   ii) SP^3-hybridisation with suitable example.
   iii) M.O. diagram of oxygen (O_2) molecule.

   _____

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
GEOGRAPHY (Paper – I) (New)
Physical Geography – Geomorphology

Day and Date : Friday, 6-6-2014   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) **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 evolution of surface features of the earth is studied in
       Climatology, hydrology, geomorphology, pedology

    2) The two main branches of Geography are _____ and human geography.
       Physical, Chemical, Social, Cultural

    3) In 1905 _____ and Moulten have suggested the 'Planetesimal Hypothesis'.
       Kant, Laplace, Russell, Chamberlin

    4) The lower limit of the crust is a discontinuity layer known as' _____ discontinuity'.
       Mohorovicic, Oldham, Conard, Guttenberg

    5) E. Suess has identified _____ number of layers below the outer thin layer of sediments.
       Two, Three, Four, Five

    6) An area experiences folding due to
       Horizontal Tension, Intrusion of lava, Vertical upliftment, Horizontal Compression

    7) Orogenic fources are responsible to form
       Block Mountains, Fold Mountains, Monadnocks, Volcanic Mountains

    8) Igneous rocks are also called as _____ rocks.
       Quaternary, Tertiary, Secondary, Primary

    9) 'Fumaroles' are related with _____ activity.
       Seismic, Vulcanicity, Weathering, Denudational

    10) _____ are used to record the intensity of earthquakes.
       Pantograph, Barograph, Hairhygrograph, Seismograph

2. Write in short (**any 5**) :　　　　　　　　　　　　　　　　　**10**
   1) Define the term 'Geomorphology'.
   2) Classify the Orogenic movements.
   3) Describe the term 'SIAL'.
   4) What is an 'Anticlinorium' ?
   5) Give the names of earthquake waves.
   6) What is 'metamorphism' ?

3. A) Write a brief answer (**any two**) :　　　　　　　　　　　　**6**
   1) Define the concept 'Binary Stars'.
   2) Describe the chemical composition of the earth.
   3) Draw a neat diagram of 'syncline'.

   B) Describe the formation of igneous rocks.　　　　　　　　　**4**

4. Write short answers (**any two**) :　　　　　　　　　　　　　　**10**
   1) Describe the effects of epirogenic movements.
   2) Write in brief the importance of the sedimentary rocks.
   3) Describe the various types of material deposited by active volcanoes.

5. Write short answers (**any two**) :　　　　　　　　　　　　　　**10**
   1) Describe the 'Planetesimal Theory' of the earth's origin.
   2) Write in brief the scope of geomorphology.
   3) Explain the effects of the 'surface waves' during an earthquake.

_____

Seat No.

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

Day and Date : Saturday, 7-6-2014   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 logarithmic table or nonprogrammable calculator is **allowed**.
     iv) **Neat** diagrams must be drawn, **wherever** necessary.
     v) Answer to every new question must be written on a **new** page.

1. Select and write the most appropriate answer from given alternatives for **each** sub-question. **10**

   i) By Fermat's principle, the condition for the time t to be extremum is

      a) $\dfrac{dt}{dx} \neq 0$ b) $\dfrac{dt}{dx} < 0$ c) $\dfrac{dt}{dx} > 0$ d) $\dfrac{dt}{dx} = 0$

   ii) In Fraunhofer type diffraction, edge of an obstacle is illuminated by

      a) spherical wavefront   b) cylindrical wave front
      c) plane wavefront   d) elliptical wavefront

   iii) The phenomenon of bending of light round the edges of an obstacle is called

      a) reflection   b) refraction   c) diffraction   d) polarisation

   iv) In Ruby Laser, pumping type used is

      a) electrical   b) optical   c) chemical   d) thermal

   v) Light rays incident near the rim or edge of the lens are called

      a) marginal rays   b) paraxial rays
      c) co-axial rays   d) non-axial rays

P.T.O.

vi) Fringe width X for interference of light in wedge shaped film is given by

   a) λ/θ b) $\dfrac{\theta}{\lambda}$ c) $\dfrac{\lambda}{2\mu\theta}$ d) $\dfrac{2\mu\theta}{\lambda}$

vii) Path difference Δ for destructive type of interference is given by

   a) $n\lambda$ b) $2n\lambda$ c) $(2n+1)\lambda$ d) $(2n+1)\dfrac{\lambda}{2}$

viii) Value of radius of curvature of a curved surface of the plano-convex lens used in the formation of Newton's Rings is

   a) large   b) small   c) infinity   d) zero

ix) Focal length of Huygen's eye-piece is 21 cm, focal length of eye lens will be

   a) 8 cm   b) 10 cm   c) 12 cm   d) 14 cm

x) When 15000 lines per inch are ruled on the surface of a plane diffraction grating' for this grating, grating element d is given by _____ cm.

   a) $\dfrac{1}{15000}$ b) 15000   c) $\dfrac{2.54}{15000}$ d) $\dfrac{15000}{2.54}$

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

  i) Describe the Fresnel's type diffraction of light.

  ii) State any one application of : optical bench.

  iii) Define : pumping process in connection with production of Laser.

  iv) Write the condition of constructive type interference of light for the interference of light in parallel faced film.

  v) Explain the process of spontaneous emission of radiation.

  vi) Calculate, the focal length of Ramsden's eye-piece when focal length of eye lens is 16 cm.

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

  i) Describe any three properties of a Laser source of light.

  ii) Write a short note on : Huygen's Eye-Piece.

  iii) How many of maximum orders will be visible if wavelength used is 6000 Å and plane diffraction grating having grating element $d = 1.693 \times 10^{-4}$ cm ?

 B) How are the replica of the original plane diffraction grating prepared ?   **4**

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

   i) Explain construction and working of : Helium-Neon Laser.

   ii) Describe the Ramsden's Eye-Piece.

   iii) Determine value of grating element of plane diffraction grating which is used. For normal incidence of light a red coloured spectral line of wavelength 7000 Å of a certain order coincides with a green coloured spectral line of wavelength 5250 Å of the next order at an angle of diffraction of 30°.

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

   i) Describe an experiment of Newton's Rings. Derive a formula for determining the wavelength of monochromatic source of light by an experiment of Newton's Rings.

   ii) Derive the condition of achromatism for two lenses kept in contact.

   Calculate the focal lengths of two lenses used for formation of an achromatic combination of focal length 150 cm. The lenses are kept in contact and dispersive powers of their materials are : 0.018 and 0.027.

   _____

Seat No.

B.Sc.– I (Semester – I) (New) Examination, 2014
STATISTICS Paper – I
Descriptive Statistics – I

Day and Date : Monday, 9-6-2014   Max. Marks : 50
Time : 11.00 a.m. to1.00 p.m.

N.B. : *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) Which one of the following is correct ?

      a) M.D. > S. D.   b) M.D. $\neq$ S. D.

      c) M.D. $\geq$ S. D.   d) M.D. $\leq$ S. D.

   2) The value of P_{50} is

      a) equal to Q_3 b) equal to Q_1

      c) equal to D_5 d) none of thes

   3) Median of an arranged data is the

      a) Most frequent value   b) Minimum value

      c) Maximum value   d) Middle most value

   4) The A.M. of a certain series of observations is 4. If each value is increased by 3 then the A.M. is

      a) 3   b) 4

      c) 7   d) None of these

   5) If the smallest value in a set is 7 and its range is 85, then the largest value of set is

      a) 78   b) 92

      c) 12.14   d) None of these

6) If $\beta_2 = 3$ then the curve is
   a) Lepto kurtic
   b) Plattykurtic
   c) Mesokurtic
   d) None of these

7) The first order moment about origin is
   a) One
   b) Zero
   c) Mean
   d) None of these

8) The most repeated observation is
   a) A.M.
   b) G.M.
   c) H.M.
   d) None of these

9) With the help of an ogive, one can not determine
   a) Median
   b) Quartiles
   c) Percentiles
   d) None of these

10) M.D. is least when measured from
   a) Mean
   b) Median
   c) Mode
   d) None of these

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

   i) State the requirement of a good measures of central tendency.

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

   iii) Define quartiles and deciles.

   iv) Given the variance of a mesokurtic distribution is 4. Find μ_4.

   v) State the first 4 central moments in terms of raw moments.

   vi) Define C.V. and explain its utility.

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

   i) The first two moments of a distribution about 4 are 3 and 34. Find mean and variance.

   ii) Distinguish between absolute and relative measures of dispersion.

   iii) Show that mean square deviation is greater than or equal to variance.

   B) Write a note on Skewness and Kurtosis.   **4**

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

   i) Explain the construction of an ogive curve.

   ii) Explain the terms :

   1) relative frequency

   2) open end classes

   3) class frequency

   iii) Show that the sum of deviations about mean of a frequency distribution is zero.

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

   i) A variable takes values 1, 2, . . . n with frequencies 1, 2, . . . n. Find its mean and variance.

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

_____

Seat No.

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

Day and Date : Tuesday, 10-6-2014   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) The sample space corresponding to the experiment "Three seeds are planted and total number of seeds germinated are recorded after a week" is

     a) (3)   b) (1, 2, 3)

     c) (0, 1, 2, 3)   d) (0)

   ii) Two coins are tossed, the complement event of A : (HH, TT) is

     a) (HH, HT)   b) (HT, TH)

     c) (TH)   d) (TH, TT)

   iii) If a discrete sample space contains 5 elements then the total number of events on the sample space is

     a) 10   b) 5

     c) 32   d) 25

   iv) The probability of drawing one white ball randomly from a bag containing 6 red, 8 black, 10 yellow and 1 green ball is

     a) $\dfrac{1}{25}$ b) 0

     c) 1   d) $\dfrac{14}{25}$

v) The classical approach to probability assumes that all possible outcomes of an experiment are

   a) Independent   b) Dependent

   c) Mutually exclusive   d) Equally likely

vi) If $P(A) = 0.4$, $P(B) = 0.2$ then $P(A \cap B)$ can be

   a) 0.4   b) 0.3

   c) 0.1   d) 0.5

vii) If for two events A and B if $P(A) = P(A / B) = 0.25$ then

   a) A and B are mutually exclusive

   b) A is subset of B

   c) A and B are independent

   d) None of these

viii) If $P(x) = K (3 + x)$ $x = -1, 0, 1$ then K is

   a) $\dfrac{1}{2}$ b) $\dfrac{1}{4}$

   c) 9   d) $\dfrac{1}{9}$

ix) Given the Distribution function of X is

   X   : 0   1   2   3   4   5

   F(X) : 0.1 0.2 0.45 0.51 0.8 1.0

   Median is

   a) 1   b) 2

   c) 3   d) 4

x) Which one of the following is not a probability distribution ?

   a) (0.5, 0.5)   b) (0, 1)

   c) (1, 0)   d) (–1, 1)

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

  i) Define a) Sample space

              b) Impossible event

  ii) A number is selected from first 50 natural numbers. Find the probability that the number selected at random is a multiple of 5 and 6.

iii) Prove that if A is a subset of B then $P(\overline{A} \cap B) = P(B) - P(A)$.

iv) Prove that $P(A \mid \overline{A}) = 0$.

v) State Baye's theorem.

vi) Given the following pmf of r.v. X

X	−1	0	1	2
P(x)	0.2	0.3	0.4	0.1

Find a) $P(X \geq 1)$ b) Mode of X

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

    i) If P(A) = 0.6, P(B) = 0.5, P(A∩B) = 0.3, compute

      a) $P(\overline{A})$ b) $P(\overline{A} \cap B)$ c) $P(\overline{A} \cup \overline{B})$

    ii) Define distribution function of X and state its properties.

    iii) For any two events A, B show that

      $P(A) \leq P(A \cup B) \leq P(A) + P(B)$.

   B) State and prove addition law of probability and write its extension for three events A, B, C.   **4**

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

   i) Let the sample space S = (1, 2, 3, 4) and assume that each point has the probability $\frac{1}{4}$. Let A = (1, 2), B = (1, 3), C = (1, 4) show that A, B, C are pairwise independent but not mutually independent.

   ii) If A, B are independent then prove that

     a) A, $\overline{B}$ are independent   b) $\overline{A}, \overline{B}$ are independent

   iii) Define conditional probability and show that it satisfies the three axioms of probability.

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

   i) X is a r.v. with following probability distribution

     X :   –3 –2 –1   1   2   3

     P(x) : 0.1 0.2 0.3 0.15 0.13 0.12

     Find a) $P(X \leq 2)$

          b) $P(X > -2 / X \leq 2)$

          c) Distribution function of X

          d) Median of X

          e) Probability distribution of 2X.

  ii) Let A and B be two events defined on S. Prove the following :

     a) $P(\overline{A}/B) = 1 - P(A/B)$

     b) $P(A/B)$ if A, B are independent

     c) $P(A/B)$ if A, B are mutually exclusive

     d) $P(A/B)$ if A is subset of B.

——————————

Seat
No.

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

Day and Date : Wednesday, 11-6-2014　　　　　　　　　　　　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) If A is any square matrix then $A + A'$ is _____ matrix.

　　　　a) Singular　　　　　　　　　　b) Symmetric

　　　　c) Skew-symmetric　　　　　　 d) Non-singular

　　2) If rank of A = rank of [A, B] = number of unknown the system of equations have

　　　　a) Infinite solution　　　　　　b) No solution

　　　　c) Unique solution　　　　　　 d) None of these

　　3) The characteristic polynomial of matrix $\begin{bmatrix} 3 & 0 \\ 8 & -1 \end{bmatrix}$ is

　　　　a) $\lambda^2 - 2\lambda - 3$　　　　　　　b) $\lambda^2 + 2\lambda - 3$

　　　　c) $\lambda^2 - 2\lambda + 3$　　　　　　　d) $\lambda^2 + 2\lambda + 3$

　　4) The rank of matrix $\begin{bmatrix} 3 & 2 & 1 \\ 6 & 4 & 2 \\ -9 & -6 & -3 \end{bmatrix}$ is

　　　　a) 2　　　　　b) 1　　　　　c) 3　　　　　d) 0

P.T.O.

5) The eigen vector for the matrix $A = \begin{bmatrix} 3 & 2 \\ -1 & 0 \end{bmatrix}$ corresponding the eigen value

$\lambda = 1$ are

a) $\begin{bmatrix} -t \\ t \end{bmatrix}$　　　b) $\begin{bmatrix} -2t \\ t \end{bmatrix}$　　　c) $\begin{bmatrix} t \\ -2t \end{bmatrix}$　　　d) $\begin{bmatrix} t \\ 2t \end{bmatrix}$

6) For any complex number z, sin (iz) =

a) sinh(iz)　　　b) i sinhz　　　c) sinhz　　　d) i sinz

7) The argument of complex number z = 1 + i is

a) $\dfrac{\Pi}{3}$　　　b) $\dfrac{\Pi}{4}$　　　c) $\dfrac{\Pi}{6}$　　　d) $\dfrac{\Pi}{2}$

8) 1, w, w^2, w^4 is fourth root of unity then $1 + w + w^2 + w^4 =$

a) 2　　　b) 3　　　c) 4　　　d) 0

9) For any complex number z, sinhz =

a) $\dfrac{e^z + e^{-z}}{2}$　　　b) $\dfrac{e^{-z} - e^z}{2}$　　　c) $\dfrac{e^z - e^{-z}}{2}$　　　d) $\dfrac{e^{iz} - e^{-iz}}{2}$

10) If $x + \dfrac{1}{x} = 2\cos\theta$ then $x^2 + \dfrac{1}{x^2} =$

a) $4\cos^2\theta$　　　b) $2\cos2\theta$　　　c) $4\cos^2 2\theta$　　　d) $2\cos^2\theta$

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

1) If x is real then show that $\cosh^{-1}x = \log\left(x + \sqrt{x^2-1}\right)$.

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

3) If z is any complex number then prove that $\cos^2 z + \sin^2 z = 1$.

4) If A is a square matrix then prove that $A - A'$ is skew-symmetric matrix.

5) Solve the system of equations $x + 3y - 2z = 0$, $2x - y + 4z = 0$, $x - 11y + 14z = 0$.

6) Find the characteristic equation of matrix $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & -1 \\ 2 & -1 & 0 \end{bmatrix}$.

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

    1) If n is any positive integer then show that

$$\left(\sqrt{3} + i\right)^n + \left(\sqrt{3} - i\right)^n = 2^{n+1} \cos\frac{n\Pi}{6}$$

    2) Test the consistency and solve $x + y + z = 9$, $2x + 5y + 7z = 52$, $2x + y - z = 0$.

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

  B) Prove that $\sin(z_1 + z_2) = \sin z_1 . \cos z_2 + \cos z_1 . \sin z_2$. **4**

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

    1) State and prove Cayley-Hamilton theorem.

    2) Investigate for what value of λ and μ the equations $x + y + z = 6$, $x + 2y + 3z = 10$.
$$x + 2y + \lambda z = \mu \text{ have}$$

      i) A unique solution

      ii) An infinite solution

      iii) No solution

    3) Find all the six, sixth root of unity and show that they are in a.p.

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

    1) State and prove De-Moivere's theorem and prove that $(1 + i)^8 + (1 - i)^8 = 32$.

    2) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ and find A^{-1}.

———————

Seat No.

B.Sc. I (Semester – I) Examination, 2014
ELECTRONICS (New) (Paper – I)
Electronics Fundamentals

Day and Date: Friday, 13-6-2014   Total Marks: 50
Time: 11.00 a.m. to 1.00 p.m.

Instructions : 1) Figures to the **right** indicate **full** marks.
2) Draw **neat** diagram **wherever** necessary.
3) Use of calculator and log table is **allowed**.
4) **All** questions carry **equal** marks.

1. Select the correct alternatives for the following :   **10**

   1) Parallel resonance circuit is also called as _____ circuit.
      a) Acceptor   b) Rejector
      c) High Pass Filter   d) Low Pass Filter

   2) The residential mains supply has _____ frequency.
      a) 230 Hz   b) 440 Hz   c) 50 Hz   d) 100 Hz

   3) In case of pure inductor current _____ the voltage.
      a) leads   b) lags
      c) in phase with   d) none

   4) The series and shunt arms of T-network for impedance matching are having
      a) inductive reactance only   b) capacitive reactance only
      c) inverse reactance of each other   d) none

   5) Series resonant circuit below resonant frequency becomes
      a) resistive   b) capacitive   c) inductive   d) all

   6) A sine wave has period of 5 ms, its frequency is _____ Hz.
      a) 200   b) 2   c) 20   d) 0.2 K

   7) The unit of inductance is
      a) Ohm   b) Farad   c) Henry   d) Coloumn

P.T.O.

8) In step up transformer
   a) Primary voltage is greater than secondary voltage
   b) Primary voltage is less than secondary voltage
   c) Primary voltage is equal to secondary voltage
   d) None

9) Four resistance of 100 Ω each are connected in series then equivalent resistance will be
   a) 200 Ω   b) 400 Ω   c) 100 Ω   d) 50 Ω

10) The impedance parameters are same as _____ circuit parameters.
    a) short   b) open   c) closed   d) hybrid

2. Answer **any five** of the following :   **10**
   i) Define Time Period and Frequency.
   ii) Define hybrid parameters.
   iii) Give the classification of inductor.
   iv) What is voltage and current source ?
   v) What is colour code of 100 kΩ resistance with 10% tolerance ?
   vi) Define active and passive network.

3. A) Answer **any two** of the following :   **6**
      i) Write short note on electromagnetic relay.
      ii) Explain phase diagram of RLC circuit.
      iii) State and explain Millman's Theorem.

   B) Distinguish between series and parallel resonance.   **4**

4. Answer **any two** of the following :   **10**
   i) Explain Black Box Theory.
   ii) Write a note on electrolytic capacitor.
   iii) State and explain Norton's Theorem.

5. Answer **any one** of the following :   **10**
   i) What is energy source ? What are its types ? Define rms value and phase.
   ii) Explain parallel resonance circuit in detail with reference to circuit diagram and necessary derivation.

_____

Seat
No.

B.Sc. – I (Sem. – I) Examination, 2014
GEOLOGY (Paper – I) (New)
Mineralogy and Palaeontology

Day and Date : Friday, 13-6-2014   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) Two sets of cleavages nearly at right angles are shown by _____ minerals.

    a) Felspar and pyroxene   b) Felspar and amphibole

    c) Amphibole and pyroxene   d) Felspar and mica

2) NaCl posses _____ bonding.

    a) Metallic   b) Ionic

    c) Covalent   d) Homopolar

3) Hardness of topaz mineral is _____

    a) 10   b) 9

    c) 7   d) 8

4) Actinolite-tremolite minerals belongs to

    a) Pyroxene   b) Mica

    c) Felspar   d) Amphibole

5) Composition of orthoclase is

    a) $K. Al. Si_3O_8$ b) $Na.Al. Si_3O_8$

    c) $Ca Al_2 Si_3O_8$ d) $Ca Al_2 Si_2 O_8$

6) In lamellibranchia umbo and teeth are located at _____ margin of the shell.

   a) Dorsal   b) Ventral

   c) Posterior   d) Peripheral

7) The main characteristic of fossils is its preservation in _____

   a) Soil   b) Sediments

   c) Ice   d) Groundwater

8) Wooly Mammoth of Siberia have been preserved in thick _____

   a) Soil   b) Lava flows

   c) Ice sheets   d) Stalagmites

9) Productus fossil belongs to _____ phylum.

   a) Branchiopoda   b) Echinodermata

   c) Coelentera   d) Arthropoda

10) Impression of leaves are preserved in _____ rocks.

   a) Argillaceous   b) Volcanic

   c) Arenaceous   d) Slate

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

   1) Colour of mineral.

   2) Asbestos mineral.

   3) Fracture.

   4) Conditions of fossilization.

   5) The pygidium of trilobite.

   6) Petrifaction.

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

   1) Hardness and Moh's scale of hardness.

   2) Physical properties of mica minerals.

   3) Covalent bonding.

   B) Draw labelled diagram of typical gastropod shell.   **4**

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

   1) Explain physical properties, chemical composition and varieties of Felspar group of minerals.

   2) Explain four forms of minerals with example.

   3) Explain difference between amphibole and pyroxene group of minerals. Give their varieties.

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

   1) Describe the morphology of a lamellibranchia shell.

   2) Explain uses of fossils.

   3) Describe in brief external morphology, geological distribution fossil names of Echinodermata.

_____

Seat
No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
CHEMISTRY (New)
Organic Chemistry (Paper – III)

Day and Date : Friday, 09-5-2014   Total 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) Substitution reaction   b) Addition reaction
        c) Elimination reaction   d) Rearrangement reaction

    2) The compound given below has
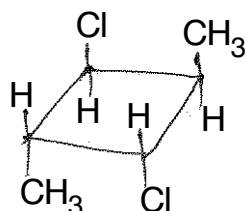
        a) Plane of symmetry
        b) Centre of symmetry
        c) Alternating axis of symmetry
        d) Chiral centre

    3) Concentrated solution of sodium or potassium salts of carboxylic acid is electrolysed to form higher alkanes is known as _____
        a) Perkins reaction   b) Wurtz reaction
        c) Kolbe's reaction   d) Corey House reaction

P.T.O.

4) The compound $CH_3 – CH = C = CH – CH_2 – CH_3$ is example of
   a) Isolated diene
   b) Conjugated diene
   c) Cumulated diene
   d) None of these

5) Anti-Markownikoff's addition of HBr is not observed in
   a) $CH_3 – CH = CH_2$
   b) $CH_2 = CH – CH_2 – CH_3$
   c) $CH_3 – CH = CH – CH_3$
   d) $CH_3 – CH = CH – CH_2 – CH_3$

6) The reaction given below is example of
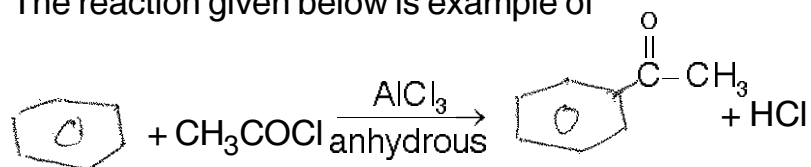
   a) Friedel-Crafts reaction   b) Kolbe's reaction
   c) Grignard's reaction   d) Wurtz reaction

7) Which of the following compound is most stable ?

   a)   b)

   c)   d)

8) The $C – C – C$ bond angle in benzene is
   a) 45°   b) 60°
   c) 120°   d) 180°

9) Which of the following atom or group shows +I effect ?
   a) $– CH_3$ b) $– Cl$
   c) –Br   d) $– COOH$

10) Hyperconjugation effect involves the delocalisation of
   a) σ -electrons   b) σ and π electrons
   c) π -electrons   d) None of these

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

   i) Explain electrophilic addition reaction with example.

   ii) Give geometrical isomerism in maleic acid and fumaric acid.

   iii) Explain the terms conjugated dienes and cumulated dienes with example.

   iv) Define :
     a) Bond length   b) Bond angle

   v) State Huckel's rule and explain it in short.

   vi) Complete the following reaction.

$$H_2C \underset{CH_2-CH_2-Br}{\overset{CH_2-CH_2-Br}{\Big\langle}} + Zn \xrightarrow{\Delta} ?$$
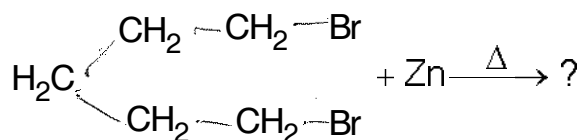
3. A) Answer **any two** of the following : **6**

   i) What is optical activity ? Discuss the optical isomerism in tartaric acid.

   ii) What is hybridization ? Explain SP hybridisation with example.

   iii) Explain homolytic and heterolytic fission of covalent bond with example.

  B) Discuss free radical mechanism of chlorination of methane. **4**

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

   i) What is the action of following reagents on ethyne ?
     a) HBr
     b) CH_3COOH/Hg^{2+}, 80°C
     c) $O_3/Zn/H_2O$
     d) $Na/(NaNH_2)$
     e) HOCl

   ii) Discuss sulphonation reaction with mechanism.

   iii) What is resonance effect ? Discuss it with respect to nitrobenzene.

5. Write notes on **any two** of the following : **10**

   i) Elements of symmetry.

   ii) Bimolecular elimination reaction.

   iii) Types of reagents with examples.

_____

Seat
No.

B.Sc. I (Semester – II) Examination, 2014
COMPUTER SCIENCE (New)
Computer Fundamentals – II (Paper – III)

Day and Date : Friday, 9-5-2014   Max. 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** place indicate **full** marks.

1. Choose correct alternatives.   **10**

   1) The very first part of the HTML documents is the
      a) Title   b) Head   c) Body   d) Table

   2) What kind of list is used to displays a list of items by using numbers or letters ?
      a) Unordered list   b) Definition list
      c) Ordered list   d) Nested list

   3) Time slice is used in
      a) Multiprogramming   b) Multiprocessing
      c) Time sharing   d) Multitasking

   4) LAN communication speed ranges from
      a) 100 mbps to 200 mbps   b) 10 mbps to 20 mbps
      c) 10 mbps to 100 mbps   d) 10 mbps to 1000 mbps

   5) HREF is stand
      a) Hyper Text Reference   b) Hyper Text Markup Language
      c) Hyper Reference   d) None of these

   6) To merge cell contents with another cell _____ is used.
      a) ROWSPAN   b) MERGE COLUMN
      c) COLSPAN   d) All of the above

7) Communication takeplace between objects called
   a) Entities
   b) Protocols
   c) Topology
   d) None of these

8) _____ is shortcut key for paste.
   a) Ctrl + V
   b) Ctrl + x
   c) Ctrl + c
   d) Ctrl + z

9) _____ tag is used to get the table data in individual cell.
   a) <TR>
   b) <TD>
   c) <TH>
   d) <HR>

10) The extension of MS-Excel file is

   a) .cel
   b) .xls
   c) .xel
   d) none of these

2. Write the answer of the following questions **(any five)**.   **10**
   I) What is multitasking ?
   II) Explain the term "E-Mail".
   III) Explain the graphical user Interface.
   IV) What is "Topology" ?
   V) What is an icons ? Give any three name of the icons.
   VI) Define the term tags.

3. A) Write the answer of the following questions **(any two)**.   **6**
   I) What is editor ? List the different types of Editors.
   II) Write note on "Program manager".
   III) What are the features of VBScript ?

   B) Explain the "Concept of Internet".   **4**

4. Write the answer of the following questions **(any two)**.   **10**
   I) What is process ? Explain time sharing and multitasking.
   II) Explain the process of mail merge.
   III) Define the term Networking. Explain types of networking.

5. Write the answer of the following questions **(any two)**.   **10**
   I) What is word processor ? Explain the features of MS-Word.
   II) Explain the Hyperlink and image tag in details.
   III) What is Windows operating system ? Explain the Windows accessories.

_____

SLR-CN – 227

B.Sc. – I (Semester – II) Examination, 2014
Paper – III : PHYSICS
Heat and Thermodynamics (New)

Day and Date : Monday, 12-5-2014   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 is **allowed**.

1. Select correct alternative :   **10**

   i) Entropy of reversible process

      a) Increases   b) Decreases

      c) Remains constant   d) Zero

   ii) In diesel engine the working substance is

      a) Air   b) Petrol

      c) Diesel   d) Mixture of air and petrol

   iii) In refrigerator liquefied gas used is

      a) Nitrogen   b) Hydrogen

      c) Carbondioxide   d) Ammonia

   iv) The coefficient of viscosity of a gas is $\eta =$

      a) $\frac{1}{2} \rho \, \bar{c} \, \lambda$ b) $\frac{1}{3} \rho \, \bar{c} \, \lambda$

      c) $\frac{2}{3} \rho \, \bar{c} \, \lambda$ d) $\frac{3}{4} \rho \, \bar{c} \, \lambda$

v) In Joule-Thomson porous plug experiment all the gases showed cooling effect except

 a) Hydrogen b) Nitrogen

 c) Oxygen d) Carbondioxide

vi) The adiabatic relation between temperature and volume is

 a) $TV^{\gamma} = $ constant b) $TV^{\gamma+1} = $ constant

 c) $TV^{\gamma-1} = $ constant d) $TV^{1-\gamma} = $ constant

vii) The efficiency of diesel engine is _____ petrol engine.

 a) Less than b) Greater than

 c) Equal to d) a and c

viii) A commercial refrigerator operates between the temperatures 7°C and 27°C. The coefficient of performance is

 a) 14 b) 1.4

 c) 41 d) 4.1

ix) As the temperature of gas increases mean free path of gas molecules

 a) Decreases b) Remains constant

 c) Increases d) a and b

x) The efficiency of Carnot heat engine working between the temperatures 27°C and 327°C is

 a) 0.05 b) 0.5 c) 0.55 d) 0.25

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

 i) State the first law of thermodynamics.

 ii) Define heat engine.

 iii) State the principle of refrigerator.

 iv) Define mean free path.

 v) State Joule Thomson effect.

 vi) A heat engine with its sink temperature at 27°C has an efficiency of 40% what should be the temperature of source ?

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

    i) Derive an expression for the work done in an adiabatic change.

    ii) Give the properties of liquid helium.

    iii) Using Clausius expression, calculate the number of molecules per c.c. of a gas, taking the mean free path as 1.83×10^{-5} cm and the molecular diameter 2.3×10^{-8} cm.

   B) Derive an expression for coefficient of thermal conductivity of gas. **4**

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

    i) Explain reversible and irreversible processes with examples.

    ii) Obtain Clausius expression for mean free path.

    iii) Determine the coefficient of viscosity of nitrogen at N.T.P. if the density of nitrogen is 1.2 kg/m^3, its mean free path is 8.5×10^{-8} m, its average velocity is 453.3 m/s.

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

    i) Explain working of Otto engine. Obtain an expression for its efficiency.

    ii) Describe vapour compression refrigerator and obtain an expression for its coefficient of performance.

—————————

B.Sc. (Part – I) (Semester – II) Examination, 2014
GEOGRAPHY (New) (Paper – IV)
Physical Geography – Oceanography

Day and Date: Tuesday, 13-5-2014   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) Draw **neat** diagrams **wherever** necessary.
           4) Figures to the **right** indicate **full** marks.
           5) Use of stencils is **allowed**.

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

   1) _____ hemisphere is called as a water hemisphere.
     1) Northern   2) Southern   3) Eastern   4) Western

   2) The deepest part of the Pacific ocean is called as
     1) Tonga Trench   2) Philippines Trench
     3) Mariana Trench   4) Kurile Trench

   3) Oceanography is a branch of _____ geography.
     1) Physical   2) Human
     3) Trade and Transport   4) Economic

   4) The annual average surface temperature of the ocean water gradually _____ from equator to poles.
     1) increases   2) decreases
     3) remains constant   4) never changes

   5) Sodium chloride dominates the salinity of _____ water.
     1) ocean   2) river   3) lake   4) tank

   6) Every day a tide is delayed by _____ minutes.
     1) 52   2) 26   3) 16   4) 08

   7) The general movement of a mass of oceanic water in a definite direction is called as ocean
     1) wave   2) tide   3) stream   4) current

P.T.O.

8) The tropical cyclones of Western Pacific Ocean are called as
   1) Cyclone   2) Depression
   3) Typhoon   4) Hurricane

9) Coral polyps can thrive only in _____ oceans.
   1) Tropical   2) Temperate   3) Polar   4) Sub-polar

10) When a coral reef is formed off the coastal platform but parallel to the platform, it is called as
   1) ridge   2) fringing reef   3) barrier reef   4) atoll

2. Write answers to **any five** questions :   **10**

   1) Define the term 'Coast'.

   2) What is a 'Tide' ?

   3) Which ocean is present at North Pole ?

   4) What is a 'harbour' ?

   5) Define the term 'Ooze'.

   6) Give names of any two ocean currents.

3. A) Answer **any two** questions :   **6**
      1) State the types of coasts.
      2) Describe the phonic zone of oceans.
      3) Explain the Kurile current.

   B) Draw a neat diagram of the ocean floor.   **4**

4. Write brief answers of **any two** questions :   **10**
   1) Describe the nature of oceanography.
   2) State the horizontal temperature variations of the oceans.
   3) Explain the development of cyclones over the oceans.

5. Write answers of **any two** questions :   **10**
   1) Describe the importance of oceanography.
   2) Write in brief the Darwin's theory of coral reef formation.
   3) State the economic importance of the coasts.

_____

Seat No.

B.Sc. I (Semester – II) (New) Examination, 2014
STATISTICS (Paper – III)
Descriptive Statistics – II

Day and Date : Thursday, 15-5-2014   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**

   1) The lines of regression intersect at the point

     a) (0, 0)   b) (1, 1)

     c) $(\overline{X}, \overline{Y})$ d) None of these

   2) If $b_{yx} = 0.4$ and $b_{xy} = 0.9$ then the correlation coefficient (r) is

     a) 0.36   b) 0.6

     c) – 0.36   d) – 0.6

   3) Total number of class frequencies of all order for 'n' attributes is

     a) 3^n b) 2^n

     c) 2^{n-1} d) None of these

   4) If Cov (x, y) = 50 then cov (10x + 10, 5y + 5) is

     a) 50   b) 2000

     c) 2500   d) None of these

   5) If the variables are uncorrelated then the regression lines are

     a) Parallel   b) Coincident

     c) Perpendicular   d) None of these

6) The G.M. of Laspeyre's and Paasche's indices is

   a) Marshall-Edgeworth index   b) Walsch index

   c) Fisher's index   d) None of these

7) If the variables X and Y changes in opposite direction then the correlation coefficient (r) is

   a) Zero   b) Positive

   c) Negative   d) One

8) When one of the regression coefficient is positive then the other would be

   a) Positive   b) Negative

   c) Zero   d) None of these

9) The limits for rank correlation coefficient are

   a) −1 and 0   b) 0 and 1

   c) −1 and 1   d) None of these

10) The number of letters used to denote a class is called as

   a) Order of class   b) Dichotomous class

   c) Class-frequency   d) None of these

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

   i) Define a fundamental set of class frequencies with illustration.

   ii) Explain why we have two lines of regression.

   iii) With usual notations, show that $b_{xy} \, b_{yx} \leq 1$.

   iv) Define Fisher's price and quantity index number.

   v) Describe Scatter diagram.

   vi) Define Spearman's rank correlation coefficient.

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

   i) Derive an expression for the acute angle between the two lines of regression.

   ii) With usual notations, prove that $Q = \dfrac{2y}{1+y^2}$.

   iii) Write a note on cost of living index numbers.

  B) Show that correlation coefficient (r) always lies between −1 and +1. **4**

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

  i) Derive the Spearman's rank formula for without ties.

  ii) Show that Fisher's formula satisfies both time reversal and factor reversal tests.

  iii) Explain the concepts of independence and association of two attributes.

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

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

  ii) What do you mean by consistency of data ? State the conditions of consistency for single, two and three attributes.

————

B.Sc. I (Semester – II) Examination, 2014
BOTANY (New) (Paper – III)
Gymnosperms and Angiosperms

Day and Date : Saturday, 17-5-2014   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 the **right** indicate **full** marks.

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

     1) Entire leaves are present in

         a) Gnetum   b) Pinus   c) Cycas   d) Abies

     2) _____ is manufactured from Cycas.

         a) Canada balsam   b) Resin

         c) Sago of commerce   d) Alcohol

     3) _____ the name used by Bentham and Hooker to publish their system.

         a) Genera plantarum   b) Species plantarum

         c) Family plantarum   d) None of these

     4) _____ are present in Gymnosperms.

         a) Archegonias   b) Stamens   c) Styles   d) Ovaries

     5) _____ is type of aggregate fruit.

         a) Schizo carpic   b) Dry indehiscent

         c) Fleshy fruits   d) Eterio of berries

     6) _____ is an example of racemose inflorescence.

         a) Catkin   b) Cyathium

         c) Hypanthodium   d) None of these

     7) _____ is one of the salient features of Angiosperms.

         a) Vessels   b) Nucellus   c) Egg cells   d) Phloem

8) _____ is an accessory whorl of the flower.

    a) Calyx   b) Stamens

    c) Gynoecium   d) None of these

9) The ICBN consists _____ principles.

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

10) Legume type of fruit is present in the family

    a) Annonaceae   b) Caesalpinaceae

    c) Amaryllidaceae   d) Convolvulaceae

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

   1) What is zygomorphic flower ?

   2) Two merits of Bentham and Hooker's system.

   3) What is typification ?

   4) What is floral diagram ?

   5) Two economic importance of Amaryllidaceae.

   6) Two salient features of Gymnosperms.

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

   1) Explain the capitulum inflorescence with suitable example.

   2) List the principles of ICBN.

   3) Give an account of economic importance of Gymnosperms.

  B] Give an account of vegetative and floral characters of caesalpinaceae with suitable diagram.   **4**

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

   1) Explain in brief the structure of carolloid root of <u>Cycas</u> with suitable diagram.

   2) What is inflorescence ? Give an account of types of inflorescence with suitable diagrams.

   3) What is fruit ? Give an account of simple fruits with suitable examples.

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

   1) Write an outline of Bentham and Hooker's system of classification.

   2) Write an outline of Sporne's system of classification of Gymnosperms.

_____

Seat No.	

B.Sc. – I (Semester – II) (New) Examination, 2014
ELECTRONICS
Electronic Devices (Paper – III)

Day and Date : Tuesday, 20-5-2014   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) *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) The germanium atoms held together by sharing of its valence electrons known as

      a) ionic bond   b) hydrogen bond

      c) co-valent bond   d) intrinsic bond

   ii) The forbidden energy gap in semiconductor

      a) lies between valence band and conduction band

      b) in the order of 1eV

      c) both a) and b)

      d) none of these

   iii) The barrier potential form in the PN junction due to

      a) immobile acceptor and donor ions

      b) majority charge carriers

      c) minority charge carriers

      d) both type of charge carriers

   iv) The zener diode usually operated in the _____ region.

      a) break-over   b) break-down

      c) break-through   d) All of these

                                                                                    P.T.O.

v) The phenomenon of penetrating charge carriers directly through potential barrier of PN junction is known as

    a) association   b) anhealing

    c) di-ssociation   d) tunneling

vi) Field effect transistor is a

    a) High input resistance device

    b) Unipolar device

    c) Voltage controlled device

    d) All of these

vii) In BJT, the base region is

    a) lightly doped   b) heavily doped

    c) moderately doped   d) pure semiconductor

viii) In transistor, the value of α is

    a) greater than one

    b) equal to one

    c) in the order of hundreds

    d) less than one but approaches to one

ix) The unit of hie is

    a) A   b) ℧

    c) Ω d) V

x) In UJT, the intrinsic stand off ratio η =

    a) $\dfrac{\gamma_{B_1}}{\gamma_{B_1} + \gamma_{B_2}}$ b) $\dfrac{\gamma_{B_2}}{\gamma_{B_1} + \gamma_{B_2}}$

    c) $\dfrac{\gamma_{BB}}{\gamma_{B_1} + \gamma_{B_2}}$ d) None of these

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

    i) Draw a symbol of PNP and UJT with labels.

    ii) Write diode equation and define volt equivalent of temperature (V_T).

iii) State the any four special purpose diodes with one application.

iv) The given FET has transconductance 200 $\mu\mho$ and drain resistance 100 KΩ. Calculate the amplification factor for the same.

v) How barrier potential forms in the PN junction ?

vi) In common base configuration the collector current is 0.9 mA' and $\alpha = 0.9$. Calculate emitter current.

3. A) Answer **any two** of the following : **10**
    i) Write a note on varactor diode.
    ii) Explain construction of Triac.
    iii) Explain the I-V characteristics of Zener diode.

  B) Define α and β of a transistor. Deduce the relation between them.

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

  i) What is meant by intrinsic and extrinsic semiconductor ? Discuss how N type semiconductor is developed ?

  ii) Explain the construction and working of JFET.

  iii) Explain working of tunnel diode with the help of I-V characteristics.

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

  i) Draw the circuit diagram of common base transistor configuration with PNP and explain the working of transistor.

  ii) Explain the working of SCR with the help of I-V characteristics.

_____

Seat No.

B.Sc. – I (Semester – II) (New) Examination, 2014
GEOLOGY (Paper – III)
Introduction to General Geology

Day and Date : Tuesday, 20-5-2014   Max. 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) Earthquake waves are of _____ types.
      a) Three   b) Four   c) Five   d) Six

   2) The radius of earth is _____
      a) 6370 Km   b) 7163 Km   c) 7613 Km   d) 6371 Km

   3) The "Nebular Hypothesis" was proposed by _____
      a) Kant   b) Kant and Laplace together
      c) Laplace   d) None of these

   4) The galaxy has _____ shape.
      a) Spiral   b) Sphere   c) Cube   d) Conical

   5) The _____ planet has no satellite.
      a) Jupiter   b) Earth   c) Mars   d) Venus

   6) Inner planets are also called as _____
      a) Terrestrial planets   b) Outer planets
      c) Core planets   d) None of these

   7) A large depression on the top of Volcanic cone is _____
      a) Caldera   b) Conduit   c) Fumaroles   d) Solftars

   8) The topmost layer of the earth crust is called as _____
      a) Lithosphere   b) Biosphere
      c) Hydrosphere   d) Atmosphere

P.T.O.

9) Circum pacific belt is also known as _____
   a) Ring of fire
   b) Mediterranean belt
   c) Mid-Oceanic ridge
   d) None of these

10) Interior of the earth can be studied with the help of _____
   a) Seismic waves
   b) Ultraviolet rays
   c) Sound waves
   d) Gamma rays

2. Answer **any five** of the following :   **10**
   1) Structure of volcano.
   2) Hot spring.
   3) Major seismic centres in India.
   4) Locating the epicentre.
   5) Planetary laws.
   6) Core of earth.

3. A) Answer **any two** of the following :   **6**
      1) Mechanism of the solar system.
      2) Galaxies.
      3) Seismograph.

   B) Write note on :   **4**
      Earthquake belt.

4. Answer **any two** of the following :   **10**
   1) Explain the concept of origin of universe.
   2) Explain planetesimal hypothesis.
   3) Describe 1st,2nd order relief features.

5. Answer **any two** of the following :   **10**
   1) Describe products of Volcano.
   2) Describe predictions of Earthquake.
   3) Describe principal divisions of Earth.

_____

Seat
No.

B.Sc. I (Semester – II) Examination, 2014
ELECTRONICS (New Course) (Paper – IV)
Digital Electronics

Day and Date: Wednesday, 21-5-2014　　　　　　　　　　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 diagram must be drawn **whenever** necessary.*

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

   i) Fan out of TTL is _____
   　a) 1　　　　　　　b) 10　　　　　　c) 100　　　　　　d) 1000

   ii) The worst case output voltage of TTL in case of high logic output is _____
   　a) 0.8 V　　　　　b) 2 V　　　　　　c) 2.4 V　　　　　d) 5 V

   iii) _____ IC is 4 : 1 multiplexer.
   　a) 74153　　　　　b) 74147　　　　　c) 74138　　　　　d) 7490

   iv) _____ number of control lines used in 1 : 8 demultiplexer.
   　a) Five　　　　　　b) Four　　　　　　c) Two　　　　　　d) Three

   v) In case of RS flip-flop using NOR gate the output remains same when _____
   　a) R = S = 0　　　　　　　　　b) R = S = 1
   　c) R = 1, S = 0　　　　　　　　d) R = 0, S = 1

   vi) The number of inputs for D flip-flop _____
   　a) one　　　　　　b) two　　　　　　c) three　　　　　d) four

   vii) Decade counter requires minimum _____ number of flip flops .
   　a) two　　　　　　b) three　　　　　c) four　　　　　　d) five

   viii) In shift registers PIPO means _____
   　a) Parallel input preset output　　b) Parallel input parallel output
   　c) Preset input preset output　　　d) Preset input parallel output

P.T.O.

ix) Clock input is given simultaneously to all flip flops in _____ counter.
   a) Synchronous
   b) Asynchronous
   c) Combination
   d) None

x) IC 7495 contains _____ flip flops.
   a) one
   b) two
   c) three
   d) four

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

   i) What is sinking current ?

   ii) Draw the diagram of 4 : 1 MUX.

   iii) Differentiate between serial and parallel loading in shift register.

   iv) What is meant by synchronous counter ?

   v) Draw the diagram of SISO 4 bit shift register.

   vi) Explain noise margin in TTL.

3. A) Answer **any two** of the following :   **6**
   i) Draw the diagram of 2 : 4 decoder and write its truth table.
   ii) Draw the diagram of Johnson counter using 7495 and write its truth table.
   iii) Differentiate between MUX and DEMUX.

   B) Explain clocked RS flip flop.   **4**

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

   i) Explain the TTL NAND gate.

   ii) Explain master slave JK flip flop.

   iii) Explain 8 : 1 multiplexer.

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

   i) Explain decade counter using IC 7490.

   ii) Explain BCD to seven segment decoder.

   _____

Seat No.

B.Sc. III (Semester – V) Examination, 2014
ELECTRONICS (Special Paper – XII)
Power Electronics

Day and Date : Tuesday, 15-4-2014   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 diagram **wherever** necessary.
4) Use of logarithmic table and calculator is **allowed**.

1. Select the correct alternatives for the following :   **10**

    i) Power MOSFET is a

    a) Voltage controlled device

    b) Current controlled device

    c) Field controlled device

    d) Both a and c

    ii) An IGBI has three terminals called

    a) Collector, emitter and gate

    b) Drain, source and base

    c) Collector, emitter and base

    d) Collector, emitter and drain

    iii) The minimum value of current required to maintain conduction in thyristor is called the

    a) breakover current   b) holding current

    c) gate trigger current   d) latching current

    iv) Diac is a

    a) bidirectional device   b) unidirectional device

    c) bipolar device   d) both a and b

v) Series connections of SCRs is used to improve _____ ratings.

   a) current   b) voltage

   c) both a and b   d) none of these

vi) In controlled rectifier the nature of the load current

   a) depends on the type of load

   b) depends on the firing angle

   c) depends on the type of load and firing angle.

   d) none of these

vii) A freewheeling diode is used in controlled rectifier in case of

   a) resistive load   b) inductive load

   c) capacitive load   d) none of these

viii) The inverter output ac waveform need not always be

   a) sine wave   b) square wave

   c) triangular wave   d) both a and b

ix) If the duty cycle of the chopper circuit is exactly 50% considered to be

   a) sine wave   b) low duty cycle

   c) high duty cycle   d) square wave

x) SMPS means

   a) Single Mode Power Supply

   b) Switched Mode Power Supply

   c) Series Mode Power Supply

   d) Shunt Mode Power Supply

2. Answer **any five** (**2** marks **each**) :   **10**

   i) Define reverse recovery time of power diode.

   ii) Draw current voltage characteristics of SCR

   iii) Explain the need of heat sink.

   iv) State important features of GTO.

   v) Explain principle of phase control.

   vi) State the applications of inverter.

3. A) Answer **any two** (**3** marks **each**) :   **6**

    i) Explain construction and working of PUT.

    ii) Explain basic chopper circuit.

    iii) Write a short note on protection circuit dv/dt for SCR.

   B) Describe operating modes of triac.   **4**

4. Answer **any two** (**5** marks **each**):   **10**

   i) Explain switching performance of power BJT.

   ii) Write a note on servo AC voltage stabilizer.

   iii) Write a short note on UPS.

5. Answer **any one** :   **10**

   i) Explain with neat diagram and waveforms working of three phase fullwave controlled rectifier with resistive load.

   ii) Explain principle and working of series inverter. Describe class C commutation method for SCR.

_____

B.Sc. (Part – II) (Semester – IV) Examination, 2014
ZOOLOGY (Paper – VIII)
Historology and Physiology

Day and Date : Friday, 2-5-2014   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. Rewrite the sentence by selecting appropriate answer :   **10**

    1) Blood is a _____ type of tissue.
        a) epithelial   b) muscular   c) connective   d) nervous

    2) Smooth muscle fibre is bounded by _____
        a) Plasmalemma   b) Sarcolemma
        c) Plasma membrane   d) Neurolemma

    3) The cytoplasm of cyton is called as _____
        a) germplasm   b) neuroplasm   c) sarcoplasm   d) cytoplasm

    4) Leydig cells of testis secretes _____
        a) growth hormone   b) estrogen hormone
        c) thyroxine hormone   d) testosterone hormone

    5) The outer most layer of graffian follicle is called as _____
        a) theca externa   b) zona pellucida
        c) theca interna   d) corona radiata

    6) ACTH is secreted by _____ of pituitary gland.
        a) pars intermedia   b) adenohypophysis
        c) infundibular stalk   d) neurohypophysis

    7) If STH = GH then vesopressine = _____
        a) oxytocin hormone   b) antidiuretic hormone
        c) lactotropic hormone   d) thyrotropic hormone

8) Vasectomy means _____
   a) cutting of fallopian tubes
   b) cutting of seminal vesicle
   c) cutting of vas. deferens
   d) cutting of ureters

9) Generally the shape of antibody is _____
   a) T-shaped
   b) Y-shaped
   c) H-shaped
   d) Z-shaped

10) Cellular immunity is due to _____
   a) plasma cell
   b) B-cells
   c) antibodies
   d) T-lymphocytes

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

   i) Functions of GH

   ii) Endometrium

   iii) Colostrum

   iv) Islet's of Langerhans

   v) Draw labelled diagram of V. S. of Tooth

   vi) Menopause.

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

   i) Enlist hormones secreted by pituitary gland.

   ii) Describe the hormonal control of parturation.

   iii) Structure of nerve cell.

   B) Describe the male sex hormones.   **4**

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

   i) Describe the cellular immunity.

   ii) Mechanical methods of contraception.

   iii) Describe hormonal control of pregnancy.

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

   i) Describe the histology of Pancreas.

   ii) Describe any two types of epithelial tissues with reference to their origin, location and functions.

_____

Seat
No.

B.Sc. II (Semester – IV) Examination, 2014
MATHEMATICS (Paper – VII)
Integral Calculus

Day and Date : Saturday, 3-5-2014   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) $(n-z)\overline{|n-z}$ = _____

      a) $\overline{|n}$ b) $\overline{|n-1}$ c) $\overline{|n+1}$ d) $\overline{|n-2}$

   2) $\int\limits_{0}^{\infty} x^4 e^{-x} dx$ = _____

      a) 4   b) 24   c) 16   d) 64

   3) $R(m-1, n-1)$ = _____

      a) $\dfrac{(m-1)!(n-1)!}{(m+n-1)!}$ b) $\dfrac{(m-2)!(n-2)!}{(m+n-3)!}$

      c) $\dfrac{(m-1)!(n-1)!}{(m+n-2)!}$ d) $\dfrac{m!\, n!}{(m+n)!}$

   4) π = _____
      a) 0!   b) 2!   c) 3!   d) 4!

   5) Area of the region of the XY-plane with proper limits of integration are provided is

      a) $\iint dxdy$ b) $\int dx$ c) $\int dy$ d) $\iiint dxdydz$

6) If $\iint f(x,y)dxdy = \iint F(u,v)|\Im|\,dudv$ then $\Im = $_____

a) $\dfrac{\partial(x,y)}{\partial(u,v)}$

b) $\dfrac{\partial(u,v)}{\partial(x,y)}$

c) $\dfrac{\partial(x,y)}{\partial(u,v)}\dfrac{\partial(u,v)}{\partial(x,y)}$

d) None of these

7) $\displaystyle\int_0^{\pi}\int_0^{x}\sin y\,dxdy = $_____

a) $-\pi$

b) 2π

c) π

d) -2π

8) If curves $y_1 = \phi_1(x)$ and $y_2 = \phi_2(x)$ intersect in two points (a, c) and (b,d) and between these points $\phi_1(x)$ lies above the $\phi_2(x)$ then area between curves is _____

a) $\displaystyle\int_c^d \left[\phi_3(x) - \phi_2(x)\right] dx$

b) $\displaystyle\int_c^d \left[\phi_1(x) + \phi_2(x)\right] dx$

c) $\displaystyle\int_a^b \left[\phi_1(x) - \phi_2(x)\right] dx$

d) $\displaystyle\int_a^b \left[\phi_3(x) + \phi_2(x)\right] dx$

9) The volume by revolving the arc of $x = f(y)$ about y-axis between the points whose coordinates are a and b is

a) $\displaystyle\int_a^b \pi x^2 dx$

b) $\displaystyle\int_a^b x^2 dx$

c) $\displaystyle\int_a^b \pi x^2 dy$

d) $\displaystyle\int_a^b x^2 dy$

10) The length of curve $y = \log\sec x$ from $x = 0$ to $x = \dfrac{\pi}{3}$ is _____

a) $\log\left(2 - \sqrt{3}\right)$

b) $\log\left(3 - \sqrt{3}\right)$

c) $\log\left(3 + \sqrt{3}\right)$

d) $\log\left(2 + \sqrt{3}\right)$

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

1) Evaluate $\int\limits_{0}^{\frac{\pi}{2}} \int\limits_{0}^{a\cos\theta} r\sin\theta \, d\theta \, dr$.

2) Evaluate $\int\limits_{0}^{1} \int\limits_{0}^{\sqrt{1+x^2}} \frac{1}{1+x^2+y^2} \, dx \, dy$

3) Show that interchange of p and q in beta function does not affect the value of the beta function.

4) Prove that $2\int\limits_{0}^{\frac{\pi}{2}} \sqrt{\tan\theta} \, d\theta = \left| \frac{1}{4} \right| \left| \frac{3}{4} \right|$.

5) Show that the length of arc of the curve $y = \log\tanh\frac{x}{2}$ from $x = 1$ to $x = 2$ is $\log\left(e + \frac{1}{e}\right)$.

6) Find the volume generated by the portion of the arc $x = \sqrt{y^2 - 1}$ lying between $x = 0$ and $x = 4$ as it revolves about the axis of x.

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

1) Evaluate $\iint xy(x+y) \, dx \, dy$ over the area between $y = x^2$ and $y = x$.

2) Show that $\int\limits_{0}^{\infty} \frac{x^3}{(1+x^2)^{9/2}} \, dx = \frac{1}{2} B\left(2, \frac{5}{2}\right)$.

3) Find the area of the one loop of the curve $r = a\cos 3\theta$.

3. B) Show that $\int\limits_{0}^{\infty} \sqrt{y} \, e^{-y^2} \, dy \cdot \int\limits_{0}^{\infty} \frac{1}{\sqrt{y}} e^{-y^2} \, dy = \frac{\pi}{2\sqrt{2}}$.   4

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

1) Using the transformations $\dot{x} + y = u$, $x - y = v$ evaluate $\iint e^{\frac{x-y}{x+y}} dxdy$ over the region bounded by $x = 0$, $y = 0$, $x + y = 1$.

2) Find the whole length of astroid $x^{2/3} + y^{2/3} = a^{2/3}$.

3) Prove the relation between beta and gamma function.

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

1) Change the order of integration $\int\limits_{0}^{a} \int\limits_{x}^{\frac{a^2}{x}} F(x, y)dxdy$.

2) Find the volume formed by the revolution of the loop of the curve $y^2 = \dfrac{x^2(a - x)}{a + x}$ about X-axis.

3) Find the area common to the circles $r = a\sqrt{2}$ and $r = 2a\cos\theta$.

_____

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

Day and Date : Saturday, 3-5-2014 Total 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.

I. Write the **correct** answer. **10**

1) 3-phospho glyceraldehyde unites with dihydroxy acetone phosphate in presence of enzyme _____ to form fructose 1-6 bisphosphate.

   a) Transketolase b) Aldolase

   c) Phosphatase d) Hexokinase

2) Reduction of molecular Nitrogen to Ammonia occurs in _____ steps.

   a) One b) Two

   c) Three d) Four

3) Highest concentration of auxin is found in _____

   a) Shoot apical bud b) Axillary bud

   c) Stem d) Leaf

4) Kranz anatomy is seen in the leaves of _____

   a) Wheat b) Rice

   c) Nerium d) Sugarcane

5) The cold stimulus is perceived by _____

   a) Flower b) Apical bud

   c) Leaf d) Petiole

P.T.O.

6) Through Krebs cycle, the total gain of ATP is _____

   a) Eight   b) Eighteen

   c) Twenty four   d) Thirty

7) Photoperiodism was studied by Garner and Allard in _____

   a) Biloxi soybean

   b) Maryland mammoth variety of tobacco

   c) Xanthium

   d) Both a and b

8) Stomatal closure is brought about by _____

   a) ABA   b) Kinetin

   c) 2, 4-D   d) Ethylene

9) _____ acts as a catalyst and electron carrier during respiration.

   a) Fe   b) Mn

   c) Ca   d) K

10) Vascular elements involved in the transport of organic substances
    are _____

   a) Phloem parenchyma   b) Phloem sclerenchyma

   c) Sieve tubes   d) Companion cells

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

   i) Define Respiration and give its types.

   ii) Give the significance of biological Nitrogen fixation.

   iii) What are phytohormones ? Give the chemical nature of ethylene.

   iv) Give the criteria of essentiality of elements.

   v) Write any four differences between C_3 and C_4 plants.

   vi) Sketch the diagram, explaining symplastic transport.

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

    i) Give the practical applications of Gibberellic acid.

    ii) Explain the role of lecithin in active uptake of ions.

    iii) What is Emerson enhancement effect ? Give its significance.

  B) Write a brief account of florigen concept. **4**

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

    i) Write a note on Glycolysis.

    ii) Explain in brief 'Nitrogen Cycle'.

    iii) Explain the Crassulacean Acid metabolism.

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

    i) Describe different phases of growth.

    ii) Explain non cyclic electron transfer.

    iii) Write a note on 'Phloem Transport'.

———————

Seat No.	

B.Sc. – II (Semester – IV) Examination, 2014
MATHEMATICS (Paper – VIII)
Integral Transforms

Day and Date : Monday, 5-5-2014   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.

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

   1) $L\{\sinh at\} = $ _____

   a) $\dfrac{p}{p^2 - a^2}$ b) $\dfrac{a}{p^2 - a^2}$ c) $\dfrac{a}{p^2 + a^2}$ d) $\dfrac{p}{p^2 + a^2}$

   2) $\displaystyle\int_0^\infty te^{-3t}\sin t\, dt = $ _____

   a) $\dfrac{3}{50}$ b) $\dfrac{3}{25}$ c) $\dfrac{1}{50}$ d) None of these

   3) $L\{F'(t)\} = $ _____

   a) $P^2 L\{F'(t)\} - F'(0)$ b) $P^2 L\{F(t)\} - PF(0) - F'(0)$

   c) $PL\{F(t)\} - F(0)$ d) $P^2 L\{F(t)\} + PF(0) + F'(0)$

   4) $\displaystyle\int_0^\infty \dfrac{\sin t}{t}\, dt = $ _____

   a) $\pi/2$ b) $\pi/4$ c) $\pi/3$ d) $\pi/6$

P.T.O.

5) If L {F(t)} = f(P) then final value theorem states that _____

    a) $\lim\limits_{t \to 0} F(t) = \lim\limits_{P \to \infty} Pf(P)$ b) $\lim\limits_{t \to 0} F(t) = \lim\limits_{P \to 0} PL\{F(t)\}$

    c) $\lim\limits_{t \to 0} F(t) = \lim\limits_{S \to 0} Pf(P)$ d) None of these

6) Convolution of two function is always _____

    a) Commutative   b) Associative

    c) Both a) and b)   d) None of these

7) $L^{-1}\left\{\dfrac{1}{P^2 + a^2}\right\} = $ _____

    a) $\dfrac{\sin at}{a}$ b) $\dfrac{\cos at}{a}$ c) $\dfrac{\sinh at}{a}$ d) None of these

8) $L^{-1}\left\{\dfrac{3}{P^2 - 3}\right\} = $ _____

    a) $\sin \sqrt{3}\, t$ b) $\sqrt{3} \sinh \sqrt{3}\, t$

    c) $\sqrt{3} \cosh \sqrt{3}\, t$ d) $\cos \sqrt{3}\, t$

9) $F * G = $ _____

    a) $\displaystyle\int_0^t F(x)\, G(t - x)\, dx$ b) $\displaystyle\int_0^t G(x)\, F(t - x)\, dx$

    c) $\displaystyle\int_0^t F(x)\, G(x)\, dx$ d) None of these

10) L {sint cost} = _____

    a) $\dfrac{1}{P^2 - 4}$ b) $\dfrac{2}{P^2 + 4}$ c) $\dfrac{1}{P^2 + 4}$ d) $\dfrac{1}{P + 4}$

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

   i) Find L {cosat}.

   ii) Find L {(sint – cost)^2}.

   iii) Find L {t^{3}e^{-3t}}.

   iv) Find $L^{-1} \left\{ \dfrac{1}{\sqrt{P}} \right\}$.

   v) Find $L^{-1} \left\{ \dfrac{1}{P^2 + 8P + 16} \right\}$.

   vi) Evaluate $L^{-1} \left\{ \dfrac{e^{-5p}}{(P-2)^4} \right\}$.

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

   i) Solve $\dfrac{d^2y}{dt^2} + y = 0$ under the conditions that $y = 1$, $\dfrac{dy}{dt} = 0$ when $t = 0$.

   ii) Find $L^{-1} \left\{ \dfrac{3P + 7}{P^2 - 2P - 3} \right\}$.

   iii) Find Laplace transform of the function F(t), where

$$F(t) = \begin{cases} \sin t & , \quad 0 < t < \pi \\ 0 & , \quad \quad t > \pi \end{cases}.$$

B) If $L^{-1}\{f(P)\} = F(t)$ then prove that $L^{-1}\{f(P - a)\} \{= e^{at} F(t) = e^{at} L^{-1}\{f(P)\}$.   **4**

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

   i) Find $L^{-1} \left\{ \log \dfrac{P+3}{P+2} \right\}$.

   ii) If $L\{F(t)\} = f(P)$ then prove that, $L\{F(at)\} = \dfrac{1}{a} f\left(\dfrac{P}{a}\right)$.

   iii) Solve $(D^2 - 2D + 2)y = 0$, $y = Dy = 1$ when $t = 0$.

5. 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) Use the convolution theorem to find $L^{-1} \left\{ \dfrac{1}{(P-2)(P^2+1)} \right\}$.

   iii) If $F(t) = t^2$, $0 < t < 2$ and $F(t+2) = F(t)$. Find $L\{F(t)\}$.

_____

SLR-C – 104

B.Sc. (Part – II) (Sem. – IV) Examination, 2014
BOTANY (Paper – VIII)
Utilization of Plants

Day and Date : Monday, 5-5-2014　　　　　　　　　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. Select the correct answer from the given alternatives.　　　　**10**

　 1) Kalyan sona wheat variety is an example of _____ plant introduction in India.

　　　a) Primary　　　　　　　　　　b) Secondary

　　　c) Tertiary　　　　　　　　　　d) Primary and secondary

　 2) 12 mega centres of diversity of cultivated plants are proposed by _____

　　　a) Zhukovsky　　　　　　　　　b) De Candolle

　　　c) Nicolai　　　　　　　　　　d) Vavilov

　 3) _____ is the legume cultivated for cooking oil.

　　　a) Red gram　　　　　　　　　b) Coconut

　　　c) Ground nut　　　　　　　　d) Cotton

　 4) The _____ of <u>Gossypium herbaceum</u> yield fibre.

　　　a) Mesocarp　　　　　　　　　b) Epicarp

　　　c) Leaves　　　　　　　　　　d) Epidermal hairs of seeds

　 5) Citronella oil is obtained from _____

　　　a) <u>Cymbopogon nardus</u>　　　　b) <u>Vetveria zizanioides</u>

　　　c) <u>Jasminum sambac</u>　　　　　d) <u>Jasminum officinale</u>

6) Alkaloid reserpine is obtained from _____

   a) Glycyrrhiza glabra   b) Withania somnifera

   c) Rauvolfia serpentina   d) Aloe vera

7) Facials and skin lotions are prepared from _____

   a) Arachis hypogaea   b) Aloe vera

   c) Glycine max   d) Opuntia sps.

8) _____ of Bixa orellana yield yellow dye.

   a) Flowers   b) Leaves

   c) Seeds   d) Heart wood

9) The botanical name of Cock's comb is _____

   a) Chrysanthemum indicum   b) Chrysanthemum coronarium

   c) Aster amellus   d) Celosia cristata

10) Bryophyllum is a _____

   a) Succulent   b) Cactus

   c) Seasonal   d) Climber

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

   i) What is primary plant introduction ?

   ii) Give the botanical name of chick pea and red gram.

   iii) What are textile fibres ?

   iv) State the botanical name of rose and give the source of perfume.

   v) Give the botanical name and source of medicine of clove.

   vi) Give the economic importance of rubber.

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

   i) What are the objectives of plant introduction ?

   ii) Give the economic importance of Glycine max.

   iii) Write the botanical name and source of any two plants used as insecticide.

   B) Give the botanical name, source and economic importance of Henna.   **4**

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

   i) Write a short note on fodder legume.

   ii) Discuss in brief the cultural practices of groundnut or soya bean.

   iii) Write a short note on "plant drugs obtained from leaves".

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

   i) Give a brief account of plant drugs obtained from rhizome stating botanical name and medicinal uses.

   ii) Write a short note on "Coir".

   iii) Give the botanical name and ornamental value of perennials you have studied.

   _____

SLR-C – 108

Seat No.	

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

Day and Date : Tuesday, 6-5-2014　　　　　　　　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 a suitable answer from the given options :　　　**10**

　　1) The rate of crystallisation is rapid in the region of _____
　　　　a) Labile zone　　　　　　　　b) Metastable zone
　　　　c) Freezing zone　　　　　　　d) Boiling zone

　　2) Fine grains and the presence of glass in an igneous rock indicat _____
　　　　a) Rapid cooling　　　　　　　b) Moderate cooling
　　　　c) Slow cooling　　　　　　　 d) None of these

　　3) A rock composed entirely crystals is said to be _____
　　　　a) Hemicrystalline　　　　　　b) Holohyaline
　　　　c) Merocrystalline　　　　　　d) Holocrystalline

　　4) Textures which are produced by flow in magmas during their crystallisation are said to be _____
　　　　a) Porphyritic　　b) Undirective　　c) Directive　　d) Reverse

　　5) _____ minerals are those which are necessary to the diagnosis of the rock type.
　　　　a) Accessory　　b) Essential　　c) Secondary　　d) Tertiary

　　6) _____ is a oversaturated rock.
　　　　a) Basalt　　b) Dunite　　c) Granite　　d) Pitchstone

　　7) Trachyte is a _____ igneous rock.
　　　　a) Plutonic　　b) Hypabyssal　　c) Volcanic　　d) Ultrabasic

P.T.O.

8) The texture of igneous rocks depend on _____

   a) Crystallinity   b) Granularity   c) Fabric   d) All of these

9) _____ is a plutonic rock.

   a) Granite   b) Basalt   c) Phyolite   d) Pumice

10) As per Bowen's reaction series, the first and last crystallised minerals are _____

   a) Augite-Hypersthene   b) Amphibole-mica

   c) Olivine-Quartz   d) Olivine-pyroxene

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

   i) Porphyritic texture

   ii) Secondary minerals in basalt rock

   iii) Dolerite rock formation

   iv) Eutectics

   v) Salic Minerals

   vi) Pegmatite.

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

   i) Xenolith formation

   ii) Porphyritic texture

   iii) Spherulitic microstructure.

   B) Write note on :   **4**

   Reaction relation in magma.

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

   i) Mutual relations of crystals and glassy matter

   ii) Mode of occurrence of igneous rocks

   iii) Crystallisation of ternary magma.

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

   i) Crystallization processes of unicomponent magma.

   ii) Classification of igneous rocks based on silica percentage.

   iii) The role of volatile constituents in differentiation.

_____

Seat
No.

B.Sc. II (Semester – IV) Examination, 2014
MICROBIOLOGY
Paper – VII : Immunology and Medical Microbiology

Day and Date : Tuesday, 6-5-2014   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 diagram **wherever** necessary.

1. Choose the correct alternative and write the sentence :   **10**

   1) Widal test is used for diagnosis of _____
      a) urinary tract infection   b) dengue fever
      c) syphilis   d) enteric fever

   2) _____ immunoglobulin is found in secretions.
      a) Ig A   b) Ig D   c) Ig M   d) Ig E

   3) TAB vaccine is used to prevent _____.
      a) candidiasis   b) dengue fever
      c) enteric fever   d) urinary tract infection

   4) _____ is not the type of T cell.
      a) helper CD_4^+ b) suppressor CD_8^+
      c) cytotoxic lymphocyte   d) plasma cell

   5) Lattice hypothesis of antigen- antibody reaction was put forth by _____
      a) Paul Bunnel   b) Marrack
      c) Robert Koch   d) Edward Jenner

   6) _____ is not primary lymphoid organ.
      a) Spleen   b) Lymph node
      c) Peyer's patches   d) Thymus

P.T.O.

7) Tears contain _____ as an antibacterial agent.
 a) lactoferrin   b) transferrin   c) mucus   d) lysozyme

8) The second line defense includes
 a) phagocytosis   b) fever   c) interferon   d) all of these

9) An incomplete antigen is _____
 a) hapten   b) immunogen   c) complement   d) interferon

10) All are transport media except _____
 a) Cary Blair's medium   b) Stuart's medium
 c) Thioglycollate broth   d) Mac Conkey's agar

2. Give at least **two** differences between :   **10**

 i) Innate immunity and adaptive (acquired) immunity.

 ii) Exotoxin and endotoxin.

 iii) Primary lymphoid organs and secondary lymphoid organs.

 iv) Ig M and Ig G.

 v) Antigen and antibody.

 vi) Primary immune response and secondary immune response.

3. A) Answer **any two** of the following :   **6**
  i) Explain about passive immunization.
  ii) Describe how enteric fever can be prevented.
  iii) What is heterophile antigen ? Explain with example.

 B) What is clinical specimen ? Describe general concepts of collection of clinical specimen.   **4**

4. Write short notes on (**any 2**) :   **10**
  i) Ig M.
  ii) Side chain theory of antibody formation.
  iii) Dengue fever.

5. Write short notes on (**any 2**) :   **10**
  i) Lymph node.
  ii) T lymphocytes.
  iii) Extracellular enzymes produced by pathogens.

_____

Seat No.

B.Sc. – I (Semester – I) (Old Course) Examination, 2014
ZOOLOGY (Paper – I)
Animal Diversity – I

Day and Date : Monday, 9-6-2014   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 diagram ***wherever*** necessary.

1. Rewrite the following sentences by choosing corrective given below :   **10**

   1) Amoeba belongs to the phylum _____

     a) Protozoa   b) Porifera

     c) Coelenterata   d) Nematoda

   2) In Paramecium _____ nuclei are present.

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

   3) In sycon water current exit the body through _____

     a) Spongocoel   b) Ostia

     c) Osculum   d) Apopyle

   4) In Hydra the locomotory organs are _____

     a) Cilia   b) Pseudopodia

     c) Tentacles   d) Setae

   5) Tapeworm is _____ parasite.

     a) Ectoparasite   b) Endoparasite

     c) Obligatory   d) Facultative

6) The Earthworm belongs to class _____

    a) Hirudinaria   b) Polychaete

    c) Oligochaete   d) Ciliata

7) In Earthworm, the spermathecae are the organs of _____ system.

    a) male reproductive   b) female reproductive

    c) digestive   d) excretary

8) In Earthworm, the locomotory organs are _____

    a) setae   b) cilia

    c) tentacles   d) flagella

9) In paramecium _____ contractile vacuoles are present.

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

10) In Sycon, the spicules functions as _____

    a) Endoskeleton   b) Exoskeleton

    c) Gland   d) Digestive organ

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

   i) Habit and habitat of sycon.

   ii) Ovary of Earthworm.

   iii) Write the classes of phylum Coelenterata with examples.

   iv) Pinacocyte of sycon.

   v) Gravid proglottids of Tapeworm

   vi) Oral groove of Paramecium.

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

     i) Setae of Earthworm

     ii) Scolex of Tapeworm

     iii) Binnary fission of Paramecium.

   B) Describe the spermatheca of Earthworm.   **4**

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

   i) Choanocyte of sycon.

   ii) Budding of Hydra

   iii) Salient features of Phylum-Annelida.

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

   i) Give an account on – conjugation in paramecium.

   ii) Describe the nervous system of Earthworm.

_____

Seat
No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
PSYCHOLOGY (Paper – VIII)
Applied Psychology

Day and Date : Wednesday, 7-5-2014   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. Select the correct alternative :   **10**

　　1) Romantic love is the strong _____ attachment to a person of the
　　　 opposite sex and on occasion the same sex.
　　　 A) Psychological　　　　　　　　B) Emotional
　　　 C) Social　　　　　　　　　　　D) Economical

　　2) Passionate love perhaps best fits our notion of _____
　　　 A) Romantic love　　　　　　　 B) Love
　　　 C) Intimate　　　　　　　　　　D) Companionate love

　　3) Emotionally, _____ love is more moderate.
　　　 A) Passionate love　　　　　　　B) Companionate love
　　　 C) Romantic love　　　　　　　 D) Lovers

　　4) _____ as an institution is being challenged by alternative arrangements
　　　 such as cohabitation.
　　　 A) Marriage　　　　　　　　　　B) Sex
　　　 C) Voluntary marriage　　　　　 D) Parallel marriage

　　5) Psychologists have identified _____ sources of perceived control.
　　　 A) 3　　　　　　　　　　　　　　B) 4
　　　 C) 2　　　　　　　　　　　　　　D) 5

　　6) _____ points out that learned helplessness also occurs among people.
　　　 A) Seligman　　　　　　　　　　B) Maslow
　　　 C) Harold　　　　　　　　　　　D) Greenwald

　　7) A major factor is the individual's level of _____
　　　 A) Maladaptive behaviour　　　　B) Personal distress
　　　 C) Pain　　　　　　　　　　　　D) Anxiety

8) Chronically anxious people may also suffer from _____
   A) Panic attacks   B) Phobic
   C) Anxiety   D) Compulsive disorder

9) _____ was the founder of psychoanalysis.
   A) Freud   B) Maslow
   C) Seligman   D) Watson

10) _____ was the founder of humanistic approach to therapy.
   A) Carl Rogers   B) Freud
   C) Seligman   D) Watson

2. Write short answers **(any four)** :   **8**
   i) Which is most common groups of psychological disorders in USA ?
   ii) Write only name of symptoms of schizophrenia.
   iii) Write the stages or types of phobia.
   iv) State the stages of decision making.
   v) Write the types of therapy.
   vi) Write the stages of a triangular theory of love.

3. Write short note **(any four)** :   **12**
   i) Cohabitation.
   ii) Sharing marital adjustment.
   iii) Sex in marriage.
   iv) The process of decision making.
   v) Phobia.
   vi) Psychoanalysis.

4. A) Discuss the triangular theory of Love.   **10**

                     OR

   B) Describe several anxiety disorders.

5. Discuss on sharing marital responsibilities.   **10**

_____

Seat No.

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

Day and Date : Wednesday, 7-5-2014   Total Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : 1) **All** questions are **compulsory**.
2) Draw the diagram **wherever** necessary.

1. Fill in the blanks and rewrite the sentence (**one** mark **each**).

   1) The maximum memory access capacity of 8085 is _____ KB.
      a) 64   b) 32   c) 16   d) 128

   2) Alternative function for port 2 is _____
      a) control bus   b) low order address bus
      c) high order address bus   d) data bus

   3) Upon reset the contents of stack pointer are _____
      a) 07   b) 00   c) 16   d) FF

   4) The flag register in the 8051 microcontroller is called as _____
      a) ACC   b) SBUF   c) PCON   d) PSW

   5) The address for Bank-0 is _____
      a) 00-07   b) 08-0F   c) 10-17   d) 18-1F

   6) The 8051 microcontroller has _____ no of on chip serial port.
      a) 0   b) 8   c) 4   d) 1

   7) For immediate addressing mode _____ sign is used.
      a) #   b) @   c) $ d) *

   8) The width of on chip timers in 8051 microcontroller is _____ bit.
      a) 8   b) 16   c) 15   d) 2

   9) In 8051 which interrupt has highest priority ?
      a) IE1   b) TF0   c) IE0   d) TF1

   10) _____ register does not have any internal memory address.
      a) PC   b) SP   c) DPH   d) DPL

P.T.O.

2. Solve **any five** (**two** mark **each**).

   1) Draw the flag structure of 8085.

   2) Draw the memory mapping diagram of on chip RAM.

   3) Draw the RESET circuit diagram for 8051 microcontroller.

   4) Compare RAM and ROM.

   5) Explain the function of $\overline{EA}$ pins of 8051 controller.

   6) Explain the function of SWAP and XCHD A, @ R0 instruction in 8051 microcontroller.

3. A) Answer the **any two** from following (**three** mark **each**).

   1) Enlist different SFR in 8051 microcontroller (Minimum 9 SFR).

   2) Describe the function DPTR, PC, SP.

   3) Write the significance of Over Flow flag in 8051.

   B) Write the program to exchange the contents of memory location 30h to 39h and memory location 40h to 49h.   **4**

4. Attempt **any two** questions (**five** marks **each**).

   1) What is addressing mode ? Enlist different addressing modes of 8051 microcontroller.

   2) Explain with suitable example the instruction ACALL, LCALL in 8051 microcontroller.

   3) Compare the microprocessor and microcontroller.

5. Attempt **any two** questions (**five** marks **each**).

   1) Write ALP to ADD two 8 bit numbers stored in Register R3 and R4 and put result in R5 register and carry in R6.

   2) Write ALP to subtract two 8 bit numbers stored in register R4 and R5 put result in R6 register.

   3) Write the salient features of 8051 microcontroller.

_____

Seat No.	

B.Sc. (Part – II) (Semester – IV) Examination, 2014
GEOLOGY (Paper – VIII)
Sedimentary and Metamorphic Petrology

Day and Date : Wednesday, 7-5-2014   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 given option.   **10**

　　1) _____ salts are more readily absorbed by colloidal matter in clays.

　　　　a) potash   b) sodic

　　　　c) calcic   d) sodic and calcic

　　2) _____ is a mineral in residual deposits.

　　　　a) Kaolinite   b) Gibsite   c) Serricite   d) Muscovite

　　3) _____ sands are characterized by sharp angular grains and unsorted.

　　　　a) desert   b) fluviatile   c) fluviaglacial   d) marine

　　4) Black shales are due to the presence of _____ material.

　　　　a) magnetite   b) manganese

　　　　c) iron   d) carbonaceous

　　5) Sandstones are mainly composed of

　　　　a) felspar   b) calcite   c) iron   d) quartz

　　6) Mica schists and gneisses belongs to _____ metamorphic facies.

　　　　a) greenschist   b) amphibolite   c) granulite   d) eclogite

　　7) Rocks of _____ metamorphic facies develop in the deepest part of the crust.

　　　　a) granulite   b) greenschist   c) amphibolite   d) hornfelse

P.T.O.

8) _____ rock is formed by tourmalinisation.

   a) greisen   b) topaz   c) schorl   d) china clay

9) Garnets in the mica-schist are

   a) Xenoblasts   b) Poikioblasts   c) Granoblasts   d) Porphyroblasts

10) Migmatites are _____ rocks.

   a) Mixed metamorphic   b) Homogeneous metamorphic

   c) Mixed sedimentary   d) Volcanic igneous

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

   i) Laterite

   ii) Texture of breccia

   iii) Characters of mudstone

   iv) Minerals and rocks of greenschist facies

   v) Quartzites

   vi) Mylonite.

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

     i) Calcareous sediments

     ii) Characters of weakly foliated rocks

     iii) Limestone and marble.

   B) What is metamorphic facies ? Add note on eclogite facies.   **4**

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

   i) Sandstone and their types

   ii) Argillaceous deposits

   iii) Classification of minerals based on mineral composition.

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

   i) Retrograde metamorphism

   ii) Fabrics of metamorphic rocks

   iii) Granulite and amphibolite facies in brief.

_____

Seat No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
MICROBIOLOGY (Paper – VIII)
(Applied Microbiology – II)

Day and Date : Wednesday, 7-5-2014　　　　　　　　　　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 **marks**.

1. Choose the correct answers from given alternatives :　　　　　　**10**

　　i) Working volume of fermentor is ———— that of total volume.
　　　　a) Same　　　　　　　　　　　b) Less than
　　　　c) More than　　　　　　　　　d) None of these

　　ii) Detection and isolation of industrially important microorganisms from natural environment is called ———— processes.
　　　　a) Screening　　　　　　　　　b) Assay
　　　　c) Preservation　　　　　　　　d) Incubation

　　iii) Alcohol production is carried out by using ————
　　　　a) B. Cereus　　　　　　　　　b) Pen. Chrysogenum
　　　　c) Sacch. Cerevisiae　　　　　d) B. Thuringiensis

　　iv) ———— is waste product of sugar industry.
　　　　a) Whey　　　b) CSL　　　c) SWL　　　d) Molasses

　　v) Sir Alexander Flemming discovered ———— antibiotic.
　　　　a) Penicillin　　　　　　　　　b) Streptomycin
　　　　c) Erythromycin　　　　　　　d) Ampicillin

　　vi) Distillation process is used for recovery of ————
　　　　a) Penicillin　　　　　　　　　b) Alcohol
　　　　c) Vit. B_{12}　　　　　　　　　d) Lysine

　　vii) ———— is symbiotic nitrogen fixer.
　　　　a) Azotobacter　　　　　　　b) Clostridium
　　　　c) Rhizobium　　　　　　　　d) E. Coli

P.T.O.

viii) Vinegar fermentation is an example of ————— fermentation.
    a) Batch   b) Continuous
    c) Single   d) Dual

ix) ————— is used for aeration of fermentation medium.
    a) Sparger   b) Impeller   c) Baffle   d) Shaft

x) ————— is used for strain improvement.
    a) Genetic recombination   b) Genetic engineering
    c) Mutation   d) All of these

2. Answer **any five** of the following :   **10**
   i) What is batch fermentation ?
   ii) How foam regulated during fermentation ?
   iii) What are the raw materials for SCP production ?
   iv) Give the significance of biofertilizers.
   v) Define primary screening.
   vi) What is meaning of submerged culture fermentation ?

3. A) Answer the following questions in brief :   **6**
     i) Production of SCP.
     ii) Secondary screening.
     iii) Utilization and recycling of molasses.

   B) Describe the production of Penicillin.   **4**

4. Answer **any two** of the following :   **10**
   i) Describe the methods for preservation of industrially important organisms.
   ii) Describe the industrial production of alcohol.
   iii) Explain the production and applications of biopesticides.

5. Answer **any two** of the following :   **10**
   i) With diagram discuss the parts and function of fermentor.
   ii) Describe the production of azofertilizer.
   iii) Discuss the utilization and recycling of dairy waste.

_____

SLR-C – 115

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
ENGLISH COMPULSORY
Countdown-English Skills for Success

Day and Date : Wednesday, 9-4-2014　　　　　　　　　　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. A) Complete the following sentences by choosing the correct option :　　**6**

　　1) _____ moulded young Raman's mental and spiritual outlook.
　　　　a) His father's collection of books
　　　　b) His father's collection of instruments
　　　　c) His father's career guidance
　　　　d) His father's collection of sports material

　　2) Raman stunned the sceptics by staying first in _____
　　　　a) B.A. examination　　　　　　b) B.E. examination
　　　　c) Matric examination　　　　　d) M.A. examination

　　3) _____ was the first task in disaster management in
　　　　Cuddalore.
　　　　a) Rescue and relief　　　　　b) Research on tsunami
　　　　c) Controling epidemics　　　　d) Shifting the people

　　4) _____ was a new mischief that Phatic imagined.
　　　　a) Roll away the log
　　　　b) Pushing the log in the mud
　　　　c) Shaping the log into mast
　　　　d) Pushing the friend into the water

P.T.O.

5) The girl in the poem "Village Song" is carrying water in _____

   a) Bucket   b) Mug

   c) Jug   d) Pitcher

6) According to long fellow _____ is not the goal of life.

   a) Success   b) Wealth

   c) Grave   d) Education

B) Fill in the blanks using appropriate modal verbs.   **2**

1) You _____ be frank with your parents.

   a) can   b) may

   c) might   d) should

2) The land here is wet. It _____ have rained here.

   a) might   b) may

   c) must   d) ought to

C) Do as directed.   **2**

1) Hasan said, "I am returning to Mumbai next Sunday."

   (Change into indirect speech)

2) He asked me if I played Cricket.

   (Change into direct speech)

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

1) Give description of Raman's formative school days.

2) How did Raman spend his spare time ?

3) What was the second job in the disaster management at Cuddalore ?

4) How did the servant take Phatik home ?

5) What did Bishambhar offer to Phatik's mother ?

6) How was the communication established between the relief centres ?

3. A) Answer the following questions in about **50** words **each** (**any two**) :　　　　**6**

   1) What does the poet compare our heart beats to ?

   2) What advice, 'A Psalm of Life' conclude with ?

   3) What is the context in which the poem ? " Village Song" finds expression ?

   B) Write reports in brief on **any two** of the following :　　　　**4**

   1) The process of mending a puncture in bicycle tube.

   2) A successful report on an experiment in laboratory.

   3) The process of lighting a stove.

4. Prepare a presentation script on **any one** of the following using charts or slides : **10**

   1) Importance of internet.

   2) Your compulsory English text book, "Countdown".

5. Write a detailed group discussion on the topic, "The need of human organ donation."　　　　**10**

_____

Seat No.

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

Day and Date : Thursday, 10-4-2014   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 **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) At the congruent melting point of the compound, system is
      a) Univarient   b) Invarient   c) Bivarient   d) Trivarient

   2) Calomel electrode is an example of
      a) Redox electrode   b) Amalgam electrode
      c) Metal-metal ion electrode   d) Metal-insoluble salt electrode

   3) In the expression $\log \dfrac{I}{I_o} = -\in .c.x$, where $\in$ is called
      a) Absorption coefficient   b) Extinction coefficient
      c) Molar absorption coefficient   d) Molar extinction coefficient

   4) The temperature at which one crystalline form changes to another is known as
      a) Transition point   b) Eutectic point
      c) Cryohydric point   d) Triple point

   5) The cell $Cd_{(s)} | CdSO_{4(aq)} | Hg_2SO_4 | Hg_{(l)} | pt$ is an example of
      a) Chemical cell with transference   b) Concentration cell with transference
      c) Chemical cell without transference   d) Concentration cell without transference

P.T.O.

6) For the dissociation of hydrogen in ultraviolet light _____ acts as sensitizer.

   a) Pb b) Hg c) Cl_2 d) Cd

7) When the temperature coefficient of cell becomes zero, ΔG of the cell reaction is

   a) Zero b) Equal to ΔH c) Equal to ΔS d) Equal to ΔA

8) In the expression $\log \dfrac{I}{I_o} = -ax$, where 'a' is called

   a) absorption coefficient b) extinction coefficient

   c) molar absorption coefficient d) molar extinction coefficient

9) The emf values of a certain cell with and without transference are 0.06 V and 0.028 Volts at 298 K respectively. The liquid junction potential is

   a) 3.2 Volts b) 32 Volts c) 0.032 Volts d) 0.088 Volts

10) In concentration cells, emf is produced due to decrease in _____ accompanying the cell reaction.

   a) Enthalpy b) Free energy c) Entropy d) None of these

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

   1) Explain the term phase with suitable example.

   2) How will you represent a cell reaction of a Daniel cell ?

   3) State Grothus draper law.

   4) Explain Zinc-amalgam electrode.

   5) Define quantum efficiency.

   6) Give the classification of electrochemical cell.

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

   1) State Gibb's phase rule and explain the terms involved in it.

   2) Explain Redox electrode with a suitable example.

   3) Write a note on 'retroflex solubility' with the help of diagram.

   B) Calculate the emf of the cell at 298K

   $Pt \mid Cl_{2(g,\ 1.5\ atm)} \mid Hc \mid_{(aq)} \mid Cl_{2(g,\ 9\ atm)} \mid pt.$ **4**
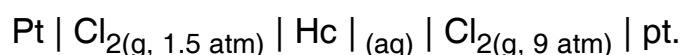
4. Answer **any two** of the following : 10

   i) Write a note on chemical cell without transference.

   ii) Explain the term photochemical equilibrium with a suitable example.

   iii) Emf of the cell.

   $Z_n | Z^{2+}_{n(aq)}$ 0.1m $|| C^-I_{(aq)}$ 0.2m $| Cl_{2(g)}$ 1 bar $|$ pt is 2.19 V at 298 K. Calculate the

   standard potential of chloride electrode $\left(E^o_{Z_n} = -0.761V, \dfrac{2.303RT}{F} = 0.0591 \right)$.

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

   1) What is liquid-liquid junction potential ? How it is eliminated ?

   2) Explain with suitable phase diagram, KI-water system.

   3) What are photochemical reactions ? Distinguish between photochemical and thermal reactions.

   _____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
BOTANY (Special Paper – IX)
Biology of Cryptogams

Day and Date : Thursday, 10-4-2014   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 option for each sub-question. **10**

   1) Morphologically similar haploid and diploid generations are found in _____
     a) Ulothrix   b) Polysiphonia   c) Spirogyra   d) Ectocarpus

   2) Psilotum stem bears _____ type of stele.
     a) Actino stele   b) Siphonostele   c) Eustele   d) Atactostele

   3) The similarity between Agaricus and Polyporus is _____
     a) Closed type of fruiting body   b) Presence of basidio carp
     c) Presence of apothecium   d) Absence of fruiting body

   4) Which of the following pair of *genera* belongs to class basidiomycetes ?
     a) Uncinula and polyporus   b) Polyporors and Agaricus
     c) Agaricus and albugo   d) Albugo and Uncinula

   5) Stalk of a fruiting body of mush room is called _____
     a) Stipe   b) Gills   c) Umbrella   d) Collar

   6) Uncinula causes the disease _____
     a) Downy mildew   b) Rust
     c) Powdery mildew   d) Smut

   7) In Marchantia, the chloroplast is _____
     a) Cup-shaped   b) Ovoid   c) Star shaped   d) Ribbon shaped

   8) Stele originated in _____
     a) Gymnosperms   b) Angiosperms
     c) Bryophytes   d) Pteridophytes

P.T.O.

9) The trilobed synangium is present in _____

   a) Marsilea   b) Selaginella   c) Psilotum   d) Pteris

10) A type of stele in Marsilea is _____

   a) Amphiphloic siphorostele   b) Dictyostele

   c) Polystele   d) Meristele

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

  i) Give the systematic position of Ectocarpus with its characteristics.

  ii) Comment upon occurrence and distribution of algae.

  iii) Illustrate diplontic type of the lite cycle with the help of graphic representation.

  iv) Write a note on origin and evolution of sex in algae.

  v) Describe the internal structure of globule in chara.

  vi) State classes and principle photosynthetic pigments of Chara and Batarachospermum.

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

   i) Describe the sexual reproduction in Polyporus.

   ii) Give the occurrence and thallus structure of Chara.

   iii) Draw the life cycle of Batarchospermum with the help of well labelled diagrams.

  B) Describe the structure of mycelium and a sexual reproduction in Albugo.   **4**

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

  i) Give the systematic position of Marchantia and add a note on morphology of its sex organs.

  ii) Give an illustrated account of the life cycle of Uncinula.

  iii) Describe structure of sporophyte of Marchantia.

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

  i) Describe the sporophytic plant body of Marsilea.

  ii) Write about the structure of spore producing organ of Psilotum.

  iii) Define stele. Describe any two stele types of Pteridophytes.

_____

B.Sc. (Part – III) (Semester – V) Examination, 2014
ZOOLOGY (Special Paper – IX)
Non-Chordates

Day and Date : Thursday, 10-4-2014   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.
             3) Draw **neat** labelled diagrams **wherever** necessary.

1. Select appropriate answer from **each** of the following and rewrite the sentences :   **10**

     1) Spongocoel of sponges is lined with
       a) porocytes   b) amoebocytes
       c) choanocytes   d) thesocytes

     2) The most common method of asexual reproduction in paramoecium is
       a) conjugation   b) conidiospore formation
       c) binary fission   d) binary fussion

     3) Pedicillarae of Echinoderms are modified
       a) tube feets   b) integuments
       c) spines   d) pollian parts

     4) _____ symmetry occurs in sea-star.
       a) bilateral   b) radial
       c) assymetrical   d) spherical

     5) Peripatus is a connecting link between
       a) annelids and arthropods
       b) annelids and heliminthes
       c) arthropods and molluscs
       d) arthropods and echinoderms

     6) _____ number of pairs of testes are present in Hirudinaria.
       a) 10   b) 11   c) 12   d) 13

7) _____ type of feeding habit is found in Leeches.
   a) Herbivores   b) Carnivores   c) Sanguivors   d) Omnivors

8) A median dorsal spine present in _____ larva of crustaceans.
   a) nauplius   b) metanauplius
   c) zoaea   d) cypris

9) The juvenile hormone of the insects is secreted from
   a) corpora allata   b) corpora cardiaca
   c) corpoda adiposa   d) corpoda quadra

10) Lingula belongs to _____ minor phyla.
   a) ectoprocta   b) branchiopoda
   c) phoronida   d) chaetognatha

2. Answer **any five** of the following :   **10**
   i) Oligopod larva
   ii) Zoological importance of limutus
   iii) Nauplius larva
   iv) Systemic position of sea-star
   v) Detorsion in mollusc
   vi) Salient features of ctenophora.

3. A) Answer **any two** of the following :   **6**
     i) Parasitic adaptation in leech
     ii) Coral reef
     iii) Haemal system in sea-star.

   B) Describe hormonal control of insect-metamorphosis.   **4**

4. Answer **any two** of the following :   **10**
   i) Describe conjugation in paramecium
   ii) Describe Ascon type of canal system
   iii) Write on cocoon formation in Leech.

5. Answer **any one** of the following :   **10**
   i) Describe the digestive system in Leech.
   ii) Give a detail account on water vascular system in sea-star.

_____

SLR-C – 120

Seat No.	

B.Sc. III (Semester – V) Examination, 2014
MATHEMATICS (Special Paper – IX)
Real Analysis

Day and Date : Thursday, 10-4-2014   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.

1. Select the correct alternative of **each** of the following.   **10**

    1) If f and g are functions from $\mathbb{R}$ to $\mathbb{R}$ such that $f(x) = 3x - 1$ and $g(x) = x^2 + 1$ then $f \circ g =$
      a) $3x^2 + 2$ b) $x^2 - 3x$
      c) $9x^2 - 6x + 2$ d) none of these

    2) If $f : \mathbb{R} \to \mathbb{R}$ such that $f(x) = c$ for every $x \in \mathbb{R}$ where c is any fixed real number then $f(\mathbb{R}) =$
      a) $\{c\}$ b) $\mathbb{R}$ c) $\mathbb{N}$ d) $\mathbb{Q}$

    3) Which of the following is not countable set ?
      a) set of rational   b) set of integers
      c) set of even natural numbers   d) set of irrational numbers

    4) For the sequence $1, - 4, 7, - 10, 13, - 16, ...$ which of the following is a subsequence
      a) $- 4, - 10, - 16, ...$ b) $7, - 4, 13, - 10, ...$
      c) $4, 10, 16, ...$ d) $1, - 4, - 10, - 13, ...$

    5) If $a_n \le b_n \le c_n$ and $\lim\limits_{n \to \infty} a_n = A = \lim\limits_{n \to \infty} C_n$ then $\lim\limits_{n \to \infty} b_n =$
      a) A   b) $- A$ c) A^2 d) None of these

    6) If a sequence $\{ S_n \}_{n=1}^{\infty}$ of real numbers diverges to ∞ then seq. $\{- S_n \}_{n=1}^{\infty}$ diverges to
      a) ∞ b) 0   c) $-\infty$ d) none of these

7) If $\lim\limits_{n\to\infty} \dfrac{S_n}{n} = L \neq 0$ then $\left\{ S_n \right\}_{n=1}^{\infty}$ is

 a) Bounded b) Not bounded
 c) Oscillate d) None of these

8) The series $1 - \dfrac{1}{2} + \dfrac{1}{2} - \dfrac{1}{4} + \dfrac{1}{3} - \dfrac{1}{8} + \dfrac{1}{4} - \dfrac{1}{16} + \ldots$ is

 a) convergent b) divergent c) oscillate d) none of these

9) If $\left\{ a_n \right\}_{n=1}^{\infty}$ is a decreasing sequence of positive numbers and $\sum a_n$ converges then $\lim\limits_{n\to\infty} n\,a_n =$

 a) 0 b) 1 c) ∞ d) $-\infty$

10) If $\lim\limits_{n\to\infty} \sup \left| a_n \right|^{1/n} = \rho$ then the series $\sum a_n$ converges absolutely if

 a) $\rho < 1$ b) $\rho > 1$ c) $\rho = 1$ d) none of these

2. Attempt **any five** out of six : **10**

 1) If $f(x) = \sin x$ then find $f[0, \pi/6]$ and $f\left([\pi/6, \pi/2] \right)$.

 2) If $I = \{1, 2, 3, \ldots\}$ and $f(n) = n + 7$; $g(n) = 2n$; $n \in I$ then find range of $f \circ g$ and range of $g \circ f$.

 3) Show that limit of sequence $\left\{ S_n \right\}_{n=1}^{\infty} = \left\{ (-1)^n \right\}_{n=1}^{\infty}$ does not exist.

 4) If sequence $\left\{ S_n \right\}_{n=1}^{\infty}$ is of real numbers which converges to L. Prove that $\left\{ S_n^2 \right\}_{n=1}^{\infty}$ converges to L^2.

 5) Show that the series $\sum\limits_{n=1}^{\infty} \dfrac{1}{n^2}$ is convergent.

 6) If $\sum a_n$ converges to A and $\sum b_n$ converges to B then prove that $\sum (a_n + b_n)$ converges to A + B.

3. A) Attempt **any two** out of three : **6**

    1) If A, B are subsets of S then prove that :

       $(A \cup B)' = A' \cap B'$.

    2) If $\{S_n\}_{n=1}^{\infty}$ is a sequence of real numbers which is convergent then prove

       that $\{S_n\}_{n=1}^{\infty}$ is bounded.

    3) Show that the series $1 - \dfrac{1}{1!} + \dfrac{1}{2!} - \dfrac{1}{3!} + \ldots$ converges obsolutely.

  B) Show that any infinite subset of countable set is countable. **4**

4. Attempt **any two** out of three : **10**

    1) Discuss the convergence of the series $\sum \dfrac{n^n}{n!}$.

    2) Using Cauchy's criterian of convergence of sequence prove that the sequence

       $\{S_n\}_{n=1}^{\infty}$ defined by $S_n = 1 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} + \ldots + \dfrac{1}{n}$ is not convergent.

    3) If $f : A \to B$ and if $X \subset B$, $Y \subset B$ then show that $\vec{f}(X \cap Y) = \vec{f}(X) \cap \vec{f}(Y)$.

5. Attempt **any two** out of three : **10**

    1) Show that the countable union of countable sets is countable.

    2) Show that the series $\sum\limits_{n=1}^{\infty} \dfrac{1}{n}$ is divergent.

    3) If $\{s_n\}_{n=1}^{\infty}$ and $\{t_n\}_{n=1}^{\infty}$ are bounded sequence of real numbers then show that

       $\lim\limits_{n\to\infty} \sup (s_n + t_n) \le \lim\limits_{n\to\infty} \sup s_n + \lim\limits_{n\to\infty} \sup t_n$.

——————

SLR-C – 122

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – IX)
Earth's Physics and Dynamics

Day and Date : Thursday, 10-4-2014   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 marks.

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

    1) The single super continent is known as —————
        a) Panthalssa   b) Gondwana   c) Eurasia   d) Pangaea

    2) The magnetic normal and reversals are documented in the rocks flanking the —————
        a) Transform faults   b) Oceanic trenches
        c) Mid-oceanic ridges   d) Continental mountains

    3) Satpura mountain is an example of —————
        a) Volcanic   b) Fault block
        c) Fold   d) Denudational

    4) The mountain building is known as —————
        a) Orogenesis   b) Epeirogenesis
        c) Plutonism   d) Geosyncline

    5) ————— proposed the seafloor is spreading.
        a) Wegner   b) Hess   c) Morgan   d) Dana

    6) Division and drifting of super continents might have begun ————— ma ago.
        a) 200   b) 100   c) 500   d) 20

    7) ————— postulated hypothesis of isostasy considering the uniform density of the outer crust.
        a) Hess   b) Pratt   c) Airy   d) Heiskanen

8) ——————— is one of the larger plate.

   a) Arabian plate   b) African plate

   c) China plate   d) Strahler plate

9) ——————— fossil has been discovered in the lands of Gondwana.

   a) Pecten   b) Productus   c) Glossopteris   d) Physa

10) Height of mountain is grater than ——————— m.

   a) 800   b) 610   c) 510   d) 910

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

   a) Asthenosphere.

   b) Meaning of sea floor spreading.

   c) Volcanic mountain.

   d) Panthalssa.

   e) Level of compensation.

   f) Figure of divergent plate boundary.

3. A) Write notes on **any two** of the following :   **6**

   a) Transform faults.

   b) Airy's hypothesis.

   c) Epeirogenic movements.

  B) Characteristics of plate boundaries.   **4**

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

   a) Evidences of continental drift.

   b) Convergent plate boundary.

   c) Fold mountain and its origin.

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

   a) Evidences of sea-floor spreading.

   b) Convection mechanism.

   c) Heiskanen's hypothesis.

———————————

Seat No.

B.Sc. Part – III (Semester – V) Examination, 2014
MICROBIOLOGY (Special Paper – IX)
Virology, Extremophiles and Bioinformatics

Day and Date : Thursday, 10-4-2014   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. 1) _____ is a virulent phage.   **10**

    a) λ b) P_1 c) Mu   d) T_4

    2) The phage $\phi \times 174$ contains

    a) Circular single stranded DNA   b) Linear single stranded DNA
    c) Circular single stranded RNA   d) Linear single stranded RNA

    3) In pock assay method, viral dilution is inoculated onto surface of

    a) Allantoiccavity   b) Amniotic cavity
    c) Yoc sac   d) Chorioallantoic membrane

    4) _____ is the only gene that is expressed during lysogenic state of λ
    phage.

    a) C I   b) C II   c) C III   d) N

    5) Polystyrene latex is used for enumeration of viruses in sample by

    a) pock method
    b) hemagglutination assay
    c) acid end pt. assay
    d) direct electron microscopic count

6) Huebner and Todaro proposed _____ theory.

   a) provirus   b) protovirus

   c) oncogene   d) somatic mutation

7) Terminal protein of 55k is attached to 5'end of DNA of _____ virus.

   a) Influenza   b) Adeno

   c) Pox   d) Polio

8) H_5N_1 is sub type of _____ virus.

   a) Influenza   b) Measles

   c) Adeno   d) Mumps

9) In the term NCBI, the letter 'B' stands for

   a) Biochemical   b) Biological

   c) Biotechnology   d) Botanical

10) _____ is used to find out the querried sequence from different databases of protein, DNA, RNA etc.

   a) Rediff   b) Blast

   c) Google   d) Yahoo

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

  i) What are osmophiles ? Where do the occur ?

  ii) What is PDB ? Give its use.

  iii) How progeny influenza viruses are released from the host cells ?

  iv) What is malignant tumor ? Give examples.

  v) What is the nature of influenza virus genome ?

  vi) What is burst period or rise period ?

  vii) What is meant by self assembly of progeny virus particles ?

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

    i) What is pock assay ? Give brief account of the method.

    ii) What is eclipse period ? Explain briefly.

    iii) What is lysogeny ? Explain briefly.

  B) Write short note on, 'Acidophiles'.   **4**

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

  i) Types of cancer.

  ii) Give brief account of purification of viruses.

  iii) Describe briefly adsorption and penetration of influenza viruses.

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

  i) Describe one step growth experiment.

  ii) Explain briefly pattern method and latex droplet method used for enumeration of viruses.

  iii) Write brief account on 'NCBI'.

————————

B.Sc. (Part – III) (Semester – V) Examination, 2014
ELECTRONICS (Special Paper – IX)
Linear Integrated Circuits and Applications

Day and Date : Thursday, 10-4-2014　　　　　　　　　　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 diagram **wherever** necessary.
　　　　　　　　4) **Use** of log table and calculator is allowed.

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

   i) The component which is not possible to fabricate in IC is
   　　a) diode　　　　　b) resistor　　　c) inductor　　　d) capacitor

   ii) A chip having more than 3000 logic gates is known as _____ chip.
   　　a) SSI　　　　　b) MSI　　　　　c) LSI　　　　　d) VLSI

   iii) _____ filter has maximum flat pass and stop bands.
   　　a) Butterworth　　b) Chebyshev　c) Elliptic　　　d) None of these

   iv) A wide band-pass filter is formed by cascading
   　　a) band pass sections　　　　　b) band stop sections
   　　c) high pass and low pass sections　　d) all of above

   v) If the control voltage to a VCO increases, the output frequency
   　　a) decreases　　　　　　　　　b) does not changes
   　　c) increases　　　　　　　　　d) none of these

   vi) In case of PLL lock range is _____ capture range.
   　　a) less than　　　b) greater than　c) equal to　　　d) none of these

   vii) _____ converter is a resistive network.
   　　a) D/A　　　　　　　　　　　b) A/D
   　　c) Both D/A and A/D　　　　　　d) None of these

   viii) IC LM 337 is a _____ voltage regulator.
   　　a) fixed positive　　　　　　　b) adjustable positive
   　　c) fixed negative　　　　　　　d) adjustable negative

P.T.O.

ix) The main job of a voltage regulator is to provide a nearly _____ output voltage.

a) sinusoidal   b) constant   c) smooth   d) fluctuating

x) Which of the following IC is used for audio amplifier ?

a) LM 386   b) IC 565   c) IC 0808   d) IC 0809

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

i) What do you mean by passive and active filters ?

ii) Give the different methods of fabricating resistor in IC.

iii) What are the advantages of IC voltage regulators ?

iv) Define lock range and capture range in PLL.

v) List the basic building blocks of PLL.

vi) What is A/D converter ? List the various A/D conversion techniques.

3. A) Answer **any two (3** marks **each)** :   **6**

i) Draw the pinconfiguration of IC LM 317 and state the expression for its output voltage.

ii) Design a low pass filter at a cutoff frequency of 1 kHz with a passband gain of 2.

iii) Write a note on monolithic diode.

B) In a 4-bit R-2R ladder DAC find :   **4**

i) Full scale output voltage.

ii) Analog output voltage for 1010 input given logic 0 = 0V, logic 1 = 12V.

4. Answer **any two (5** marks **each)** :   **10**

i) Explain narrow band pass filter.

ii) Explain with neat block diagram the frequency multiplication using PLL.

iii) Explain series op-amp regulator.

5. Answer **any one** :   **10**

i) Draw the block diagram of function generator IC 8038 and explain the function of each block.

ii) What is an integrated circuit ? Explain the different types of integrated circuits. Explain the epitaxial process used in the fabrication of IC's

_____

SLR-C – 128

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
BOTANY (Special Paper – X)
Gymnosperms and Palaeobotany

Day and Date : Friday, 11-4-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences choosing the correct alternative.   **(1×10=10)**

   1) Zamia belongs to order
      a) cycadales   b) coniferales   c) gnetales   d) taxales

   2) The sperms in Zamia are
      a) non motile   b) motile
      c) motile and pear shaped   d) spiral

   3) Gnetum is different from other gymnosperms because it has _____ in Xylem.
      a) parenchyma   b) fibres   c) tracheids   d) vessels

   4) Most of the characters of Gnetum are homologous with
      a) monocot-angiosperms   b) dicot-angiosperms
      c) pteridophytes   d) bryophytes

   5) Calculation of geological age of fossil specimens is called
      a) sulpher dating   b) nitrogen dating
      c) calcium dating   d) carbon dating

   6) The cellular details are well preserved in _____ type of fossils.
      a) cast   b) petrification
      c) impression   d) compression

   7) Calamite has _____ subgenera based on branching pattern.
      a) 3   b) 4   c) 5   d) 6

P.T.O.

8) <u>Laginostoma lomaxi</u> is a _____ genera of <u>Lyginopteris</u>.
   a) stem   b) root   c) seed   d) leaf

9) Anthracite coal has _____ commercial value.
   a) low   b) intermediate   c) high   d) no

10) Over 99% of oil and gas is drawn from _____ rock.
   a) sedimentary   b) igneous   c) metamorphic   d) none of these

2. Answer **any five** of the following :   **10**
   1) Sketch and label the sporophyte of <u>Zamia</u>.
   2) What is mesarch xylem ?
   3) In list Indian species of <u>Gnetum</u>.
   4) What is Amber ?
   5) Define organe genera.
   6) What are microfossils ?

3. A) Answer **any two** of the following :   **6**
      1) Describe V.S. of <u>Gnetum</u> ovule.
      2) Classification of <u>Cycadeoidea</u> with form genera.
      3) Describe seed genera of <u>Lyginopteris</u>.

   B) What is geological time scale ? Give fossil flora of palaeozoic era.   **4**

4. Answer **any two** of the following :   **10**
   1) Describe the structure of male cone and male gametophyte of <u>Zamia</u>.
   2) What are fossils ? Describe compression and purification type of fossils.
   3) Explain coal and oil are biotic in origin.

5. Answer **any two** of the followings :   **10**
   1) Describe anomalous secondary growth in <u>Gnetum</u>.
   2) Describe internal structures of <u>cycadeoidea</u> stem.
   3) What are fossils ? Describe nodule and microfossils.

_____

Seat
No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
STATISTICS
Sampling Techniques (Special Paper – X)

Day and Date : Friday, 11-4-2014　　　　　　　　　　　　　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) Soundless calculators are **allowed**.

1. Choose most appropriate alternative from those given in **each** case : 　　　　**10**

　　i) Sampling is inevitable in the situations
　　　　a) blood test of a person　　　　　　b) when the population is infinite
　　　　c) testing of life of dry battery cells　d) all of these

　　ii) Probability of drawing a unit at each selection remains same in
　　　　a) SRSWOR　　　　　　　　　　　b) SRSWR
　　　　c) both (a) and (b)　　　　　　　　d) neither (a) nor (b)

　　iii) Sampling frame is a term used for
　　　　a) a list of random numbers
　　　　b) a list of voters
　　　　c) a list of sampling units of a population
　　　　d) none of these

　　iv) Regarding the number of strata, which statement is true ?
　　　　a) lesser the no. of strata, better it is　b) more than no. of strata, poorer it is
　　　　c) more than no. of strata, better it is　d) none of these

　　v) Which of the following statement is not true ?
　　　　a) standard error cannot be zero　　b) standard error cannot be one
　　　　c) standard error can be negative　　d) all of these

P.T.O.

vi) How many types of optimum allocations are in common use ?

    a) one   b) two   c) three   d) none of these

vii) Selected units of a systematic sample are

    a) easily locatable

    b) not easily locatable

    c) not representing the whole population

    d) none of these

viii) In what situation two stage sampling is better than single stage sampling ?

    a) when the elements in the same stage are positively correlated

    b) when the elements in the same stage are negatively correlated

    c) when the elements in the same stage are uncorrelated

    d) none of these

ix) What precautions makes cluster sampling more effective ?

    a) taking clusters of small size

    b) choosing clusters having largest within variation

    c) choosing clusters having least variation between clusters

    d) all of these

x) The errors emerging out of faulty planning of surveys are categorised as

    a) non sampling errors   b) sampling errors

    c) non response errors   d) none of these

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

    i) Explain elementary units and sampling units.

    ii) Explain sampling for dichotomous attributes.

    iii) Real life situations where stratification can be used.

    iv) Give idea of circular systematic sampling.

    v) Give situations where ratio method is appropriate.

    vi) Write a note on two stage sampling.

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

   i) Explain proportional allocation and optimum allocation.

   ii) Concept of sampling error and non sampling errors.

   iii) Give objectives of a sample survey.

   B) Write a note on multistage sampling. **4**

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

   i) Find an unbiased estimator of the population mean and obtain its variance in case of stratified random sampling.

   ii) Describe cluster sampling. State the estimator of population total and population mean under cluster sampling.

   iii) Obtain relative efficiency of regression estimators with that of a simple random sampling without replacement.

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

   i) Describe systematic sampling. Obtain an unbiased estimator of population total for systematic sampling.

   ii) Explain sampling for proportion. Show that sampling proportion is unbiased estimator of population proportion.

   iii) Obtain relative efficiency of ratio estimators with that of simple random sampling without replacement.

_____

Seat No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
GEOLOGY (Special Paper – X)
Geomorphology

Day and Date : Friday, 11-4-2014

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 principle of uniformitarianism was enunciated by _____
      a) Steno   b) Hutton   c) W. M. Davis   d) Penk

   2) Which of the following causes mass movement ?
      a) $g_p + g + friction > g_t$ b) $g_p + g + friction = g_t$
      c) $g_p + g + friction < g_t$ d) $g_p + g_t + friction = g$

   3) Choose the incorrect statement about Himalayan rivers.
      a) Their tributaries are engaged in head ward erosion
      b) Pot holes are normal features
      c) Long profile of rivers are characterised by rapids and waterfalls
      d) They are more sinus and developed numerous meanders

   4) Elevations measured from Mean Sea Level (MSL) is _____
      a) Relative relief   b) Initial relief
      c) Absolute relief   d) None of these

   5) No river can erode vertically beyond _____
      a) Local base level   b) Valley floor
      c) Interfluve   d) Mean Sea Level (MSL)

   6) The slope can be considered as stable when it has angle _____
      a) 20° to 47°   b) 35° to 37°   c) 20° to 27°   d) 30° to 37°

   7) In the youth stage valley sides show _____ slope.
      a) Convex   b) Rectilinear   c) Concave   d) None of these

P.T.O.

8) No landscape on the earth is older than _____
   a) Oligocene   b) Miocene   c) Pliocene   d) Pleistocene

9) Removal of upper deposition causes exposure of old landscape is known as
   _____ topography.
   a) Exhumed   b) Resurrected
   c) Both exhumed and resurrected   d) None of these

10) The slope angle 0° to 2° can be classified as _____ slope.
   a) Level to very gentle   b) Almost level
   c) Gentle   d) Moderate

2. Answer **any five** of the following :   **10**
   i) What is multicyclic landscape ?
   ii) River capture is characteristic of which stage ?
   iii) Which is the driving force of mass movement ?
   iv) How normal cycle of erosion begin ?
   v) What is peneplane ?
   vi) What is slope of accumulation ?

3. A) Answer **any two** of the following :   **6**
   i) Explain slow flowage and rapid flowage.
   ii) Explain how orientation of bedding planes affect mass movement ?
   iiI) Explain static rejuvenation.

   B) Draw a table showing classification of mass movement.   **4**

4. Answer **any two** of the following :   **10**
   i) What causes subsidence ?
   ii) Explain any five preventive measures for mass movement.
   iii) What are the characteristics of old stage ?

5. Answer **any two** of the following :   **10**
   i) Describe in brief the concept of cycle of erosion.
   ii) What are topographic evidences of rejuvenation ?
   iii) Describe quantitative classification of slope.

_____

Seat
No.

B.Sc. III (Semester – V) Examination, 2014
ELECTRONICS Special Paper – X
Fundamentals of Communication

Day and Date : Friday, 11-4-2014　　　　　　　　　　　　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**

   i) A frequency of 27MHz has wave length of approximately
   　　a) 27 m.　　　　b) 30 m　　　　c) 11 m　　　　d) 33 m

   ii) _____ is approximate time of scanning one horizontal line in TV set
   　　a) 64 µs　　　　b) 52 µs　　　　c) 12 µs　　　　d) 48 µs

   iii) _____ is the frequency difference between sound IF and picture IF values in Television system.
   　　a) 455 KHz　　　b) 4.5 MHz　　　c) 1.5 MHz　　　d) 3.5 MHz

   iv) In super heterodyne AM radio receiver standard value of IF is
   　　a) 455 KHz　　　b) 4.5 MHz　　　c) 7.5 MHz　　　d) 4.5 KHz

   v) The modulation index value of ideal AM modulator is
   　　a) less than 1　　b) more than 1　c) equal to 1　　　d) none

   vi) If ma is greater than 1, for AM transmission, then
   　　a) operation is normal　　　　　b) carrier drops to zero
   　　c) information signal is distorted　d) carrier frequency shifts

   vii) Receiver uses
   　　a) modulator　　　b) detector　　　c) both (a) and (b)　d) none

P.T.O.

viii) Telephone communication is _____ system.

    a) simplex   b) duplex   c) complex   d) multiplex

ix) Noise figure in radio receiver is the ratio of

    a) $\dfrac{S/N\ \text{input}}{S/N\ \text{output}}$ b) $\dfrac{S}{N}$ c) $\dfrac{S/N\ \text{output}}{S/N\ \text{input}}$ d) N/S

x) D-layer in Ionosphere is largely present

    a) day time   b) night time   c) both (a) and (b)   d) none

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

   i) What is need of modulation ?

   ii) Define Noise is communication. What are types of noise ?

   iii) What is line of sight communication ?

   iv) What is principle of superheterodyne receiver ?

   v) What are the elements of Telephone handset ?

   vi) What are the drawbacks of ground wave communication ?

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

    i) Give the concept of FDM and TDM.

    ii) Write a note on Telephone Microphone.

    iii) What are the types of communication system ? Explain any one.

  B) Differentiate between DSB, SSB and VSB techniques used in AM.   **4**

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

   i) Explain PWM Technique used in digital modulation.

   ii) Write short note on propagation by tropospheric waves.

   iii) Explain Interlaced scanning used in Television System.

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

   1) Explain with neat block diagram FM superheterodyne receiver.

   2) Explain frequency modulation and derive mathematical expression for FM wave.

_____

Seat No.	

B.Sc. – III (Sem. – V) Examination, 2014
COMPUTER SCIENCE
Core Java (Special Paper – X)

Day and Date : Friday, 11-4-2014   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) The documentation comment start and ends with _____

      a) /* and */   b) /* * and * */

      c) /* and * */   d) /* * and */

   2) Every try statement should be followed by _____ catch block.

      a) 1   b) 2

      c) 3   d) 4

   3) Java does not supports for multi-threading programming.

      a) True   b) False

   4) _____ keyword can be used to refer to the current object.

      a) static   b) object

      c) this   d) super

   5) Who is considered as creator of Java ?

      a) Dennis Ritchei   b) Bjarne Strous Trup

      c) Ken Thompson   d) James Gosling

   6) Java does not supports for multiple inheritance.

      a) True   b) False

   7) _____ exceptions that are checked at compilation time.

      a) Checked Exception   b) Unchecked

      c) Arithmetic Exception   d) None of these

P.T.O.

8) Primitive data types can be converted into objects by using _____

   a) Type operator   b) Type-casting

   c) Wrapper class   d) All of these

9) Default parameter passing technique for Java is _____

   a) Pass by value   b) Pass by reference

   c) Pass by pointer   d) None of these

10) _____ type of variable can not be serialized.

   a) static   b) transient

   c) both a) and b)   d) none of these

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

   1) What is interface ?

   2) Define type-casting.

   3) Explain sleep ( ) method.

   4) What is assertion ?

   5) Define Hash table.

   6) What is boxing ?

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

   1) Differentiate C++ and Java.

   2) Explain history of Java.

   3) What is byte code ?

   B) Write a program to check given string is palindrom or not.   **4**

4. Attempt **any two** question from the following :   **10**

   1) Write a program to handle ArrayOut Of Bounds Exception.

   2) Write a program to create a thread using Runnable interface.

   3) Write a program to check the given number is Armstrong or not. (using package)

5. Attempt **any two** questions from the following :   **10**

   1) Differentiate method overloading and method overriding.

   2) Explain different forms of inheritance.

   3) What is collection ? Explain collection classes.

_____

Seat No.

B.Sc. – III (Semester – V) Examination, 2014
PHYSICS (Special Paper – XI)
Classical Mechanics and Spectroscopy

Day and Date : Saturday, 12-4-2014   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) **Neat** diagrams must be drawn **wherever** necessary.
                iv) **Use** of log table or calculator is **allowed**.

1. Select correct alternative :   **10**

   i) In H_2-molecule the spins of two electrons are
      a) parallel   b) antiparallel   c) perpendicular   d) both a) and b)

   ii) Good quantum numbers in Paschen-Back effect are
      a) n, l, ml, ms   b) n, l, j, mj   c) n, l, j, s   d) n, l, s, ms

   iii) Raman shift is equal to
      a) frequency of vibration of molecule
      b) twice the frequency of rotation of diatomic molecule
      c) twice the frequency of vibration of diatomic molecule
      d) both a) and b)

   iv) When the body attains motion, the subject is ?
      a) dynamics   b) kinematics   c) statics   d) kinetics

   v) The constraint involved in the motion of a particle placed on the surface of a sphere is
      a) holonomic   b) non holonomic   c) rheonomous   d) scleronomous

   vi) The deflection of the missile due to the corioli's force is _____ at the north pole.
      a) maximum   b) minimum   c) zero   d) one

   vii) If the forces acting on a particle or system of particles are conservative, then _____ of the particle or system of particles is conserved.
      a) linear momentum   b) angular momentum
      c) energy   d) spin momentum

   viii) If the coupling between l* and s* is not broken in an external magnetic field, then we observe
      a) Normal Zeeman effect   b) Anomalous Zeeman effect
      c) Paschen back effect   d) Stark effect

ix) In which formulation the equations of motion are written without any specific reference to the coordinate system used ?
   a) Galilean formulation   b) Newtonian formulation
   c) Lagrangian formulation   d) Hamiltonian formulation

x) Raman shift generally lies in
   a) visible region   b) ultraviolet region
   c) infrared region   d) microwave region

2. Attempt **any five** :   **10**
  i) What do you mean by virtual displacement ?
  ii) Define inertial and non-inertial frames of reference.
  iii) Explain the term generalized coordinates why are they needed ?
  iv) What is Bohr magneton ?
  v) What is covalent bonding ?
  vi) Write selection rules for Paschen back effect.

3. A) Attempt **any two** :   **6**
  i) What are constraints ? Explain with examples holonomic and nonholonomic constraints.
  ii) Write note on weak field stark effect in hydrogen.
  iii) Prove that $\vec{L} = \vec{R} \times \vec{P} + \vec{L}'$.

  B) When acetylene is irradiated by 4358A° mercury line, a Raman line attributed to symmetric stretching vibration is observed at 4768A°. Calculate the fundamental frequency of this vibration.   **4**

4. Attempt **any two** :   **10**
  i) Derive an expression for acceleration in the Atwood's machine by using Lagrange's equation.
  ii) State and prove theorem of conservation of angular momentum of a particle.
  iii) Write a note on Frank Condon principle.

5. Attempt **any one** :   **10**
  i) Explain anomalous Zeeman effect and obtain an expression for term shift.
  ii) What is Coriolis force ? What is Coriolis acceleration ? Discuss the effect of Coriolis force on a body falling freely under the action of gravity.

_____

SLR-C – 137

B.Sc. (Part – III) (Semester – V) Examination, 2014
CHEMISTRY
Organic Chemistry (Special Paper – XI)

Day and Date : Saturday, 12-4-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 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) Spectroscopic chart supplied by University is *allowed*.

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

    i) The middle IR frequency region useful for the structure determination is
    _____
       a) $12500 - 4000\ cm^{-1}$ b) $4000 - 667\ cm^{-1}$
       c) $667 - 50\ cm^{-1}$ d) none of these

    ii) _____ is a measure of effectiveness of spin-spin coupling in
    NMR spectroscopy.
       a) Ionisation constant   b) Planck's constant
       c) Coupling constant   d) Velocity constant

    iii) Mass spectrum of methanol shows molecular ion peak at $\dfrac{m}{z} =$ _____
       a) 32   b) 30   c) 23   d) 21

    iv) The cycloalkane which is free from ring strain is _____
       a) cyclopropane   b) cyclobutane
       c) cycloheptane   d) none of these

    v) The compound _____ , on Hofmann rearrangement produces ethyl amine.
       a) CH_3COCH_3 b) $CH_3CH_2COCH_2CH_3$
       c) CH_3COCl d) $CH_3CH_2CONH_2$

P.T.O.

vi) Base catalysed condensation of two ethyl acetate molecules to form ethyl acetoacetate is called _____
   a) aldol condensation
   b) claisen condensation
   c) witting reaction
   d) oppenauer oxidation

vii) Strain theory of cycloalkanes is proposed by _____
   a) Baeyer
   b) Mohr
   c) Huckel
   d) Sachse

viii) _____ ion acts as a leaving group in Meerwein Ponndorf verley reduction.
   a) Al^{3+}
   b) OH^-
   c) H^+
   d) H^-

ix) Diethyl malonate reacts with urea to give _____ acid.
   a) butyric
   b) barbituric
   c) glutaric
   d) crotonic

x) The NMR spectrum of ethyl acetate shows _____ signals.
   a) 3
   b) 2
   c) 1
   d) 4

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

   i) What are the necessary conditions for the absorption of IR radiations by a molecule ?

   ii) Explain equivalent and non-Pequivalent protons with examples.

   iii) What is ring flipping in chair conformation of cyclohexane ?

   iv) What are Wagner-Meerwein rearrangements ? Give one example.

   v) Explain stereoselective reaction with an example.

   vi) What is Keto-enol tautomerism ?

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

   i) Explain the use of mass spectroscopy in the determination of molecular weight of a compound.

   ii) Sketch the mechanism of the following transformation
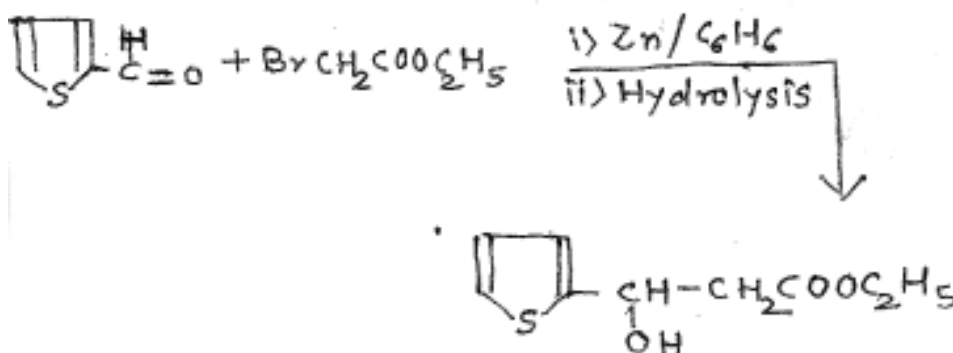
   iii) An organic compound with molecular formula $C_2H_4O_2$ shows IR absorption bands at 3400 cm^{-1} (broad) and 1700 cm^{-1}. Deduce its structure.

   B) Draw the various conformations of cyclohexane and explain their stability.   **4**

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

  i) How is diethyl malonate synthesized ? Starting from diethyl malonate how will you obtain a) acetic acid and   b) crotonic acid ?

  ii) Discuss the mechanism of Knoevenagel reaction.

  iii) What is shielding and de-shielding of protons ? Explain with suitable examples.

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

  i) Propose a structure consistent with the following spectral data

     Molecular formula : C_4H_8O

     $\dfrac{m}{z}$: 72

     IR   : $1720\,cm^{-1}$

     PMR : 1.05 δ (t, 3H)

             1.12 δ (s′, 3H)

             2.50 δ (q, 2H)

  ii) How will you synthesize

    a) ethyl, z-methyl acetoacetate

    b) butanoic acid and

    c) antipyrine from ethyl acetoacetate ?

  iii) Discuss the various types of fundamental modes of vibrations in IR spectroscopy.

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$_2$ C = 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 1720		
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, $R_2C = C - CH_3$	1.6 – 1.9

$$\underset{R}{\overset{|}{}}$$

Ester $R - \overset{\overset{\displaystyle O}{\|}}{C} - O - CH_2 - R$ 4 to 4.5

$N - CH_3$ 2.3

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, $R\overset{\overset{\displaystyle O}{\|}}{C}CH_3$	2.1 – 2.6
Aldehyde, $R\overset{\overset{\displaystyle O}{\|}}{C}H$	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, $RC\overset{\overset{\displaystyle O}{\|}}{O}H$	10 – 13[a]
Phenolic, ArOH	4.5 – 7.7[a]
Amino R– NH_2	1.0 – 5.0

[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

– OH, – OR, Cl, Br   5 (nm)
– SR, (30 nm)
– NR_2 (60 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

	α	β	γ
Cl	15	12	
OH, OR	35	30	
SR		85	
NR_2		95	
O		75	
Acyl	6	6	6

SLR-C – 138

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
BOTANY (Special Paper – XI)
Genetics

Day and Date : Saturday, 12-4-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

   1) When normal women married to colourblind man all her sons and daughter have _____

     a) normal colour vision   b) colourblind vision

     c) son only colourblind   d) daughter only colourblind

   2) _____ is known as Father of genetics.

     a) Bateson   b) Charls Darwin

     c) Gregor Mendel   d) T. H. Morgan

   3) The gene that stops the expression of another gene is called as _____

     a) Inhibitory gene   b) Complementary gene

     c) Supplementary gene   d) None of these

   4) The Law of Segregation is also called as _____

     a) law of purity of gametes

     b) law of dominance

     c) law of co-dominance

     d) law of independent assortment

5) The "Breakage and Reunion Theory" of crossing over was proposed by
_____

a) Landstener

b) J. Belling

c) C. D. Darligton

d) Stern

6) The blood group in man was discovered by _____

a) Bateson

b) Stern

c) Landsteiner

d) East

7) _____ genes are present on homologous part of 'Y' chromosome which passed directly from father to son.

a) Hemophilia

b) Holandric

c) Hologenic

d) Diandric

8) Polytene chromosome first time observed by _____

a) Babiani

b) Painter

c) Bridige

d) Both a) and b)

9) The individuals having one chromosome extra to diploid genome are called
_____

a) nullysomy

b) trisomy

c) tetrasomy

d) monosomy

10) Inheritance of plastids on the plastid present in the cytoplasm of _____

a) egg

b) pollen

c) egg and pollen

d) ovary

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

I) What is linkage group ?

II) Define epistasis.

III) What is Turner Syndrome ?

IV) What is extrachromosomal inheritance ?

V) Give any four characters of autopolyploid.

VI) What is Trisomic ?

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

    i) What is supplementary gene interaction ?

    ii) Factors affecting crossing over.

    iii) Describe plastid inheritance.

  B) Deletion. **4**

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

    I) Self incompatibility in plants.

    II) Hardy-Weinberg law.

    III) Significance of polyploidy.

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

    I) Sex chromosome in drosophila

    II) Inversion

    III) Haemophilia.

_____

Seat No.

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

Day and Date : Wednesday, 11-6-2014   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 correct alternative for **each** of the following :   **10**

   1) A square matrix A = (aij) is said to be skew-symmetric if —————

      a) aij = aji   b) aij = – aji   c) aji = 0   d) aij = 0

   2) If $A = \begin{bmatrix} p & q \\ r & s \end{bmatrix}$ then adjoint of the matrix adj A = —————

      a) $\begin{bmatrix} p & -q \\ r & -s \end{bmatrix}$ b) $\begin{bmatrix} -p & q \\ -r & s \end{bmatrix}$ c) $\begin{bmatrix} s & -q \\ -r & p \end{bmatrix}$ d) $\begin{bmatrix} -s & q \\ r & -p \end{bmatrix}$

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

      a) $\lambda^2 - 2\lambda - 3 = 0$ b) $\lambda^2 - 2\lambda - 4 = 0$

      c) $\lambda^2 + 2\lambda + 5 = 0$ d) $\lambda^2 + 2\lambda - 3 = 0$

   4) Find the rank of the matrix $\begin{bmatrix} 2 & 4 & 1 \\ 3 & 6 & 2 \\ 4 & 8 & 3 \end{bmatrix}$

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

   5) The pair of equations 2x – y = 0, 6x – 3y = 0 is —————
      a) Consistent with zero solution only
      b) Consistent with unique solution
      c) Consistent with infinitely many solutions
      d) In consistent

6) The modulus and argument of a complex number $(1+i)$ are —————

a) 1 and $\dfrac{\pi}{2}$ b) 2 and $\dfrac{\pi}{4}$ c) 3 and $\dfrac{\pi}{3}$ d) $\sqrt{2}$ and $\dfrac{\pi}{4}$

7) All the values of $(1)^{1/4}$ are —————

a) $0, 1, -1, i$ b) $1, -1, i, -i$ c) $-1, -i, 4, 4i$ d) $1, \dfrac{1}{4}, i, -i$

8) The relationship between the circular and hyperbolic cosine functions is ——
   a) $\cos hz = \cos (iz)$ b) $\cos z = i \cos hz$
   c) $\cos hz = -i \cos z$ d) $\cos z = -i \cos h(iz)$

9) The value of $\sin h\left(\dfrac{\pi}{2}\, i\right) = $ —————

a) $\dfrac{e^{i\pi/2} + e^{-i\pi/2}}{2}$ b) $\dfrac{e^{i\pi/2} - e^{-i\pi/2}}{2}$

c) $\dfrac{e^{i\pi/2} + e^{-i\pi/2}}{2i}$ d) $\dfrac{e^{i\pi/2} - e^{-i\pi/2}}{2i}$

10) If $\cos z = w$ then the inverse cosine of w is $\cos^{-1} w = $ —————

a) $2 n\pi \pm \cos^{-1} w$ b) $n\pi \pm \cos^{-1} w$

c) $n\pi + (-1)^n \cos^{-1} w$ d) $2 n\pi + (-1)^n \cos^{-1} w$

2.2 Attempt **any five** of the following :   **10**

1) If A is square matrix then show that $(A - A')$ is a skew symmetric matrix.

2) If B is the inverse of the matrix A then show that A is non singular matrix.

3) Show that the equations $x + y = 1$, $2x + 3y = 1$, $5x - y = 11$ are consistent.

4) Find all the values cube roots of unity.

5) If z is a complex number then prove that $\cos^2 z + \sin^2 z = 1$.

6) Prove that $\cos h (0) = 1$.

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

1) Show that the system of equations $2x - 2y + z = \lambda x$, $2x - 3y + 2z = \lambda y$, $-x + 2y = \lambda z$ can possess a nontrivial solution if and only if $\lambda = 1, \lambda = -3$ and obtain the solution if $\lambda = 1$.

2) Show that the continued product of the four values of

$$\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right)^{3/4} \text{ is 1.}$$

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

B) Reduce the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 7 \\ 3 & 6 & 10 \end{bmatrix}$ in the normal form and hence find its

rank. **4**

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

1) State and prove Cayley Hamilton theorem.

2) If α, β are roots of the equation $x^2 - 2x + 4 = 0$, prove that

$$\alpha^n + \beta^n = 2^{(n+1)} \cos \left(\frac{n\pi}{3} \right).$$

3) If z is a real number then prove that $\sin h^{-1} z = \log \left(z + \sqrt{z^2 + 1} \right)$.

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

1) For all rational values of n, prove that $(\cos \theta + i \sin \theta)^n = \cos n\theta + i \sin n\theta$

2) Using Cayley-Hamilton's theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

find A^{-1}.

3) Investigate for which value of λ and μ the equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ have (i) no solution (ii) unique solution (iii) infinite number of solutions.

_____

Seat
No.

B.Sc. (Part – III) (Semester – V) Examination, 2014
MATHEMATICS
Complex Analysis (Special Paper No. – XI)

Day and Date : Saturday, 12-4-2014　　　　　　　　　　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.

1. Select the correct alternative for **each** of the following.　　　　**10**

　　1) A curve $\ulcorner$ is called a closed curve if

　　　　a) $z(\alpha) \neq z(\beta)$　　b) $\dfrac{z(\alpha)}{z(\beta)}$　　c) $z(\alpha) = z(\beta)$　　d) $\dfrac{z(\beta)}{z(\alpha)}$

　　2) The curve $z(t) = t^2$, $-1 \leq t \leq 1$ is closed but

　　　　a) simple　　　　　　b) not simple

　　　　c) Jordan arc　　　　d) none of these

　　3) The domain is unbounded then such domain is called as

　　　　a) exterior　　　　　　　　　　b) interior

　　　　c) neither interior nor exterior　　d) none of these

　　4) The curve L is regular if

　　　　a) $z'(t) = 0$　　b) $z'(t) \neq 0$　　c) $z(t) = 0$　　d) $z(t) \neq 0$

　　5) The inequalities a = $t_0 < t_1 < t_2 < ... < t_{n-1} < t_n$ = b. The greatest of the
　　　number $t_1 - t_0, t_2 - t_1, t_3 - t_2, ... , t_n - t_{n-1}$ is called the _____ of the portion.

　　　　a) Arc　　　　　　　　　b) Closed curve

　　　　c) Partition　　　　　　　d) Norm

P.T.O.

6) A region in which every closed curve can be shrunk to a point without passingout of the region is called _____ region.

a) simply connected

b) multiply connected

c) neither simply nor multiply connected

d) none of these

7) The arc L is rectifiable if the least upper bound of the sums $\left|z_1 - z_0\right| + \left|z_2 - z_1\right| + \left|z_3 - z_2\right| + ... + \left|z_n - z_{n-1}\right|$ taken over all partitions P is

a) infinite   b) finite

c) neither finite nor infinite   d) none of these

8) A pole of order _____ is said to be a simple pole.

a) 2   b) greater than one

c) less than one   d) one

9) Two families are orthogonal then the product of the slope is

a) 1   b) 0   c) –1   d) none of these

10) Residue of poles of order m greater than

a) zero   b) unity   c) constant   d) infinity

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

i) Prove that $\dfrac{d}{dz}[f(z) \cdot g(z)] = f(z)\dfrac{d}{dz}g(z) + g(z)\dfrac{d}{dz}f(z)$.

ii) Construct the analytic function $f(z) = u + iv$ where $u = y^3 - 3x^2y$.

iii) Prove that the families are orthogonal then the product of slope is -1.

iv) The following statements are equivalent :

a) A line integral of f(z) over an arc L depends only on the end points of L

b) The integral of f(z) over any closed curve is zero.

v) Expand $\dfrac{1}{z(z^2 - 3z + 2)}$ for the region $\left|z\right| > 2$.

vi) Evaluate the residue of $\dfrac{z^2}{(z-1)(z-2)(z-3)}$ at $z = 2$.

3. Attempt **any two** of the following. **6**

   A) i) Prove that real and imaginary parts of an analytic function satisfy Laplace equation.

   ii) Let f(z) be continuous on a contour L of length l and let $|f(z)| \leq M$ on l then

   prove that $\left| \int_2 f(z)\, dz \right| \leq Ml$.

   iii) Show that $\int_0^{2\pi} \dfrac{d\theta}{2 + \cos\theta} = \dfrac{2\pi}{\sqrt{3}}$.

   B) If the real part of an analytic function f(z) is 0 given harmonic function u(x, y)

   then prove that $f(z) = 2u\left(\dfrac{z}{2}, \dfrac{z}{2i}\right) - u(0,0)$. **4**

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

   i) If w = f(z) = u + iv and u – v = e^x (cosy – siny), find w interms of z.

   ii) Evaluate the integrals $\int_2 z\,dz$, where L is any rectifiable arc joining the points

   z = α and z = β.

   iii) State and prove Cauchy's Residue Theorem.

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

   1) a) Expand $f(z) = \dfrac{1}{(z+1)(z+3)}$ in a Laurent's series valid for the region

   $|z| < 1$.

   b) State and prove Cauchy's fundamental theorem.

   2) State and prove Milne-Thomson's Method.

   _____

Seat No.	

B.Sc. – III (Semester – V) Examination, 2014
STATISTICS (Special Paper – XI)
Probability Distributions and Stochastic Process

Day and Date : Saturday, 12-4-2014   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) Number of passengers on S.T. stand can be considered as a stochastic process with _____ state space if observed at any time of a given day.

   a) discrete   b) continuous

   c) either a) or b)   d) neither a) nor b)

   ii) If $X \sim B(1, p)$ r.V. suppose it is truncated at $X = 0$ then $E(X) =$ _____

   a) $\dfrac{p}{q}$ b) q   c) 1   d) 0

   iii) Consider a sequence of tosses of a coin with $P(H) = P$. Suppose at time n (i.e. after n tosses) the state of the process is number tails minus number of heads in n tosses. Then $P(X_n = 10 \mid X_{n-1} = 11)$ is = _____

   a) 0   b) 0.5   c) p   d) $(1 - p)$

   iv) If X follows truncated normal distribution truncated above 100 and below 0 then $P(0 < X < 100)$ is = _____

   a) 0   b) 1

   c) less than 1   d) none of these

   v) If $X \sim$ lognormal $\left(\mu, \sigma^2\right)$ then the probability curve starts at 0, increases to its _____ and then decreases thereafter.

   a) Q_1 b) Q_2 c) Q_3 d) Mode

P.T.O.

vi) For X ~ lognormal $\left(\mu, \lambda^2 \right)$ which of the following statements is correct ?

    a) $Q_1 \leq Q_3$

    b) $Q_1 > Q_2$

    c) $Q_2 > Q_3$

    d) Q_3 is smallest quartile

vii) If X ~ N (5, 25), Y ~ N (4, 16) then _____ is a Cauchy r.V.

    a) $\dfrac{(X-5)\,(X-4)}{20}$ b) $\left(\dfrac{X-5}{16} \right)\left(\dfrac{Y-4}{16} \right)$

    c) $\dfrac{(X-5)(Y-4)^{-1}}{20}$ d) $\left(\dfrac{X-5}{5} \right)\left(\dfrac{Y-4}{4} \right)^{-1}$

viii) If X ~ λ Laplace (a, b) then _____

    a) $a < 0$ b) $b > 0$ c) $a > 0$ d) $b \leq 0$

ix) If (X, Y) ~ BN $\left(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho \right)$ then the conditional distribution of X given Y = r is _____ distribution.

    a) normal   b) bivariate normal

    c) lognormal   d) Cauchy

x) If X ~ C (2, 3), Y ~ C(3, 2) then X + Y is _____

    a) C (0, 1)   b) C (5, 5)

    c) C (–1, 1)   d) N (0, 1)

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

    a) Define recurrent state of a Markov chain.

    b) Write the pmf of truncated binomial distribution, truncated at X = 0.

    c) State the additive property of Cauchy distribution.

    d) Sketch the probability curve for $L\left(\mu, \lambda \right)$ distribution.

    e) If (X, Y) ~ B.N. $\left(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, 0 \right)$, write the pdf of (X + Y).

    f) If X ~ lognormal $\left(\mu, \sigma^2 \right)$ write the expressions for E(X) and E(X²).

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

    i) Let $X \sim N\left(\mu, \sigma^2\right)$ is truncated below K. Write the pdf of this truncated r.V.

    ii) State the Chapman-Kolmogrov theorem for Markov chain.

    iii) For Laplace $\left(\mu, \lambda\right)$ distribution find $P(X \leq x)$ when $X \geq \mu$.

   B) If $f(x, y) = K.e^{\frac{-1}{2}\left(x^2+y^2\right)}\left(-\infty < x, y < \infty\right)$ find the value of K and E(X), V(X).   **4**

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

   A) State and prove the relationship between Cauchy and Uniform distribution.

   B) If X ~ lognormal (0, 1) find mean and mode.

   C) If $X \sim P\left(\lambda\right)$, truncated at X = 0 find mean and variance.

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

   A) If X, Y are iid exponential r.v.s. with mean λ then find the distribution of (X – Y) using mgf approach.

   B) If one step TPM of certain M.C. is $P = \begin{bmatrix} 0.7 & 0.3 \\ 0.1 & 0.9 \end{bmatrix}$ and initial state matrix is

     P (X_0 = i) = [0.4, 0.6] i = 1, 2 find P (X_2 = i) i = 1, 2.

   C) If (X, Y) ~ BN $\left(\mu_x, \mu_y, \sigma_x^2, \sigma_y^2, \rho\right)$ find mgf.

_____

Seat No.

B.Sc. – III (Semester – V) Examination, 2014
ELECTRONICS (Special Paper – XI)
Microcontroller and Interfacing

Day and Date : Saturday, 12-4-2014   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 diagram **wherever** necessary.
4) **Use** of log table and calculator is **allowed**.

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

    i) _____ port of microcontroller 89VSI is an open drain port.

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

    ii) The control bits for software START and STOP of the timers are available in
    _____ SFR.

    a) TMOD   b) TCON   c) PCON   d) SCON

    iii) To achieve standard band rate for the microcontroller, the crystal frequency
    used is _____

    a) 12 MHz   b) 11.0892 KHz   c) 10.5 MHz   d) 11.0592 MHz

    iv) If RESET is considered to be a hardware interrupt, its vector address
    is _____

    a) 0000 H   b) 000B H   c) 001B H   d) 0023 H

    v) In I/O mapped I/O, the memory has _____ bit address and I/O device
    has _____ bit address.

    a) 8, 16   b) 16, 16   c) 16, 8   d) 8, 8

    vi) The 62XX series represents _____

    a) UVEPROM   b) Flash ROM   c) NVRAM   d) Static RAM

    vii) The control register and port selection in 8255 PPI is achieved
    through _____

    a) chip select logic   b) read/write control signals
    c) address lines A0 and A1   d) Data lines D0-D7

viii) If a switch is connected to port pin P1.3, which instruction will correctly read the switch status.

   a) SETB P1.3   b) MOV C, P1.3   c) CPL P1.3   d) CLR P1.3

ix) If input voltage range to an A to D converter is 0 to +5V, its step size or resolution will be _____

   a) 19.53 mV   b) 4.88 mV   c) 1.2 mV   d) 39.06 mV

x) The 4-bit binary pattern required to full-step rotate a unipolar stepper motor is _____

   a) A, B, C, D   b) 3, 4, 7, 8   c) 1, 2, 3, 4   d) A, 9, 6, 5

2. Answer **any five** (**two** marks **each**) :   **10**

   i) Explain the role of timer overflow flag.

   ii) What is interrupt service routine ? Explain.

   iii) Distinguish between memory mapped I/O and I/O mapped I/O.

   iv) What is unipolar and bipolar DAC output ?

   v) Write any two instructions, with proper comments, that deal with port latch.

   vi) Explain the need of memory and I/O expansion.

3. A) Answer **any two** from the following (**three** marks **each**) :   **6**

   i) What is asynchronous serial communication ? How data is framed during serial communication ?

   ii) Show the relationship between step-size i.e. resolution and the n-bit output of an ADC. Comment on it.

   iii) Write a program to generate square wave on port pin P1.5.

   B) Draw 7-segment display interface circuit and explain in brief.   **4**

4. Answer **any two** of the following (**five** marks **each**) :   **10**

   i) Write a program to generate a square wave of 10 KHz on port pin P1.2 using timer-0 in mode-1. Assume a crystal frequency of 12 MHz connected to the microcontroller.

   ii) Explain any one of the 27XX series EPROM chip.

   iii) Draw the interface diagram of a stepper motor using ULN 2003 and explain.

5. Answer **any one** :   **10**

   A) Explain how standard band rate is generated in the microcontroller. Write programming procedure to transfer and receive the data serially.

   B) Interface DAC0808 to a microcontroller and explain.

      Write a program to generate sawtooth waveform.

   _____

Seat No.

B.Sc. – III (Sem. – V) Examination, 2014
COMPUTER SCIENCE (Special Paper – XI)
Operating System – I

Day and Date : Saturday, 12-4-2014

Total Marks : 50

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

Instructions : 1) **All** questions are **compulsory**.
2) **All** questions carry **equal** mark.
3) Calculator is **not** allowed.

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

   1) Paging suffers from
      a) Internal fragmentation
      b) External fragmentation
      c) Both
      d) None of these

   2) When a dead lock occurs, the system has to be in
      a) safe state
      b) unsafe state
      c) both
      d) none of these

   3) The integer value of counting semaphore can be range between
      a) 0 and 1
      b) 0 and 256
      c) – 256 to 256
      d) un restricted domain

   4) The critical section problem is a problem faced by
      a) operating system process
      b) user processes
      c) co-operating system process
      d) all of these

   5) SJF is a special case of
      a) FCFS
      b) priority algorithm
      c) preemptive algorithm
      d) non-preemptive algorithm

   6) A process execution begins and ends with
      a) CPU burst
      b) I/O burst
      c) Both
      d) None of these

   7) The CPU can only execute program which are stored in
      a) hard disk
      b) main memory
      c) CD
      d) floppy disk

P.T.O.

8) In real time system _____ is important.
   a) showing good user interface
   b) showing good hardware interface
   c) completing processing on time
   d) optimum utilization of I/O device

9) Bankers algorithms is a
   a) deadlock avoidance algorithm
   b) deadlock detection algorithm
   c) deadlock prevention algorithm
   d) all of these

10) A page table is used for
   a) converting logical address to physical address
   b) converting physical address to logical address
   c) searching a file
   d) none of these

2. Answer **any five** of the following :   **10**
   1) What is internal fragmentation ?
   2) What is operating system ? Types of operating system.
   3) What is process ? Process states.
   4) What is segmentation ?
   5) What is scheduling ? Types of scheduling.
   6) What is swapping ?

3. A) Answer **any two** of the following :   **6**
   1) Explain PCB.
   2) Explain distributed operating system.
   3) Explain context switch.

   B) Explain uses of operating system.   **4**

4. Answer **any two** of the following :   **10**
   1) What is threads ? Explain it.
   2) Explain semaphores in detail.
   3) Explain paging and swapping.

5. Answer **any two** of the following :   **10**
   1) Explain classic problem of synchronization.
   2) Explain monolithic and layered system.
   3) What is deadlock ? Explain it.

_____

Seat
No.

B.Sc. – III (Sem. – V) Examination, 2014
CHEMISTRY (Special Paper – XII)
Analytical and Industrial Physical Chemistry

Day and Date : Tuesday, 15-4-2014 Max. Marks : 50
Time : 3.00 p.m. to 5.00 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.

1. Select the most correct alternative from among those given below and rewrite the sentence. **10**

   1) If the specific conductance and observed conductance of a solution are same, then the cell constant is _____
      a) 0 b) 0.5
      c) 1.0 d) 10.0

   2) The burner in which all sample enters the flame is called _____
      a) Total consumption burner b) Premix burner
      c) Lundergraph burner d) All of these

   3) For standardisation of potentiometer, a standard cell having voltage _____ is generally used.
      a) 1.000 b) 1.018
      c) 10.18 d) 1.108

   4) A device for measuring a response of photocell is called _____
      a) voltmeter b) galvanometer
      c) conductometer d) all of these

   5) The removal of oxide or dust on the article by the action of mineral acids like HCl, H_2SO_4 and HNO_3 is called _____
      a) blasting b) brushing
      c) pickling d) none of these

   6) In precipitation titration of $AgNO_3$ Vs. KCl solution _____ salt bridge is used.
      a) KCl b) KNO_3
      c) Both a) and b) d) None of these

P.T.O.

7) In the equation $\dfrac{N^*}{N_0} = Ae^{-\Delta E/KT}$, K is known as _____

   a) Gas constant   b) Planck's constant

   c) Boltzmann constant   d) All of these

8) In chromium plating, generally _____ is used as anode.

   a) Lead   b) Chromium   c) Nickel   d) None of these

9) A glass electrode contains _____ MHCl.

   a) 0.01   b) 0.1   c) 1.0   d) 0.001

10) In simple flame photometers _____ is used as monochromator.

   a) prism   b) grating   c) slit   d) all of these

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

   i) Define molar extinction coefficient.

   ii) Give any two limitations of quinhydrone electrode.

   iii) State Faraday's law of electrolysis.

   iv) Draw the block diagram of flame photometer.

   v) How conductivity water is prepared ?

   vi) Write applications of Nickel plating.

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

    i) Write a note on theory of colorimetry.

    ii) What are the advantages of flame photometry.

    iii) Explain the basic circuit of D.C. Wheatstone bridge.

  B) Explain role of brightness in electro plating.   **4**

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

   i) Discuss the following essential parts of colorimeter :

     a) Photovoltaic cell   b) Galvanometer

   ii) Give the construction and working of glass electrode.

   iii) Write the application of flame photometry in qualitative analysis.

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

   i) Explain the potentiometric acid-base titration.

   ii) Write a note on conductometric titration of weak acid-strong base.

   iii) Explain chromic acid process in anodising.

Seat
No.

B.Sc. (Part – I) (Sem. – I) (Old) Examination, 2014
BOTANY (Paper – I)
Plant Diversity, Classification of Plant Kingdom, Non Vascular Plants and Plant Pathology

Day and Date : Wednesday, 11-6-2014　　　　　　　　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. Rewrite the following sentences by choosing correct alternative : **10**

1) Algae growing in sea water called as _____ algae.

a) marine　　　b) psammon　　c) parasite　　d) epizoic

2) The shape of Bacillus bacterium is _____

a) spiral　　　b) rod like　　c) spherical　　d) filamentous

3) Spirogyra is a _____ algae.

a) sea water　　b) terrestrial　　c) fresh-water　d) none of these

4) _____ has some antiseptic property and used in surgical dressing.

a) Anthoceros　b) Marchantia　c) Notothylas　d) Sphagnum

5) Air bladders are found in _____

a) Sargassum　b) Spirogyra　　c) Ulva　　　d) Chara

6) Foot and seta are absent in _____

a) Anthoceros　b) Riccia　　c) Funaria　　d) None of these

7) Fungi growing on cattle or animal dung are called _____ fungi.

a) aquatic　　　　　　　　　b) symbiotic

c) coprophilous　　　　　　　d) saprophytic

8) _____ is used as biofertilizer.
   a) Ulothrix   b) Ulva   c) Volvox   d) Nostoc

9) Yellow vein mosaic of Bhendi is a _____ disease.
   a) Viral   b) Fungal   c) Bacterial   d) Phytoplasma

10) Mucor belongs to division _____
   a) Myxomycota   b) Eumycota
   c) Basidiomycotina   d) Zygomycotina

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

   i) What is saprophytic fungi ?

   ii) Define plant disease.

   iii) Give systematic position of spirogyra.

   iv) What is plant diversity ?

   v) How many divisions of cryptogams ? Give the names and divisions related to fungi.

   vi) What is mutual (symbiotic) association ?

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

      i) Diversity of fungi with respect to habitat.

      ii) Give medicinal economic importance of algae.

      iii) Give general characters of Bryophytes.

   B) Give classification of Algae.   **4**

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

   i) Economic importance of fungi.

   ii) Describe the sex organs of Riccia.

   iii) Sketch, label and describe the male conceptacle in Sargassum.

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

   i) Give symptoms, causal organism and control measures of Grassy shoot disease of sugarcane.

   ii) Give scalariform conjugation in spirogyra.

   iii) Describe the stages of puccinia on wheat.

   _____

Seat No.

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

Day and Date : Tuesday, 15-4-2014   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. Select the correct alternative for **each** of the following :   **10**

   1) The _____ function is used to display output on to the screen.

      a) scanf ()   b) printf ()

      c) getch ()   d) getchar ()

   2) C language contains _____ keywords.

      a) 32   b) 23   c) 36   d) 63

   3) _____ is the largest value that an unsigned short int type variable can store.

      a) 127   b) 32767   c) 255   d) 65533

   4) A global variables is also known as _____

      a) Static   b) Auto   c) Register   d) Extern

   5) _____ is not relational operator.

      a) ! =   b) ==   c) >   d) >>

   6) _____ is the bitwise complement operator.

      a) 1   b) ∧   c) ~   d) ? :

P.T.O.

7) The _____ specification is used to read or write a short integer.

   a) % d   b) % wc

   c) % f   d) None of these

8) _____ is the conditional statement.

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

9) _____ is the exit controlled loop.

   a) for   b) while

   c) do-while   d) None of these

10) In C, string is a _____

   a) One dimensional character array

   b) Two dimensional character array

   c) Three dimensional character array

   d) None of these

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

   a) Write a sample program of adding two numbers.

   b) What is constant and state the types of constants available in C ?

   c) What is the comma operator in C ?

   d) What is the purpose of printf () function ?

   e) Explain simple if statement.

   f) Evaluate x + y * x – z where x = 5, y = 6 and z = 8.

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

   a) What do you mean by keywords ? List some keywords in C.

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

   c) Explain switch statement with example.

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

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

   a) Explain nesting of if ..... else statements in C.

   b) Write a C program to find the Fibonacci sequence of given number.

   c) Discuss one-dimensional arrays.

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

   a) Explain the term of formatted outputs in detail.

   b) A computer manufacturing company has the following monthly compensation policy to their sales-persons :

   Minimum base salary   :   1,500.00

   Bonus for every computer sold   :   200.00

   Commission on the total monthly sales   :   2%

   Write a program to compute a sale-person's gross salary.

———————————

Seat No.

B.Sc. – III (Semester – V) Examination, 2014
MICROBIOLOGY (Special Paper – XII)
Immunology

Day and Date : Tuesday, 15-4-2014　　　　　　　　　　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** *labeled diagrams* **wherever** *required.*

1. Rewrite the sentences after choosing a correct alternative :　　　　**10**

　　i) In an autoimmune disease pernicious anaemia, antibodies are produced against
　　_____

　　　　a) Folic acid　　　　　　　　　　b) Vitamin B_{12}

　　　　c) Intrinsic factor　　　　　　　　d) Acetyl choline receptors

　　ii) IgE _____

　　　　a) Is bound by J chain

　　　　b) Binds to most cells through its Fab region

　　　　c) Differ from IgG Ab because of its light chain

　　　　d) Is present in high concentration in serum

　　iii) _____ is an example of type III hypersensitivity reaction.

　　　　a) Anaphylaxis　　　　　　　　　b) Atopy

　　　　c) Arthus reaction　　　　　　　　d) Homograff rejection

　　iv) HelperT cells are distinguished from cytotoxic T cells by the presence of
　　_____

　　　　a) CD_2　　　　b) CD_3　　　　c) CD_4　　　　d) CD_{13}

P.T.O.

v) In monoclonal antibody production for production of hybridoma cells cancerous cell is fased with _____

   a) T Lymphocyte   b) B Lymphocyte

   c) Macrophage   d) Monocyte

vi) Naturally acquired active immunity would be most likely acquired through which of the following processes.

   a) Vaccination

   b) Drinking colostrum

   c) Natural birth

   d) Infection with disease causing organism followed by recovery

vii) The MHC is a collection of genes located on chromosome No. in ————— humans.

   a) 6   b) 15   c) 17   d) 20

viii) Treatment of autoimmune disease includes _____

   a) Metabolic control

   b) Use of antinflammatory drugs

   c) Use of immuno suppressive drugs

   d) All of these

ix) An antibody response to foreign tissue is suppressed in which of the following phenomenon ?

   a) Immunological tolerance   b) Immune enhancement

   c) Auto immunity   d) None of these

x) Which one of the following IS NOT true for the antibodies ?

   a) They fix complement

   b) They are glycoproteins

   c) They occure of surface of B-lymphocytes

   d) They are molecules with single, defined amino acid sequence

2. Answer in **one** or **two** sentences **(any five)** :   **10**

   i) What is xenograft ?

   ii) Properties of complement.

   iii) Role of cytokines.

   iv) What is autoimmunity ?

   v) New generation vaccines.

   vi) Macrophage.

3. A) Write in brief on **any two** : **6**

    i) Immuno suppressive drugs

    ii) Properties of monoclonal antibody

    iii) HLA typing.

   B) Differentiate between immediate and delayed type of hypersensitivity. **4**

4. Write in detail **(any two)** : **10**

   i) Cells and mediators involved in hypersensitivity.

   ii) ABO blood group system.

   iii) Use of HAT medium in hybridoma technology.

5. Write in detail on **any two** : **10**

   i) Non organ specific autoimmunity

   ii) Activation of complement of alternate pathway

   iii) Antibody diversity.

———————

Seat No.

B.Sc. III (Semester – V) Examination, 2014
COMPUTER SCIENCE (Special Paper – XII)
Data Communication and Networking – I

Day and Date : Tuesday, 15-4-2014　　　　　　　　　　Total Marks : 50

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

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

　　1) A cable break in a _____ topology stops all transmission.

　　　　a) Mesh　　　　b) Bus　　　　c) Star　　　　d) Hybrid

　　2) The de jure standards apply because of

　　　　a) conventions　　　　　　　b) agreement

　　　　c) regulation　　　　　　　　d) choice

　　3) _____ encoding has a transition at the middle of each bit.

　　　　a) R Z　　　　　　　　　　　b) Manchester

　　　　c) Differential Manchester　　d) All the above

　　4) _____ couples an acknowledgement with a data frame.

　　　　a) Pipelining　　b) HDLC　　c) An Ack　　d) Piggybacking

　　5) Error detection at the data link level is achieved by

　　　　a) Bit stuffing　　　　　　　b) CRC

　　　　c) Hamming codes　　　　　d) Equalization

　　6) In _____ each router receives information directly from its neighbours.

　　　　a) Shortest path routing　　　b) Optimality principle

　　　　c) Distance vector routing　　d) Link state routing

　　7) In CDMA the bandwidth is divided into channels

　　　　a) True　　　　　　　　　　b) False

8) In _____ the transmission medium is not shared.

   a) WAN   b) LAN   c) MAN   d) None of the above

9) PCM is an example of _____ conversion.

   a) Digital to digital   b) Digital to analog

   c) Analog to analog   d) analog to digital

10) The Hamming code is a method of

   a) Error detection   b) Error correction

   c) Error encapsulation   d) a and b

2. Answer the following :   **10**

   i) FDMA

   ii) Flooding

   iii) Functions of a physical layer of OSI model

   iv) Infrared

   v) Fundamental characteristics of data communication system.

3. a) Answer **any 2** of the following :   **6**

     i) Shannon's capacity formula

     ii) Hamming distance

     iii) Congestion prevention policies of transport layer.

  b) Discuss in brief applications of computer Network.   **4**

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

   i) Shortest Path Routing

   ii) CSMA/CA

   iii) Modem.

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

   i) Explain stop and wait ARQ protocol.

   ii) Explain in brief history of Internet.

   iii) Design issues of layers.

_____

| Seat |
| No. |

B.Sc. (Part – III) (Semester – VI) Examination, 2014
ENGLISH (Compulsory)
Countdown – English Skills for Success

Day and Date : Monday, 21-4-2014   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 choosing the correct alternative given below them :   **10**

   1) Self-esteem is necessary when we are _____
      a) alone   b) among society
      c) among members of family   d) none

   2) _____ helps you better than any other to establish good
      relationships with others.
      a) Self-esteem   b) Prejudice
      c) Envy   d) Happiness

   3) A scientist cannot decide what is _____ according to Haldane.
      a) Good and bad   b) Day and night
      c) Black and white   d) Right and wrong

   4) Rahim Khan's wife tolerated his tortures and beatings for _____
      years.
      a) Twenty   b) Twenty three
      c) Thirty   d) Thirty two

   5) The refugee mother had a _____ smile on her lips when she was
      combing his hair lovingly.
      a) Sad   b) Pleasant   c) Mocking   d) Ghost

   6) William Wordsworth is the _____ poet.
      a) Classical   b) Rustic   c) Nature   d) Urban

P.T.O.

7) The quarrel _____ so much that I lost the peace of my mind.

   a) Ruffled by features   b) Broke me down

   c) Drew the line   d) Stumbled block

8) I wanted to be a collector but now _____ about it.

   a) Have no wish   b) Have second thoughts

   c) Have a doubt   d) None

9) Reading is her _____ and butter.

   a) Wheat   b) Bread   c) Milk   d) Cake

10) T.C.S. is _____ Company.

   a) Complicated   b) Many nations

   c) Multi-national   d) Regional

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

   1) Write a note on six pillars of self-esteem.

   2) What are the advantages of self-esteem ?

   3) What is scientific point of view ?

   4) What is the difference between scientist and judge ?

   5) What is the end of the story 'Sparrows' ?

   6) What made Rahim Khan ill ?

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

   1) How is the condition of sick children ?

   2) What is the central theme of the poem 'Refugee Mother and Child' ?

   3) Describe in brief the daffodils effect on poet's mind.

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

   1) What do you do when work pressure suddenly increases ?

   2) How you will adapt any critical situation ?

   3) State the ways by which you manage your time better.

4. A) Write a description of a person who sat opposite you on a train journey. Remember to use the words to convey character, thoughts, mood, attitude of the person. **10**

    OR

   B) Write a description of a famous T.V. Actor you met at the function. Remember to use the words to convey the character, thoughts, mood, attitude of the actor seemed to be.

5. Read the passage below and write one-third summary of it. **10**

   Mr. Spectator is a learned person exposed to foreign culture and ways of thinking because of his travels abroad. His mind stored with wit, humour and knowledge of these civilizations and their ways, was a store house of ideas. Added to this, wisdom was his intimate acquaintance with ancient and modern books in different languages. His observing eye makes him compare and contrast different cultures and civilizations for their manners, mores, customs, traditions and peculiarities.

   In the words of Addison, the spectator had made himself a speculative statesman, soldier, merchant or artisan without ever meddling with any practical part in life. His classical ideal suggests the value of ancient wisdom for self improvement. The middle class culture and character gets itself exposed and defined in authentic way in the essays of Addison.

   _____

Seat No.

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

Day and Date : Thursday, 10-4-2014   Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : 1) **All** questions are **compulsory**.
2) Figures to the **right** 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) For rotational transition, selection rule is _____.
      a) $\Delta J = \pm 1$ b) $\Delta J = \pm 2$ c) $\Delta J = 0$ d) all of these

   2) In the rotational spectra, the unit of constant "B" is _____.
      a) Joules   b) Joules^{-1} c) cm   d) cm^{-1}

   3) Which of the following pairs of liquids will not form the binary solution ?
      a) Ethanol + Water   b) Benzene + Water
      c) Acetone + Water   d) Aceticacid + Water

   4) The solutions which donot obey Raoult's law at all concentrations and temperatures are called _____.
      a) ideal solutions   b) non-ideal solutions
      c) binary solutions   d) none of these

   5) $\Delta G = \Delta A$, when _____.
      a) 'T' is constant   b) P is constant
      c) V is constant   d) both (a) and (b)

6) Gibbs-Duhem equation is given as _____.

   a) $\sum n_i dX_i = 0$ b) $\sum X_i dn_i = 0$

   c) $\sum X_i n_i = 0$ d) none of these

7) The term fugacity has dimensions of _____.

   a) temperature   b) volume

   c) pressure   d) length

8) In the sequence of reactions

   $A \xrightarrow{K_1} B \xrightarrow{K_2} C$. $K_1 > K_2$, then the rate determining step is _____.

   a) $A \rightarrow B$ b) $B \rightarrow C$

   c) $A \rightarrow C$ d) All of these

9) The reaction $2NO + 2H_2 \rightarrow N_2 + 2H_2O$ is an example of _____.

   a) parallel   b) consecutive

   c) chain   d) reversible

10) The rate of certain reaction is given by the expression.

   Rate $= K[A]^{1/2} \cdot [B]^{3/2} \cdot [C]$, then the order of the reaction is _____.

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

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

   i) What is the fundamental equation of spectroscopy ?

   ii) How are the wavelength, wave number and frequency interrelated ?

   iii) Define the terms :

      a) conjugate solutions

      b) tie line

   iv) Give the equation used to determine the maximum work obtainable in gaseous reversible reaction. Write down the expressions for maximum work obtained in the following gaseous reactions.

      a) $2H_{2(g)} + O_{2(g)} \rightleftharpoons 2H_2O_{(g)}$

      b) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

v) State raw of mass action and apply it to the homogeneous reaction.

$$CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$$
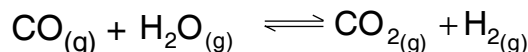
vi) The order of the reaction,

$$3NaClO \longrightarrow 2NaCl + NaClO_3$$
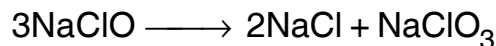
appears to be 3. The experimentally determined order is 2. Explain.

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

   i) Differentiate between Gibbs free energy and Helmholtz free energy.

   ii) What are ideal solutions ? Discuss briefly the causes of negative deviations of real solutions from their ideal behaviour.

   iii) Explain the isotope effect in the study of rotational spectra.

B) If temperature coefficient of reaction is 2 between temperatures 298 K and 308 K. Calculate the energy of activation. **4**

(Given : $R = 8.368$ Joules K^{-1} mol^{-1})

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

   i) Explain in brief reversible reactions.

   ii) At 373.6K and 372.6K the vapour pressures of liquid, water are 1.018 atm. and 0.982 atm. respectively. What is the heat of vapourisation of water ? (Given :- $R = 8.314$ J K^{-1} mol^{-1}).

   iii) Explain in brief overtone band. The absorption of intrared radiation by CO molecule showed an absorption band at 2140 cm^{-1}. Calculate the bond force constant of the C – O bond.
(Given :- $C = 3 \times 10^8 ms^{-1}$, $\pi = 3.14$ $\mu = 1.14 \times 10^{-26} Kg$).

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

   i) Discuss the theory of fractional distillation as applied to mixture of two miscible liquids whose boiling point increases regularly.

   ii) Derive thermodynamically Van't Hoff isochore.

   iii) Mention various characteristics of third order reaction and explain in brief any one.

———————

Seat
No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
BOTANY (Special Paper – XIII)
Microbiology and Plant Pathology

Day and Date : Thursday, 10-4-2014   Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : I) **All** questions carry **equal** marks.
           II) **All** questions are **compulsory**.
           III) Draw **neat** and labelled diagrams **wherever** necessary.
           IV) Figures to the **right** indicate **full** marks.

1. Rewrite the following sentences by choosing correct alternative :   **(1×10=10)**

   1) Making the system free from any kinds of microbes is called as _____
     a) Isolation   b) Purification   c) Sterilization   d) Inoculation

   2) Crystal violet is the _____ stain used for staining Gram +ve bacteria.
     a) Counter   b) Primary   c) Secondary   d) Mordant

   3) Hot air oven is used for sterilization of glass wares and liquid paraffin with the temp. regulation at _____°C for one hour.
     a) 160   b) 140   c) 130   d) 100

   4) Potato Dextrose Agar formulated by Ricker and Ricker is _____ medium.
     a) Synthetic   b) Natural   c) Semi-synthetic   d) Artificial

   5) The salts of _____ are used as disinfectant during sterilization.
     a) Ag   b) Cu   c) Hg   d) All the above

   6) Cheese is obtained from milk by the process of _____
     a) Filtration   b) Pasteurization
     c) Coagulation   d) All the above

   7) _____ Sp. of fungus is used in the production of citric acid by Koji fermentation process.
     a) <u>Leuconostoc</u>   b) <u>Neurospora</u>
     c) <u>Cladosporium</u>   d) <u>Aspergillus</u>

8) <u>Sphacelotheca</u> <u>Sorghi</u> causes _____ disease.

   a) Downy Mildew   b) Grain Smut

   c) White rust   d) Anthracuose

9) The enzyme _____ is involved in the conversion of sucrose into glucose and fructose.

   a) Invertase   b) Zymase   c) Protease   d) Amylase

10) Antibiotics company-Glaxo India Ltd., is located at _____

   a) Pune   b) Nagpur   c) Bangalore   d) Mumbai

2. Answer **any five** of the following :   (5×2=10)

   I) Define culture medium.

   II) State any four characters of fungi as microbes.

   III) Write the applications of alcohol.

   IV) Name the fungal and bacterial microbes involved in alcohol production.

   V) Write the symptoms of Leaf Curl of Chillies.

   VI) State the uses of cheese.

3. A) Answer **any two** of the following :   (2×3=6)

   I) Describe any one method of Pure culture.

   II) Write the characters of bacteria as microbes.

   III) Describe the sources and applications of mycopesticides.

   B) Describe the methods of transmission of pathogens.   **4**

4. Answer **any two** of the following :   (2×5=10)

   I) Describe any two methods of physical sterilization.

   II) Describe in brief the method of <u>citric acid</u> production by fermentation.

   III) Describe symptoms, causal organism and control measures of Bongdi disease of Potato.

5. Answer **any two** of the following :   (2×5=10)

   I) Give the classification of culture media based on utility.

   II) Describe any one processed food product by fermentation method.

   III) Describe the classification of plant diseases based on crops infected.

_____

SLR-C – 16

Seat No.	

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

Day and Date : Thursday, 12-6-2014　　　　　　　　　　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.

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

   1) If $y = (ax + b)^3$ then $y_4 =$ _____
      a) $3 (ax + b)$　　b) $3 (ax + b)^2$　　c) zero　　d) none of these

   2) If $y = e^{ax}$ then $y_n =$ _____
      a) ae^{ax}　　b) $a^n e^{ax}$　　c) $(ae^{ax})^n$　　d) none of these

   3) If ϕ is constant then $\nabla \phi =$ _____
      a) zero　　b) constant　　c) two　　d) none of these

   4) If $\bar{f} = xi + yj + zk$ then $\text{curl}\,\bar{f} =$ _____
      a) constant　　b) zero　　c) three　　d) none of these

   5) If $\bar{r} = xi + yj + zk$ then $\text{div}\,\bar{r} =$ _____
      a) one　　b) two　　c) three　　d) none of these

   6) The Geometric meaning of L.M.V.T. is that the tangent at point $c \in (a, b)$ is
      a) Parallel to chord AB　　b) Perpendicular to chord AB
      c) Intersecting to chord AB　　d) None of these

P.T.O.

7) The expansion of tanx is

   a) $X + \dfrac{X^3}{3} + \dfrac{2X^5}{15} + \underline{\quad}$ b) $X - \dfrac{X^3}{3} + \dfrac{2X^5}{25} - \underline{\quad}$

   c) $1 - \dfrac{X^2}{2} + \dfrac{3X^4}{15} - \underline{\quad}$ d) none of these

8) If a function f (x) on [a, b] satisfying all the conditions of Rolle's mean value theorem then there is at least one value of x = c in [a, b] such that

   a) $f'(c) > 0$ b) $f'(c) < 0$ c) $f'(c) = 0$ d) none of these

9) If u is homogeneous function of degree n then

$$X^2 \left(\frac{\partial^2 u}{\partial X^2} \right) + 2XY \left(\frac{\partial^2 u}{\partial X \partial Y} \right) + Y^2 \left(\frac{\partial^2 y}{\partial Y^2} \right)$$

   a) nu   b) (n – 1) u   c) n (n – 1) u   d) none of these

10) The degree of homogeneous function $f(x, y) = \dfrac{\sqrt{x} + \sqrt{y}}{x + y}$ is

   a) 0   b) 1   c) $-\dfrac{1}{2}$ d) $\dfrac{1}{2}$

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

   1) Find n^{th} derivative of $\dfrac{x}{x^2 - a^2}$.

   2) If y = log (sinx) then show that $y_2 = -\dfrac{1}{\sin^2 X}$.

   3) State Rolle's theorem.

   4) If f (x) = x and $g(x) = \dfrac{1}{\sqrt{x}}$ for $x \in [a, b]$ verify Cauchy's M.V.T.

   5) If f (x, y) = e^{ax} sin by verify $\dfrac{\partial^2 F}{\partial x \partial y} = \dfrac{\partial^2 F}{\partial y \partial x}$.

   6) If $\phi(x, y, z) = x^2 y + y^2 z + z^2$ then find $\nabla \phi$ at (1, 1, 1).

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

   1) If f and g are two scalar function then show that $\nabla(fg) = f\nabla g + g\nabla f$.

   2) Find n^{th} derivative of $x^2.\sin x$.

   3) Find expansion of e^x.

   B) If Z is homogeneous function of x and y of order n then $x\dfrac{\partial z}{\partial x} + y\dfrac{\partial z}{\partial y} = nz$. **4**

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

   1) State and prove Leibnitz's theorem.

   2) Using Lagrange's mean value theorem prove that $1 < \dfrac{\sin^{-1}x}{x} < \dfrac{1}{\sqrt{1-x^2}}$ for $0 < x < 1$.

   3) If $x = r\cos\theta, y = r\sin\theta$ prove that $\dfrac{\partial^2\theta}{\partial x^2} + \dfrac{\partial^2\theta}{\partial y^2} = 0$ for $x \neq 0, y \neq 0$.

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

   1) If $y = \sin^{-1}x$ prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - n^2y_n = 0$.

   2) If $u = \log\left(\dfrac{x^5 + y^5}{x^3 + y^3}\right)$ prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = 2$.

   3) If $\phi(x, y, z) = x^3 + y^3 + z^3 - 3xyz$ find
      i) div (grad ϕ) and
      ii) curl (grad ϕ).

B.Sc. Part – III (Semester – VI) Examination, 2014
ZOOLOGY Special Paper – XIII
Physiology

Day and Date : Thursday, 10-04-2014   Total 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) The process of chemical digestion of carbohydrates starts in _____
     a) Stomach   b) Oral cavity
     c) Intestine   d) Oesophagus

   2) Complete digestion of fats results into formation of _____
     a) Fatty acids and glycerols   b) Glucose and fructose
     c) Fatty acids and amino acids   d) Glucose and amino acids

   3) _____ is antihaemorrhagic vitamin.
     a) Vit. A   b) Vit. E
     c) Vit. K   d) Vit. D

   4) The normal blood pressure is adult man is usually _____ mm. Hg.
     a) 80-120   b) 60-80   c) 90-130   d) 130-140

   5) The HCl is secreted by _____
     a) Oxyntic cells   b) Chief cells   c) Neck cells   d) Argentaffin cells

   6) _____ is waste product produced in Ornithine cycle.
     a) Ammonia   b) Urea   c) Creatine   d) Creatinine

   7) Hamburger's phenomenon is also called as _____ shift
     a) Phosphate   b) Nitrite   c) Chloride   d) Bicarbonate

P.T.O.

8) Transmission of nerve impulse through synapse is carried by _____

   a) Cholene   b) Acetic acid   c) Acetylcholine d) Cholinesterase

9) Plasma membrane of striated muscle is called as _____

   a) Neurolemma   b) Plasmalemma

   c) Sarcolemma   d) Myeline sheath

10) _____ is a structural and functional units of nervous system.

   a) Plexus   b) Neuron   c) Ganglion   d) Blood vessel

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

   i) Definition of digestion.

   ii) Draw neat labelled diagram nerve cell.

   iii) Physiological roles of Vitamin C.

   iv) Chemical composition of gastric juice.

   v) Protein as a nutritional requirement.

   vi) Physiological response of yoga on respiration.

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

   i) ECG

   ii) Vitamin E

   iii) Ultra structure of striated muscle.

  B) Functions of bile.   **4**

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

   i) Chloride shift

   ii) Vitamin D

   iii) Cardiac cycle.

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

   i) Describe process of glycolysis.

   ii) Describe physiology of urine formation.

_____

Seat
No.

B.Sc. – III (Sem. – VI) Examination, 2014
ELECTRONICS
Special Paper – XIII : Sensors and Instrumentation

Day and Date : Thursday, 10-4-2014　　　　　　　　　　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 is ***allowed***.

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

　　1) Which of the following act as inverse transducer ?
　　　　a) Thermistor　　　　　　　　b) Capacitive transducer
　　　　c) LVDT　　　　　　　　　　d) Piezo-electric crystal

　　2) The first step, to measure the unknown current with digital multimeter is
　　　　a) Current to voltage converter　b) Current amplifier
　　　　c) Current booster　　　　　　d) Current attenuator

　　3) The reference electrode used for ECG measurement is
　　　　a) Right arm　　b) Left arm　　c) Right leg　　d) Left leg

　　4) The instrumentation amplifier are used principally to amplify signals from which of the following ?
　　　　a) Active filters　　　　　　　b) Choppers
　　　　c) D to A converters　　　　　d) Transducers

　　5) The size of air-cored inductive transducer as compared to iron-cored inductive transducer is
　　　　a) Smaller　　b) Bigger　　c) Same　　d) All of these

　　6) An electronic circuit that produces various specified waveform for test purpose over a wide range of frequencies.
　　　　a) Signal source　　　　　　b) Wave generator
　　　　c) Function generator　　　　d) a.c. source

　　7) Magnetic flux can be measured by
　　　　a) Capacitive pick-up　　　　b) Inductive pick-up
　　　　c) Resistive pick-up　　　　　d) Hall-effect pick-up

8) Identify the passive transducer from the given transducers.
   a) LVDT
   b) Thermocouple
   c) Photo-voltaic cell
   d) Piezo-electric transducer

9) To design digital thermometer, to measure room-temperature the selection criteria may use for transducer, are
   a) Linearity
   b) Sensitivity
   c) Accuracy
   d) All of these

10) The 8 bit DAC is used in the instrumentation with reference voltage 2.5 volt. What is the step voltage is
   a) 19.53 mV
   b) 9.765 mV
   c) 195.35 mV
   d) 97.65 mV

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

   i) What is transducer ?

   ii) Enlist 4 different specific errors that frequently occur in the process of making measurements.

   iii) What is $3^1/_2$ digit multimeter ? What is meant by $^1/_2$ digit ?

   iv) Why intensity and focus knobs are essential for the oscilloscope ?

   v) Give the measurement standers in practice.

   vi) A metallic strain gauge under stretching condition, double to its original length calculate the gauge factor, for the same.

3. A) Answer **any two** of the following :   **6**
   i) What is actuator ? Give its example.
   ii) Explain isolation technique in brief.
   iii) Discuss merits of FET input op-amp; for signal conditioning with transducers.

   B) Draw the block diagram and explain digital tachometer in brief.   **4**

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

   i) Explain ECG with block-diagram.

   ii) Describe the multiplexed display technique using-LED/7 segment display.

   iii) Draw the circuit diagram and explain instrumentation amplifier with transduction bridge.

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

   i) a) What are the important feature of Op-Amp how they utilised in signal conditioning circuits ?

   b) Explain the principal and working of LVDT.

   ii) Draw the block diagram of CRO and explain the working of each block and the various applications of CRO.

Seat No.

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE
Web Technology (Special Paper – XIII)

Day and Date : Thursday, 10-4-2014   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 :   **10**

     1) Sql connection object is used for _____ database.
         a) Mysql   b) Sqlserver
         c) Oracle   d) MS-Access

     2) Default event for check box is
         a) Click   b) Select
         c) Checked change   d) None of these

     3) ASP.Net pages does not require IIS server for execution
         a) True   b) False

     4) For separating server side code from client side code on ASP.Net, _____ programming model should be used.
         a) separation model   b) code inline
         c) code behind   d) client server model

     5) Where would you define application and session level events ?
         a) Global.asax   b) Default.aspx
         c) Web.config   d) None of these

     6) _____ method is used to load data into dataset invoked by data adapter in dataset.
         a) read   b) execute query
         c) fill   d) all of these

     7) _____ property is used for password textbox.
         a) password   b) textpass   c) textmode   d) none of these

8) _____ is the root namespace for all types in dot net.

    a) Root   b) System   c) Web   d) Windows

9) If a developes of ASP.Net defines style information in common location. Then that common location is called as

    a) master page   b) themes   c) customization   d) all of these

10) _____ property is used to set for single selection of radio button.

    a) group name   b) single select   c) select no.   d) none of these

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

   i) Hidden field

   ii) Label control

   iii) Required field validator control

   iv) Image class

   v) Login control

   vi) Isvalid property

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

    i) Explain how to add control at run time

    ii) Explain validation group

    iii) Data table class

   b) Explain difference between ASP and ASP.Net.   **4**

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

   a) Write code for master detail form in ASP.Net.

   b) Explain different application folders used in ASP.Net.

   c) Explain list class with example.

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

   a) Explain server side state management technique used in ASP.Net

   b) Explain website location in detail.

   c) Explain event ordering in master page.

_____

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
CHEMISTRY
Inorganic Chemistry (Special Paper – XIV)

Day and Date : Friday, 11-4-2014   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. Select the correct alternative for the following and rewrite the sentences :   **10**

   1) Most of the actinons show _____ oxidation state.

      a) + III   b) + IV   c) + VI   d) + II

   2) Germanium doped with donor atom is called _____ conductor.

      a) super   b) n – type   c) p – type   d) mixed oxide

   3) The terminal B – H distance is _____ in Diborane.

      a) 120 pm   b) 119 pm   c) 123 pm   d) 118 pm

   4) In carbonyl compounds M is _____ while CO is _____

      a) Lewis acid, Lewis base

      b) Lewis base, Lewis acid

      c) Acid – base

      d) Electron donar – Electron acceptor

   5) Atmospheric corrosion involves _____ heterogeneous system.

      a) liquid – solid   b) liquid – gas   c) solid – gas   d) solid – solid

   6) Bonding in metal is best explained by _____ theory.

      a) Valence bond   b) Molecular orbital

      c) Crystal field   d) Ligand field

   7) Xe – F distance in Xenon difluoride is _____

      a) 190 pm   b) 200 pm   c) 195 pm   d) 205 pm

P.T.O.

8) _____ is the best general method of preparation of TU elements.

   a) Heavy – ion bombardment

   b) Accelerated projectile

   c) Neutron – capture fallowed by B-decay

   d) None of these

9) Anodic dissolution of the metal is called _____

   a) passivity   b) corrosion   c) electrolysis d) reduction

10) Idea of superconductor was introduced by _____

   a) Kamerlingh Onner   b) Bloch

   c) Pauling   d) Drude

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

   1) Define atmospheric corrosion.

   2) Explain n-type semiconductor.

   3) Draw the structure of Xeo_4.

   4) Mention methods of separation for lanthanides.

   5) Describe the synthesis of Alkyl-alluminium compounds.

   6) What are the applications of superconductors ?

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

   1) Mention the methods for the prevention of corrosion.

   2) Give the electronic configuration for the elements Samarium, Neodymium and Lutetium.

   3) Explain intrisic semiconductor.

   B) Discuss structural study of alkyl-beryllium compounds.   **4**

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

   1) Describe the oxide film theory of passivity.

   2) Explain the structure of XeF_6.

   3) Give the detailed electronic configuration of lanthanides.

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

   1) What is metallic bond and explain band theory of bonding in metals ?

   2) How mixed oxide superconductors are prepared by chemical vapour deposition method ?

   3) Draw and explain the structure of borazine.

_____

Seat No.

B.Sc. – III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XIV)
Linear Algebra

Day and Date : Friday, 11-4-2014   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) Let V be a vector space and let $S_1 \subseteq S_2 \subseteq V$ and

     p) S_1 is linearly dependant
     q) S_2 is linearly dependant then

     a) $p \Rightarrow q$ b) $q \Rightarrow p$
     c) $p \Leftrightarrow q$ d) None of these

   2) Let V and W be vector spaces and Let I : $V \rightarrow V$ be identity transformation then N(I) i.e. nullity of I is

     a) {0}   b) ϕ c) V   d) 1

   3) Every _____ dimensional inner product space has an orthonormal basis.

     a) Finite   b) Infinite
     c) Both finite and infinite   d) Non zero finite

   4) Let V and W be finite dimensional vector spaces and T : $V \rightarrow W$ is linear. If dim (V) < dim W then

     a) T cannot be onto   b) T cannot be one-one
     c) T cannot be both 1 – 1 and onto   d) None of these

   5) The vector space $M_{m \times n}(F)$ has dimension

     a) mn   b) n^2 c) m^2 d) m + n

6) A zero vector space is always

    a) Linearly dependant

    b) Linearly independent

    c) Both linearly dependant and linearly independent

    d) None of these

7) If $V = R^3$ and $S = \{e_3\}$ then $S^\perp =$

    a) xz plane   b) yz plane

    c) xy plane   d) x axis

8) $\left|\langle x, y \rangle\right| \leq$ _____

    a) $\left|x\right| \cdot \left|y\right|$ b) $\left\|x\right\| + \left\|y\right\|$

    c) $\left\|x\right\| \cdot \left\|y\right\|$ d) $x \cdot y$

9) Over the field of complex numbers the vector space of complex numbers has dimension

    a) 1   b) 2

    c) 0   d) ∞

10) A linear transformation $T : V \to V$ is invertible. Then T is

    a) One-one and onto   b) One-one and into

    c) Many one and onto   d) Many one and into

2. Solve **any five** :   **10**

1) Let $T : P_n(R) \to P_{n-1}(R)$ is defined by $T(f(x)) = f'(x)$ show that T is linear.

2) Define basis and dimension of a vector space.

3) Orthonormalise the set $\{(1, 2), (2, -1)\}$.

4) Let $T : V \to W$ be linear then define N(T) and R(T) i.e. null space and range of T respectively.

5) Define a subspace of vector space with one example.

6) Let $T : R^2 \to R$ be linear map defined by $T(7, 1) = 3$, $T(0, 1) = -2$ find T(a, b).

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

    1) Let W be a subspace of finite dimensional vector space V. Then show that W is finite dimensional and dim (W) ≤ dim V.

    2) Let V be inner product space and S = {v_1, v_2, ... v_k} be an orthogonal subset of V consisting of non zero vectors if $y \in$ span(s) then show that

$$y = \sum_{i=1}^{k} \frac{\langle y, v_i \rangle}{\|v_i\|^2} v_i .$$

    3) Let β and β′ be two ordered bases for a finite dimensional vector space V and let $Q = [I_v]_{\beta}^{\beta'}$ then show that Q is invertible and for any

    $v \in V \quad [v]_{\beta} = Q[v]_{\beta'}.$

  B) Let V and W be vector spaces and let T : V → W be linear and invertible then show that T^{-1} is linear. **4**

4. Solve **any two** : **10**

    1) Let V and W be vector spaces over a field F and Let T : V → W and U : V → W are linear then show that for all $a \in F$ $aT + U$ is linear.

    2) Apply Gram Schmidt orthogenalisation process to find an orthonormal basis S = {W_1 = (1, –2, –1, 3) W_2 = (–2, 1, –5, 5) W_3 = (1, 3, 7, 11)}.

    3) Determine the vectors in R^4 are linearly dependant or independent.

    {(1, 3, –1, 4), (3, 8, –5, 7), (2, 9, 4, 23)}.

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

    1) State and prove the rank-nullity theorem.

    2) Let V and W are finite dimensional vector spaces with ordered bases β and γ.

    Let T : V → W be linear, then prove that T is invertible iff $[T]_{\beta}^{\gamma}$ is invertible

    further $[T^{-1}]_{\gamma}^{\beta} = ([T]_{\beta}^{\gamma})^{-1}.$

_____

B.Sc. – III (Semester – VI) Examination, 2014
GEOLOGY
Pre-Cambrian Stratigraphy of India, (Special Paper – XIV)

Day and Date : Friday, 11-4-2014   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.

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

   1) Rocks of the Sakoli Group occur in triangular track of _____ districts.
      a) Nagpur-Bhandara and Chanda
      b) Nagpur-Bhandara and Aurangabad
      c) Nagpur-Chanda and Aurangabad
      d) Bhandara-Chanda and Aurangabad

   2) The younger group of uppar Vindhyan supergroup is _____
      a) Kaimur   b) Bhandar   c) Semari   d) Alwar

   3) Kaladgi Group is equivalent of _____ supergroup.
      a) Cuddapah   b) Delhi   c) Dharwar   d) Vindhyan

   4) The trend of Satpura is _____
      a) N – S   b) E – W
      c) ENE – WSW   d) NW – SE

   5) Aravalli Group consists of huge thickness of mainly _____ rocks.
      a) Calcareous   b) Arenaceous   c) Rhyolites   d) Argillaceous

   6) The term Dharwar system for the Archean rocks of South India was introduced
      by _____
      a) Willium Smith   b) B. Ramarao   c) D. N. Wadia   d) R. Bruce Foot

   7) The number of Archean Province in Peninsular India are _____ that
      have distinct geological and structural history.
      a) 3   b) 4   c) 5   d) 6

8) The basement of Aravalli region is known as _____
   a) Peninsular Gneisses
   b) Banded Gneissic complex
   c) Fundamental Gneisses
   d) Aravalli Gneisses

9) Khondalites are essentially gray and red foliated _____ schists.
   a) Garnet-Sillimanite
   b) Garnet-Kyanite
   c) Kyanite-Staurolite
   d) Garnet-Staurolite

10) Singhbhum shear zone is known for _____ deposits.
    a) Fe
    b) Cu
    c) Fe and Cu
    d) Au and Ag

2. Answer **any five** of the following :   **10**
   i) Zawar deposits
   ii) Alwar group
   iii) Malani Volcanics
   iv) Economics of Vindhyan supergroup
   v) Erinpura granite
   vi) Charnockite series.

3. A) Answer **any two** of the following :   **6**
      i) Iron ore group
      ii) Clospet Granite
      iii) Badami group.

   B) Explain classification and lithology of upper Vindhyan supergroup.   **4**

4. Answer **any two** of the following :   **10**
   i) Dharwar supergroup
   ii) Cuddapah supergroup
   iii) Precambrian basement of South India.

5. Answer **any two** of the following :   **10**
   i) Distribution, lithology and economic importance of sausar group.
   ii) Distribution and economic importance of Delhi supergroup.
   iii) Kurnool and Bhima groups.

_____

B.Sc. – III (Semester – VI) Examination, 2014
MICROBIOLOGY (Special Paper – XIV)
Microbial Biochemistry

Day and Date : Friday, 11-4-2014   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.

Rewrite the sentences by selecting correct alternative.   **10**

1. 1) The term enzyme was first time used by the scientist

   a) Berzelius   b) Buchner   c) Kuhne   d) Summer

2) The nonprotein organic molecule which is bound loosely to enzyme is called

   a) coenzyme   b) apoenzyme   c) holoenzyme   d) isoenzyme

3) The disadvantage of cross linking method of immobilisation is _____
   of enzyme.

   a) denaturation   b) desorption   c) absorption   d) leakage

4) In arabinose operon the ara 1 site overlaps with _____ site.

   a) $araO_2$ b) $araO_1$ c) pc   d) pBAD

5) For preparation of density gradient _____ is used.

   a) lactose   b) starch   c) sucrose   d) cellulose

6) The basis of separation of column chromatography is

   a) size   b) adsorption   c) solubility   d) affinity

7) _____ nucleotide is involved in peptidoglycan biosynthesis.

   a) ADP   b) UDP   c) GDP   d) CDP

8) In prokaryotes process of translation starts with _____ tRNA molecule.

   a) met   b) phe   c) fmet   d) ser

P.T.O.

9) The property of subsequent substrate binding with enzyme is explained by _____ model.

   a) induced fit   b) koshland   c) lock and key   d) fluid mosaic.

10) The binding of RNA polymerase to promoter site requires presence of catabolite gene _____ protein.

   a) inhibitor   b) activator   c) regulator   d) repressor

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

   i)   What is an active site ?

   ii) Define isozymes. Give example of it.

   iii) Draw schematic diagram of glyoxylate pathway.

   iv) What is group specificity ?

   v)   Write Michaelis menton final equation.

   vi) What is turnover number ?

   vii) What is strain and distortion ?

3. A) Write **any two** of the following :   **6**
   i)   Explain induced fit model of enzyme action.
   ii) Write about proximity and orientation.
   iii) Give a brief account of ED pathway.

   B) Explain models for action of allosteric enzymes.   **4**

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

   i)   Give an account of purification of protein (enzyme) based upon charge.

   ii) Give an account of general acid-base catalysis.

   iii) Write assimilation of N covering molecular N_2 and NH_3.

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

   i)   Describe tryptophan operon.

   ii) Give an account of enzyme assay.

   iii) Give an account of pyrimidine biosynthesis.

_____

SLR-C – 176

B.Sc. III (Semester – VI) Examination, 2014
COMPUTER SCIENCE
Advanced Java (Special Paper – XIV)

Day and Date : Friday, 11-4-2014   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 correct alternative :   **10**

   I) Which of the following is a valid HTML comment ?
     a) < -- comment -->   b) <! -- comment -->
     c) < // comment >   d) </* comment */>

   II) By default, the servlet API uses a _____ to store a session ID.
     a) Cookies   b) URL-Rewritting
     c) Session   d) None of these

   III) The _____ interface handles choice events.
     a) ContainerListener   b) ItemListener
     c) ActionListener   d) WindowListener

   IV) Pannel is used for _____ components.
     a) Groupind   b) Managing
     c) Deleting   d) Modifying

   V) _____ is a passive component.
     a) JTextBox   b) JTextArco
     c) JTree   d) JLabel

   VI) To load the driver _____ class is used.
     a) Create . upload ( )   b) method . Append ( )
     c) Class . forName ( )   d) All of the above

VII) _____ is a group of SQL statement that forms a logical and perform a particular task.
    a) Statement   b) Stored procedure
    c) CallableStatement   d) All of the above

VIII) The code for loading a JDBC driver and connecting to a database should be invoked from _____ in a servlet.
    a) init ( ) method   b) doGetmethod ( )
    c) doPost ( ) method   d) destroy ( ) method

IX) By default how long does a cookie last ?
    a) 24 hours
    b) 30 days
    c) 365 days
    d) By default a newly created cookies persist until the browser exist

X) You can run JSP from _____
    a) any web server
    b) JVM
    c) any web browser
    d) any webserver that supports Java servlet and JSP

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

    I) Can Applets on different page communicate with each other ?

    II) Can null value added to any list ?

    III) What are the steps involved in establishing a connection ?

    IV) What is session ?

    V) What is the use of Resultset ?

    VI) What is AWT ?

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

    I) What is adapter class ? List adapter classes.

    II) What is difference between Applet and Frome ?

   B) Write a program to load Image intoApplet.   **4**

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

    I) Write a program to demonstrate the use of JRadioButton.

    II) Write a servlet to count the number of times a servlet has been invoked.

    III) Write a JDBC program to insert the records into Employee table. Employee (empno, name, salary)

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

    I) Explain JSP life cycle.

    II) What is session tracking ? Explain cookies.

    III) Explain type-4 driver.

———————

Seat No.	

B.Sc. (Part – III) (Semester – VI) Examination, 2014
PHYSICS (Special Paper – XV)
Quantum Mechanics and Astrophysics

Day and Date : Saturday, 12-4-2014   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 log table or scientific calculator is **allowed**.
  iv) **Draw** neat diagrams **wherever** necessary.

1. Select correct alternative :   **10**

   i) The astronomer who first observed the red shift in the spectra of distant galaxies was _____

   a) Hubble   b) Slipher

   c) Sandage   d) Gamow

   ii) Approximate age of universe is given by _____

   a) Hubble constant (H)   b) Reciprocal of H

   c) H/V   d) V/H

   iii) The wave function associated with moving particle or body is denoted by

   a) K   b) α c) ψ d) γ

   iv) The zero point energy of linear harmonic oscillator is given by _____

   a) $E_0 = 0$ b) $E_0 = \hbar\omega$

   c) $E_0 = mc^2$ d) $E_0 = \frac{1}{2}\hbar\omega$

   v) 1 light year = _____

   a) 9.46×10^{12} kms   b) 9.46×10^{12} ms

   c) 9.46×10^{12} metres   d) 9.46×10^{12} km/s

vi) About 90% of matter in interestellar medium contains _____

    a) dust   b) hydrogen

    c) helium   d) oxygen

vii) The eigenvalue of L^2 is given by _____

    a) $\langle L^2 \rangle = (m + 1)\hbar$ b) $\langle L^2 \rangle = l(l + 1)\hbar^2$

    c) $\langle L^2 \rangle = l(l + 1).\hbar^2$ d) $\langle L^2 \rangle = -(m + 1)\hbar$

viii) The milky way galaxy was first discovered by _____

    a) Slipher   b) Hubble   c) Sandage   d) Galileo

ix) The energy spectrum of a particle in one dimensional rigid box has the nature of _____

    a) infinite sequence of discrete energy level

    b) infinite sequence of equidistance energy level

    c) exponentially increasing

    d) exponentially decreasing

x) In a normal state of the atom, the number of electrons in a sub-shell of the atom is given by _____

    a) $l\sqrt{(l+1)}$ b) $(2l + 1)$ c) $2(2l + 1)$ d) $l + \frac{1}{2}$

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

   i) Write a note on milky way Galaxy.

   ii) Give one test to verify cosmological theories.

   iii) Define operator in Quantum Mechanics.

   iv) Explain normalization condition for wave function.

   v) Explain zero point energy.

   vi) What are sun spots ?

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

    i) Give the physical significance of ψ .

    ii) Write a note on birth of star.

    iii) Obtain an expression for momentum operator.

  B) Write an essay on "prospects for life on Mars". **4**

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

  i) What is nuclear reaction ? Explain proton chain reaction.

  ii) Calculate eigen functions and eigen values of the linear harmonic oscillator.

  iii) Explain condensation theory for the origin of solar system.

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

  i) What is Hubble law ? Define Hubble constant. Explain how approximate range and age of universe can be established using Hubble law.

  ii) Derive Schrodinger's time dependent wave equation in one dimension.

———————————

B.Sc. (Part – III) (Semester – VI) Examination, 2014
Chemistry
Special Paper – XV : ORGANIC CHEMISTRY

Day and Date : Saturday, 12-4-2014   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**

   1) Pyrrole on oxidation with CrO_3 / CH_3COOH gives
      a) Maleic ionide   b) Maleic anhydride
      c) Acetic anhydride   d) Succinic anhydride

   2) Quinoline is synthesised by heating a mixture of aniline, glycerol and con. H_2SO_4. This synthesis is called as
      a) Killani's synthesis   b) Skraup's synthesis
      c) Gatterman's synthesis   d) Willasaman's synthesis

   3) Lactose on hydrolysis with acid gives
      a) Both molecules of glucose   b) Glucose and Fructose
      c) Glucose and Galactose   d) Both molecules of fructose

   4) Weerman reaction can be used for
      a) Chain lengthening of carbohydrates
      b) Chain shortening of carbohydrates
      c) Conversion of Glucose to Fructose
      d) Conversion of Fructose to Glucose

   5) Methyl orange and Methyl red are examples of
      a) Mordant dyes   b) Nitroso dyes   c) Indigo dyes   d) Azo dyes

P.T.O.

6) Name the following insecticide

$$O-\overset{\overset{\displaystyle O}{\displaystyle \|}}{C}-NHCH_3$$
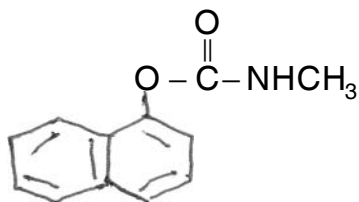
   a) Monocrotophos   b) Carbaryl
   c) Endosulphan   d) Methoxychlor

7) How many double bonds are present in side chain of vitamin A_1 ?
   a) One   b) Three   c) Four   d) Six

8) Orange IV is synthesised by condensation of diazotised sulphanilic acid with
   a) Methyl amine   b) Ethyl amine
   c) Triphenyl amine   d) Diphenyl amine

9) Which one of the following compound is used as antiinflammatory agent ?
   a) Chloromycetin   b) Isoniazid
   c) Tolbutamide   d) Ibuprofen

10) What is the product of following reaction ?

$$+H_2SO_4 \xrightarrow[623K/HgSO_4]{So_3+(H_2SO_4)} ?$$
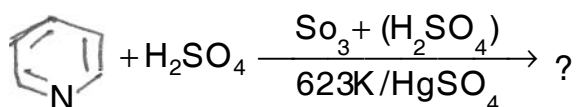
   a) Pyridine-2-sulphonic acid   b) Pyridine-3-sulphonic acid
   c) Pyridine-1-sulphonic acid   d) None of these

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

   i) What are heterocyclic compounds ? Give any two methods of synthesis of pyridine.

   ii) Give brief classification of vitamins and harmones.

   iii) What are polysaccharides ? Give structure of maltose.

   iv) Why phenolphthalein has pink colour in alkaline medium ? Explain with reaction and structure.

v) What are agrochemicals ? Give only structure and use of monocrotophos.

vi) Predict the products of following reaction and name it
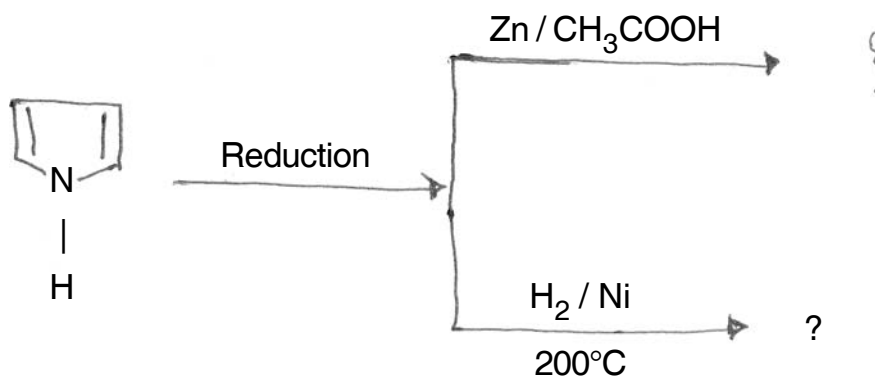
3. A) Answer **any two** of the following : **6**

   i) Give one synthesis and uses of Indole-3-acetic acid.

   ii) Explain the electrophilic substitution reactions of pyrrole.

   iii) Give synthesis and use of orange-IV.

   B) Discuss the periodic acid method for determination of size of D-glucose. **4**

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

   i) What are antibiotics ? Give synthesis of chloromycetin.

   ii) Discuss Skraup's synthesis.

   iii) How configuration of D-glucose is determined from D-arabinose.

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

   i) Discuss the structure of Thyroxine on the basis of analytical ground.

   ii) What are dyes ? Give synthesis of Malachite green.

   iii) Give synthesis of Methoxychlor and Ethophan.

_____

Seat No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
BOTANY (Special Paper – XV)
Microbial Genetics, Plant-Breeding and Biostatistics

Day and Date : Saturday, 12-4-2014　　　　　　　　　　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) Draw **neat** labelled diagrams **wherever** necessary.
4) Figures to the **right** indicate **full** marks.

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

   1) Transduction was discovered by _____ in 1952.
      a) A. D. Hershey and R. Rotman　　　b) W. D. Zinder and J. Ledberg
      c) M. Delbrack and W.T. Belley　　　d) M. Delbrack and S. E. Luria

   2) The unidirectional transfer of DNA from F^+ bacterial cell to F^- bacterial cell through cytoplasmic bridge is called
      a) transformation　　b) conjugation　　c) transduction　　d) both a and c

   3) _____ is chemical mutagenic agent used in mutation breeding.
      a) DES　　　b) EMS　　　c) MMS　　　d) All of the above

   4) 'TMV' is single stranded
      a) DNA molecule　　　　　　　b) RNA molecule
      c) DNA + protein molecule　　　d) RNA + protein molecule

   5) Sugarcane is improved by _____ selection method.
      a) mass　　　b) pureline　　　c) clonal　　　d) both a and b

   6) Mutation breeding is used in
      a) self pollinated crops　　　　　b) cross pollinated crops
      c) vegetatively propagated crops　　d) all of the above

   7) The hybridization between two individuals of same variety is called
      a) Intravarietal　　b) Intervarietal　　c) Intergeneric　　d) Interspecific

8) Cotton is improved by
   a) Introduction
   b) Mutation breeding
   c) Hybridization
   d) All of the above

9) The two varieties, Kalyan Sona and Sonalika were selected from introduction in _____ crop.
   a) Wheat
   b) Rice
   c) Jowar
   d) Maize

10) Data represented in rectangles variable heights but of equal width is called
    a) pie-diagram
    b) bar-diagram
    c) line-diagram
    d) point-diagram

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

   1) What is conjugation ?

   2) Enlist the scope of plant-breeding.

   3) Merits of pure line selection.

   4) Merits of hybridization.

   5) Arithmetic mean.

   6) What is hybrid vigour ?

3. A) Answer **any two** of the following : **6**
   i) What is introduction and acclimatization.
   ii) Demerits of mass selection.
   iii) What is transformation ?

   B) Mutagenic agents. **4**

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

   i) Breeding in cotton

   ii) Bulk method

   iii) Histogram.

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

   i) Purine line selection

   ii) Arithmetic mean and median

   iii) R.N.A. viruses.

_____

SLR-C – 18

B.Sc. I (Semester – I) (Old) Examination, 2014
ELECTRONICS (Paper – I)
Electronics Fundamentals

Day and Date : Friday, 13-6-2014   Max. Marks : 50

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

Instructions : 1) *Figures to the **right** indicate **full** marks.*
                  2) *Draw neat diagrams **wherever** necessary.*
                  3) ***Use** of logtable and calculator is **allowed**.*
                  4) ***All** questions carry **equal** marks.*

1. Select the correct alternatives for the following :   **10**

  1) After applying Thevenins theorem, equivalent circuit has new
    a) Voltage source in series with resistance
    b) Current source in series with resistance
    c) Current source in parallel with resistance
    d) Voltage source in parallel with resistance

  2) The impedance parameters are _____ circuit parameters.
    a) open   b) short   c) closed   d) hybrid

  3) Two resistances of 18 Ω are connected in series, equivalent resistance will be
    a) 18Ω b) 36Ω c) 10.12Ω d) 3.6Ω

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

  5) In step down transformer
    a) primary voltage is more than secondary voltage
    b) primary voltage is less than secondary voltage
    c) primary voltage is equal to secondary voltage
    d) none of these

6) The unit of reactance is
   a) Ohm   b) Mhos   c) Henary   d) Farade

7) Frequency of mains supply used for domestic purpose is _____ Hz.
   a) 100   b) 50   c) 60   d) 230

8) Series resonant circuit below resonant frequency becomes
   a) Resistive   b) Capacitive   c) Inductive   d) All

9) In case of pure capacitor current _____ the voltage.
   a) lags   b) leads
   c) in phase with   d) none

10) In Ohms law potential difference is _____ to current.
    a) directly proportional   b) inversely proportional
    c) both a and b   d) none

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

   i) What are Kirchoff's laws ? Define them.

   ii) Define loop and branch for a network.

   iii) What are 'Z' parameters ? Give formulae for them.

   iv) Give the relation between band width and quality factor in case of parallel resonance circuit.

   v) What is frequency of dc source ?

   vi) In brief give classification of Inductors.

3. A) Answer **any two** of the following :   **6**
   i) What is transformer ? Explain its types.
   ii) What is T-network ? Explain it.
   iii) State super position theorem with suitable network.

   B) In the following network, find the current through R$_L$.   **4**
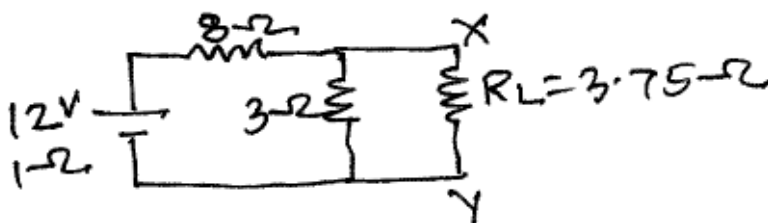
4. Answer **any two** of the following :   **10**

i) State and explain Norton's theorem.

ii) What are hybrid parameters for two port network ? Draw its equivalent network.

iii) What is energy source ? Explain its types.

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

i) Write a short note on electrolatic capacitor.

ii) What are active and passive components ? Explain in short.

iii) Explain Millman's theorem.

————————————————

Seat No.

B.Sc. III (Semester – VI) Examination, 2014
ZOOLOGY (Special Paper – XV)
Molecular Biology and Biotechnology

Day and Date : Saturday, 12-4-2014

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** labelled diagrams **wherever** necessary.

1. Select the appropriate answer from **each** of the following and rewrite the sentence : **10**

    i) Initiation of DNA replication require

       a) RNA primer b) DNA dimer c) tRNA d) m-RNA

    ii) _____ is initiation amino acid in protein synthesis.

       a) Methionine b) Lycine c) Valine d) Proline

    iii) In operon the repressor molecule is synthesized by the activity of _____ gene.

       a) Regulatory b) Repressor c) Operator d) Normal

    iv) DNA finger printing is explained by

       a) Watson b) Alece Jefrey c) Crick d) Jacob

    v) Hybridoma technique is explained by

       a) Crick b) Jacob and Monad

       c) Kohler and Milstein d) Alwine

    vi) Long form of Mab is

       a) Metabolism b) Mobile antibody

       c) Monoclonal antibody d) Monoclonal antigen

P.T.O.

vii) Long form of DAC ELISA is _____ ELISA.

   a) Direct antigen connection   b) Double antigen connection

   c) Double antibody conversion   d) Direct antigen coating

viii) Process of synthesis of protein on ribosome is called as

   a) Transcription   b) Replication   c) Metabolism   d) Translation

ix) Two stands of DNA run in _____ direction.

   a) Circular   b) Parallel   c) Straight   d) Antiparallel

x) The main use of PCR is making

   a) multiple copies of DNA   b) multiple copies of RNA

   c) antigen   d) antibody

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

   i) Okazaki fragment.

   ii) Nonsense codons.

   iii) Plasmid.

   iv) DNA ligase.

   v) Genetic code.

   vi) Sigma (σ) factor.

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

   i) Northern blotting.

   ii) DNA repair.

   iii) t-RNA.

  B) Describe Wobble hypothesis.   **4**

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

   i) DNA finger printing.

   ii) ELISA.

   iii) Applications of PCR.

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

   i) What is recombinant DNA technology ? Explain any two cloning vectors in detail.

   ii) Describe the hybridoma technique and add note on monoclonal antibody.

———————————

Seat No.

B.Sc. III (Semester – VI) Examination, 2014
MATHEMATICS (Special Paper – XV)
Partial Differential Equation

Day and Date : Saturday, 12-4-2014   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. Choose correct alternative for **each** of the following :   **10**

   1) The solution of auxiliary equation zp = – x is

      a) $\phi(x^3 + y^3, y) = 0$ b) $\phi(x^2 + z^2, y) = 0$

      c) $\phi(x^2 - z^2, y) = 0$ d) $\phi(x^3 - z^3, y) = 0$

   2) Elimination of two arbitrary functions gives rise to partial differential equation
      of order

      a) zero   b) one

      c) higher than one   d) none of these

   3) If a first order p.d.e. f(x, y, z, p, q) = 0 is linear in p and q then the equation is
      known as

      a) linear equation   b) semi-linear equation

      c) quasi-linear equation   d) non-linear equation

   4) The complete integral of $\sqrt{p} + \sqrt{q} = 1$ is

      a) $z = ax + \left(1 - \sqrt{a}\right)^2 y + c$ b) $z = ax + \left(1 - a^2\right) y + c$

      c) $z = ax + (a - 1)^2 y + c$ d) $z = ax + by + c$

5) The integral obtained by giving particular values to arbitrary constants is known as
   a) complete integral
   b) particular integral
   c) singular integral
   d) general integral

6) The differential equations $\dfrac{\partial z}{\partial x} = 5x - 7y$ and $\dfrac{\partial z}{\partial y} = 6x + 8y$ are

   a) not compatible
   b) compatible
   c) compact
   d) exact

7) How many arbitrary constants are there in particular integral of $\phi(D, D') z = f(x, y)$?
   a) one
   b) two
   c) zero
   d) None of these

8) If $F(D, D')$ is homogenous function of D and D' of degree n and $F(a, b) = 0$

   then $\dfrac{1}{F(D, D')} \ \phi(ax + by) =$

   a) $\dfrac{x^n}{b^n n!} \phi(ax + by)$
   b) $\dfrac{x^n}{b^n} \phi(ax + by)$

   c) $\dfrac{x^n}{nb^n} \phi(ax + by)$
   d) $\dfrac{x^n}{n! b^n} \phi(ay + bx)$

9) $\dfrac{1}{(D + D')^2} e^{x+y} =$

   a) $\dfrac{1}{2} e^{x+y}$
   b) $\dfrac{1}{4} e^{x+y}$
   c) e^{x+y}
   d) $2e^{x+y}$

10) In p.d.e. $f(D, D')z = F(x, y)$, DD' means

   a) $\dfrac{\partial}{\partial x} \dfrac{\partial^2}{\partial y^2}$
   b) $\dfrac{\partial^2}{\partial x^2} \dfrac{\partial}{\partial y}$
   c) $\dfrac{\partial^2}{\partial x \partial y}$
   d) none of these

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

   1) Form p.d.e. by eliminating arbitrary constants a and b from $z = a(x+y) + b$.

   2) Eliminate arbitrary function f from $z = x^n f (y/x)$.

   3) Find the complete and singular solutions of $z = px + qy + p^2q^2$.

   4) Explain the method of solving the equation of the form $z = px + qy + f(p, q)$.

   5) Solve $\left(\dfrac{\partial^4 z}{\partial x^4}\right) - \left(\dfrac{\partial^4 z}{\partial y^4}\right) = 0$.

   6) Solve $\{DD' + aD + bD' + ab\}z = e^{mx+ny}$.

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

   1) Eliminate a, b and c from $z = a(x + y) + b(x - y) + abt + c$.

   2) Solve $p^2 + q^2 = z$.

   3) Explain the general method of finding the P.I. of linear homogeneous equation with constant coefficients.

   B) Solve $\left(x^2D^2 - y^2D'^2\right) z = xy$. **4**

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

   1) Find the equation of surface satisfying $4yzp + q + 2y = 0$ passing through $y^2 + z^2 = 1$, $x + z = 2$.

   2) Explain the method of solving the equation of the form $f(p, q) = 0$.

   3) Solve $\left(2D^2 - 5DD' + 2D'^2\right) z = 24 (y - x)$.

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

   1) Find a complete, singular and general integrals of $(p^2 + q^2) y = qz$.

   2) Explain the Lagrange's method of solving $Pp + Qq = R$, when P, Q and R are functions of x, y and z. Hence solve $y^2p - xyq = x (z - 2y)$.

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
STATISTICS (Special Paper – XV)
Limit Theorems, Reliability and Queuing Theory

Day and Date : Saturday, 12-4-2014   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 correct alternative :   **10**

   1) If X is a continuous r.v. with $E(X) = \mu$ and $V(X) = \sigma^2 < \infty$ then
      $P\left[\,|X - \mu| > 2\sigma\right]$ is _____

      a) atmost 0.75   b) at least 0.25

      c) atmost 0.25   d) at least 0.75

   2) In usual notations the sequence of r.v.s. $\{X_n, n \geq 1\}$ is said to converge in
      distribution to a r.v. X if _____ as $n \to \infty$.

      a) $F_n(x) \to F(x)$ b) $F_n(x) \to 0$

      c) $F_n(x) \to 1$ d) None of these

   3) Suppose $R_i(t)$ = Reliability of ith component i = 1, 2. Let $R(t)$ = Reliability of
      the series system of these two components. Then _____

      a) $R(t) \geq \min \{R_1(t), R_2(t)\}$

      b) $R(t) \leq \max \{R_1(t), R_2(t)\}$

      c) $R(t) \geq \max \{R_1(t), R_2(t)\}$

      d) $R(t) \leq \min\{R_1(t), R_2(t)\}$

   4) Using order statistic we can find the distribution of _____
      a) Sample mean   b) Sample range
      c) Sample mode   d) Sample S.D.

5) Let X_i are iid $N(0, 1)$ r.v.s. $i = 1, 2, ..., n$. Then limiting distribution of $Z =$ _____ is $N(0, 1)$.

    a) $\overline{X}$ b) $\dfrac{\overline{X}}{\sqrt{n}}$ c) $\overline{X}\sqrt{n}$ d) $\overline{X} + \sqrt{n}$

6) Ageing function is same as reliability function if _____

    a) $t = 0$ b) $t > 0$ c) $t < 0$ d) none of these

7) Consider a system →—[C_1 | C_2]—→. This system fails if

_____

    a) only C_1 fails   b) only C_2 fails

    c) any one of C_1, C_2 fails   d) both C_1 and C_2 fail

8) In usual notations hazard rate is given by $\lambda(t) =$ _____

    a) $\dfrac{1 - f(t)}{F(t)}$ b) $\dfrac{f(t)}{\overline{F}(t)}$ c) $\dfrac{f(t)}{F(t)}$ d) $\dfrac{1 - f(t)}{\overline{F}(t)}$

9) For a random sample of size 2 from $U(0, 1)$ distribution, pdf of first order statistic is _____

    a) $2y_1 \ 0 < y_1 < 1$ b) $2y_1 (1 - y_1) \ 0 < y_1 < 1$

    c) $2(1 - y_1) \ 0 < y_1 < 1$ d) none of these

10) In usual notations expected waiting time is given by $W_S =$ _____

    a) $\dfrac{1}{\mu - \lambda}$ b) $\mu - \lambda$ c) $\lambda - \mu$ d) $\dfrac{1}{\lambda - \mu}$

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

    A) Define convergence in probability of a sequence of random variables to a constant.

    B) Define queue length.

    C) Draw block diagrams for series system and parallel system of two components.

    D) State Chebeyhev's inequality.

    E) In usual notations state the cdf of nth order statistic.

    F) Describe the parameters M and M in $M / M / 1 : \infty / $ FIFO model.

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

    i) How large a sample must be taken from $N(\mu, 1)$ distribution, so that

      $P\left[\,|\,\overline{X}_n - \mu\,| < 0.5\,\right] \geq 0.96$?

    ii) State and prove weak law of large numbers for a sequence of iid rvs.

    iii) Show that exponential life time has no ageing effect.

  B) Explain the terms :   **4**

    i) Minimal path vector

    ii) Minimal cut vector.

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

  A) Let $X \sim \exp(1)$

    i) find the upper bound for $P\,[|\,X - 1\,| > 2]$.

    ii) find the lower bound for $P\,[|\,X - 1\,| < 3]$.

  B) A fertilizer company distributes its products by trucks loaded at its only loading station. Both, company trucks and contractor trucks are used for this purpose. It was found that on an average loading time was 3 minutes and on an average every 5 minutes, one truck arrived. Under suitable assumptions find :

    i) probability that a truck has to wait

    ii) the average time of a truck in queue.

  C) Define reliability function. Obtain the same for

    a) Series system of two components

    b) Parallel system of two components.

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

  A) Obtain the distribution of service time in queuing system.

  B) Let $X_1, X_2, ..., X_{100}$ be a random sample from χ^2 distribution with 50 degrees of freedom. Using CLT find approximately probability that the sample mean lies in the interval $(47, 53)$.

  C) Find the distribution of sample range of a random sample from $U(0, 1)$ distribution.

––––––––––––––––––

Seat No.	

B.Sc. – III (Sem. – VI) Examination, 2014
GEOLOGY (Special Paper – XV)
Phanerozoic Stratigraphy of India

Day and Date : Saturday, 12-4-2014   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.

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

   1) The Indo-Gangetic plain is composed _____ sediments.
      a) Quaternary   b) Tertiary   c) Cenozoic   d) Holocene

   2) _____ Flora is characteristic of lower Gondwana.
      a) Glassopteris   b) Gangopteris
      c) Ptillophyllum   d) Glassopteris and Gangopteris

   3) Bhuj Formation belongs to _____ succession.
      a) Palaeozoic   b) Pre-Cambrian   c) Mesozoic   d) Cainozoic

   4) Bagh beds are _____ deposits.
      a) Lacustrine   b) Marine
      c) Fluvial   d) Lacustrine and glacial

   5) Warm and humid climate was dominating during deposition of _____ sediments.
      a) Siwalik   b) Jurassic of Kutch
      c) Lameta   d) Bagh

   6) The most common rock in the spiti valley is _____
      a) Sandstone   b) Conglomarate
      c) Shale   d) Limestone

P.T.O.

7) Sedimentation in Gondwana began in _____ period.

   a) Permian   b) Triassic   c) Jurassic   d) Cambrian

8) Thickest formation of cretaceous of Trichi is _____

   a) Uttatur   b) Ariyalur   c) Dalmiapuram d) Trichinopoly

9) The Indian Peninsula is devoid of marine _____ rocks.

   a) Mesozoic   b) Ceainozoic   c) Palaeozoic   d) Holocene

10) Bag Beds in Narmada Valley are exposed as _____ in Deccan Traps.

   a) Outliers   b) Inliers

   c) Inliers and outliers   d) Horst

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

   1) Lameta Beds.

   2) Laterites in Maharashtra.

   3) Sediments in Indo-Gangetic plains.

   4) Kamathi Formation.

   5) Otoceras Bed.

   6) Talchir Formation.

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

     1) Life during Siwalik.

     2) Upper Gondwana and its Flora.

     3) Intertrappean Beds.

  B) Pre-Cambrian stratigraphy of Maharashtra.   **4**

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

   1) Distribution, lithology, structure and importance of deccan Traps.

   2) Distribution and classification of Jurassic of Kutch.

   3) Palaeoclimates and sedimentation in Gondwana.

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

   1) Distribution and economic importance of lower Gondwana.

   2) Siwalik Group and its classification.

   3) Haimanta Group.

_____

Seat
No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
MICROBIOLOGY (Special Paper – XV)
Environmental Microbiology

Day and Date : Saturday, 12-4-2014   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 sentences by choosing correct answer from given alternatives.   **10**

   i) Incubation time for BOD test is _____ days.

     a) 2   b) 5   c) 8   d) 3

   ii) Corrosion of building, monuments, statues takes place due to

     a) Excess of rain   b) Acid rain

     c) Photochemical smog   d) Excess of CO_2.

   iii) Pollutants from a motor car which affect nervous tissue is

     a) Pb   b) NO_2 c) SO_2 d) Hg

   iv) Depletion of Ozone is due to

     a) BHC   b) CFC   c) DDT   d) PAN

   v) Increase in the temperature of earth surface due to concentration of CO_2 is called as

     a) Acid rain   b) Green house effect

     c) Smog   d) Eutrophication

   vi) Photochemical smog is

     a) Yellowish brown haze   b) Red haze

     c) White haze   d) Black haze

   vii) _____ play an important role is leaching of uranium.

     a) Thiobacillus ferroxidans   b) E. Coli

     c) Bacillus polymyxa   d) Streptomyces albus

   viii) Marine bacteria grow best at salt concentration of _____ %.

     a) 0.5 to 2   b) 2.5 to 4

     c) 0.1 to 1   d) 1.5 to 2

P.T.O.

ix) Oil and grease are common in waste from _____ industry.
  a) Paper   b) Textile
  c) Dairy   d) Sugar

x) Bhopal tragedy is a case of _____ pollution.
  a) Water   b) Radioactive
  c) Soil   d) Air

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

  i) Define COD.

  ii) Define gnotobiology.

  iii) What is impingement technique ?

  iv) Define oligotrophic lake.

  v) What is bioremediation ?

  vi) Define bioindicator of fecal pollution.

3. A) Answer **any two** of the following :   **6**
    i) Treatment of waste from paper industry.
    ii) Explain effects of air pollution.
    iii) Explain microbially enhanced oil recovery.

  B) Write a note on control of Eutrophication.   **4**

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

  i) Explain impact and control of depletion of Ozone layer.

  ii) Explain characteristics of marine environment.

  iii) What is bioleaching ? Explain leaching of uranium.

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

  i) Briefly explain Biological safety.

  ii) Explain routine bacteriological analysis of water.

  iii) Explain characteristics and treatment of waste from sugar industry.

_____

SLR-C – 186

Seat No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE (Special Paper – XV)
Operating System – II

Day and Date : Saturday, 12-4-2014   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 alternatives :   **10**

 1) More command is used for ———— file.
  a) Display   b) Create
  c) Both a) and b)   d) None of these

 2) The default system wide permission for a file are ————
  a) 644   b) 777   c) 645   d) 475

 3) The tar command ———— option is used to display files in archive.
  a) – x   b) – t   c) – d   d) – r

 4) ———— pattern is used to search for all lines which end with 'est'.
  a) ∧ est   b) / est   c) est $ d) est ?

 5) How long a file name in linux be ?
  a) 8 character   b) 10 character
  c) 128 character   d) 255 character

 6) Directories do have execute permissions.
  a) True   b) False

 7) Which of the following is not a shell keyword ?
  a) IS   b) Shift   c) Read only d) Unset

 8) Input mode ————— option is used to inserts text to left of cursor.
  a) I   b) i   c) a   d) A

9) In ls command ———————— option is used for recursive listing.

   a) R   b) – r   c) – X   d) – x

10) In chmode command only read permission is used for ———————— octal number.

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

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

   1) What is shell ?

   2) What is redirection ?

   3) What is operating system ?

   4) What is filer with its type ?

   5) Explain cp and rm command.

   6) Explain cut and pwd command.

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

   1) Explain login and logout procedure.

   2) Write note on chmode command.

   3) Explain input mode of vi-editor.

   B) Explain features of linux operating system.   **4**

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

   1) What is file ? Explain file types.

   2) Explain listing a files with examples.

   3) Write a program to display number is palindrome or not.

5. Write short note on **(any four)** :   **10**

   1) X-Windows.

   2) Internet communication.

   3) Background and Kill.

   4) od command.

   5) File compression.

———————————

SLR-C – 187

B.Sc. – III (Semester – VI) Examination, 2014
PHYSICS (Special) (Paper – XVI)
Electronics and Computer Programming

Day and Date : Tuesday, 15-4-2014
Time : 11.00 a.m. to 1.00 p.m.

Max. Marks : 50

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) Common mode gain of Op-Amp is always _____
   - a) Less than one
   - b) Greater than one
   - c) One
   - d) Infinite

   ii) Voltage gain of Op-Amp with external feedback is called as _____ gain.
   - a) Open loop
   - b) Closed loop
   - c) Infinite
   - d) Moderate

   iii) The frequency of unsymmetrical rectangular wave form of an astable multivibrator using IC-555 timer is given by _____

   - a) 0.70/RC
   - b) 1.38 RC
   - c) 0.69 RC
   - d) $\dfrac{1.44}{C(R_A + 2R_B)}$

   iv) Output of timer is _____ of supply voltage.
   - a) dependent
   - b) corresponds
   - c) independent
   - d) constant

   v) Holding current in p – n – p – n diode is the _____
   - a) normal operating current
   - b) current corresponding to break over voltage
   - c) minimum current to keep the device on
   - d) none of above

   vi) In normal operating mode of SCR anode is held at _____ potential with respect to cathode.
   - a) negative
   - b) zero
   - c) positive
   - d) infinite

P.T.O.

vii) _____ is a device which accepts instructions and data from the user and communicate these to the computer.
    a) Output device   b) Input device
    c) Control unit   d) CPU

viii) To compare the two quantities _____ operator is used.
    a) Relational   b) Logical   c) Arithmetic   d) Assignment

ix) Maximum length of string constant is _____ characters.
    a) 235   b) 523   c) 325   d) 435

x) _____ is unconditional control structure.
    a) goto   b) if-else   c) switch   d) do-while

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

    1) What are the characteristics of ideal operational amplifier ?

    2) What are the applications of IC-555 ?

    3) What do you mean by holding current of SCR ?

    4) Differentiate between computer hardware and software.

    5) What is mean by keywords ?

    6) What is flowchart ?

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

    1) Give the comparison between normal amplifier and differential amplifier.

    2) Explain the monostable operation of IC-555.

    3) Define the term operating system. Explain different functions of operating system.

  B) Explain the difference between while-loop and do-while loop in C++ programing.   **4**

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

    1) Explain construction and working of astable multivibrator.

    2) Draw the block diagram of computer and explain it.

    3) Explain insertion and extraction in C++.

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

    1) Discuss the operational amplifier as inverting and non-inverting amplifier.

    2) Describe the construction and working of SCR. What is meant by SCR firing ? Give any two methods of SCR firing.

_____

Seat No.

B.Sc. (Part – III) (Semester – VI) Examination, 2014
ZOOLOGY (Special Paper – XVI)
Biotechniques and Applied Zoology

Day and Date : Tuesday, 15-4-2014   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) The media prepared artificially by using several nutrients for the cell culture are called as _____ media.

   a) Synthetic   b) Systematic   c) Biological   d) Physiological

   2) The chromatography technique was explained by _____

   a) Ross Harrison   b) Michel Tswell

   c) Dart Yorkish   d) Alexis Carrel

   3) _____ incubators provide the suitable environmental conditions to the growing animal cell in a culture media.

   a) O_2 b) NO_2 c) CO_2 d) SO_2

   4) The weight of given sample is measured from the device _____

   a) pH meter   b) Calorimeter

   c) Spectrophotometer   d) Balance

   5) _____ is also called as falling net.

   a) Trawl net   b) Drift net   c) Cast net   d) Ramphani

   6) _____ is good source of fish oil.

   a) Catla   b) Oil sardine   c) Mrigal   d) Pompret

   7) The casting of skin in silkworm is called _____

   a) Ecdysis   b) Hibernation

   c) Cocoon formation   d) Silk production

8) Silk is a secretion of silkworm from its specialized _____
   a) Fat bodies
   b) Anal horn
   c) Salivary glands
   d) Spiracles

9) _____ deals with fish culture.
   a) Apiculture
   b) Pisciculture
   c) Silviculture
   d) Sericulture

10) Tribolium is the pest of _____ crop.
    a) Cotton boll
    b) Maize corn
    c) Jowar grain
    d) Pea pod

2. Answer **any five** of the following :   **10**
   i) Balance
   ii) Stem cell
   iii) Cocoon of silkworm
   iv) Pyrilla
   v) Ultracentrifuse
   vi) Cast net.

3. A) Answer **any two** of the following :   **6**
   i) Give an account of applications of tissue culture.
   ii) Write about the use of pH meter.
   iii) Describe the agricultural pest-rat.

   B) Describe the biological control of crop pest.   **4**

4. Answer **any two** of the following :   **10**
   i) Describe in brief the various crafts used in fishing.
   ii) Write in brief about silkmoth diseases.
   iii) Give an account of castes of termite.

5. Answer **any one** of the following :   **10**
   A) Define separation technique. Describe the column chromatography.
   B) What is Pearl culture ? Narrate the methods which are followed in pearl culture.

_____

Seat No.

B.Sc. – III (Semester – VI) Examination, 2014
MATHEMATICS
Special Paper – XVI : Graph Theory

Day and Date : Tuesday, 15-4-2014　　　　　　　　　　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. Attempt the following : **10**

　1) A vertex is called as pendant if and only if it has a degree
　　　a) 0　　　　　　　b) 1　　　　　　c) 2　　　　　　d) none of these

　2) A multigraph consists _____ between vertices.
　　　a) both loops and parallel edges　　b) no loops but parallel edges
　　　c) loops but no parallel edges　　　d) none of these

　3) A subgraph H of G is called a spanning subgraph of G if and only if
　　　a) $V(H) = V(G)$　　　　　　　　b) $V(H) \neq V(G)$
　　　c) $V(H) < V(G)$　　　　　　　　d) $V(H) > V(G)$

　4) A directed graph is called strongly connected if for any pair of vertices of the
　　　graph _____ of the pair are reachable from one another.
　　　a) both the vertices　　　　　　b) at least one of the vertex
　　　c) no vertices　　　　　　　　　d) none of these

　5) Complete graph K_n is Eulerian if n =
　　　a) 2　　　　　　　b) 4　　　　　　c) 5　　　　　　d) 6

　6) The wheel graph C_6 is _____ graph.
　　　a) complete bipartite　　　　　b) not regular
　　　c) bipartite　　　　　　　　　　d) none of these

　7) A tree with n vertices has _____ edges.
　　　a) n + 1　　　　　　b) n – 1　　　　c) n　　　　　　d) n^2

P.T.O.

8) A tree with _____ vertex is called a trivial tree.

    a) one   b) two   c) three   d) four

9) $5237_{(8)}$ =

    a) $2719_{(10)}$ b) $2718_{(10)}$ c) $2720_{(10)}$ d) $2721_{(10)}$

10) The binary number 101.11 is equivalent to decimal number

    a) 5.75   b) 5.76   c) 5.77   d) 5.74

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

  1) Write in degree and out degree of each vertex of the following graph.
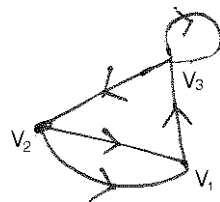
  2) Define complete bipartite graph with example.

  3) Define ring sum of two graphs with example.

  4) Define Eulerian graph.

  5) Convert $101.1101_{(2)}$ to decimal.

  6) Define cut vertex with example.

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

  1) Find all cut-vertices of the graph.
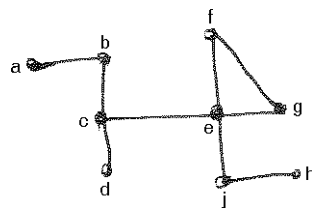
  2) Convert $DAD_{(16)}$ to octal.

  3) Write incidence matrix for the graph G.
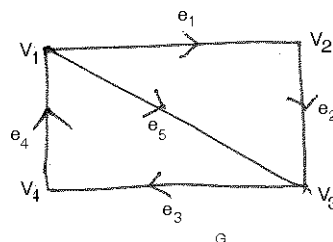
B) Show that following graphs are isomorphic. **4**
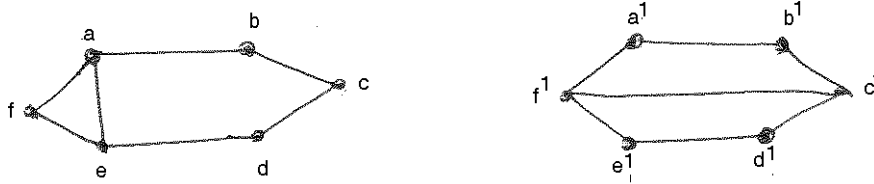
4. Attempt **any two** of the following **10**

   1) Convert decimal number 511.78125 to binary equivalent.

   2) Find minimal spanning tree of the graph G using prim's algorithm.
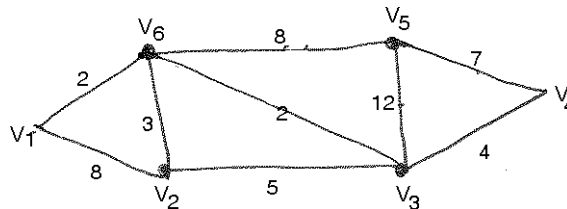
   3) Find complement of the following graphs.
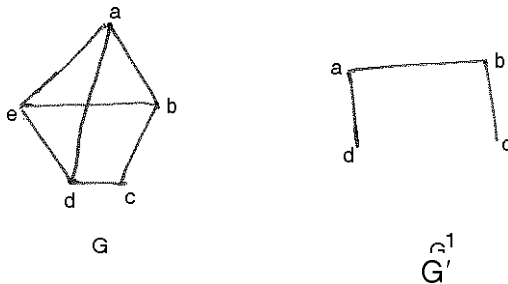
5. Attempt **any one** of the following : **10**

   1) Determine a shortest path between vertex a to z for the graph by using algorithm.
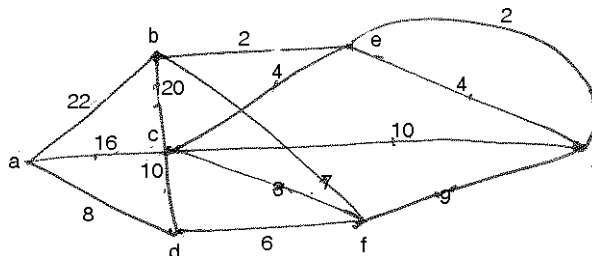
   2) i) A simple graph G has a spanning tree iff G is connected.

      ii) Convert the decimal number 15321.3 to hexadecimal.

_____

SLR-C – 193

Seat No.	

B.Sc. (Part– III) (Sem. – VI) Examination, 2014
(Special Paper – XVI) : GEOLOGY
Economic Geology

Day and Date : Tuesday, 15-4-2014   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 answers :   **10**

   1) The best example of magmatic segregated ore is _____ deposits.

      a) Bauxite   b) Iron

      c) Chromium   d) Phosphate

   2) In a complex pegmatite, the zone that is richest in economic minerals is _____ zone.

      a) Border   b) Wall

      c) Intermediate   d) Core

   3) The Indian gold deposits are of _____ origin.

      a) Epithermal   b) Mesothermal

      c) Hypothermal   d) Xenothermal

   4) A typical bauxite deposit has

      a) A laterite capping and lithomarge base

      b) A lithomarge capping and laterite base

      c) A limonite capping and laterite base

      d) None of the above

   5) Kudremukh in Karnataka is famous for _____ deposits

      a) Copper   b) Haematite

      c) Magnetite   d) Ilmenite

6) Malachite has the formula

    a) $CuCO_3.2Cu(OH)_2$ b) $Cu\,CO_3.Cu(OH)_2$

    c) $2CuCO_3.Cu(OH)_2$ d) $2CuCO_3.2Cu(OH)_2$

7) The chemical composition of chromite is

    a) Cr_2O_3 b) Cr_2O_4

    c) $2FeO.Cr_2O_3$ d) $FeCr_2O_4$

8) Which of the following is hydrous mica ?

    a) Muscovite   b) Illite

    c) Montmorillonite   d) All above

9) Plaster of paris is represented as

    a) $CaSO_4.2H_2O$ b) $CaSO_4.H_2O$

    c) $2\,CaSO_4.2H_2O$ d) $CaSO_4.^1/_2\,H_2O$

10) Which of the following is an ore of tungsten

    a) Scheelite   b) Tungstenite

    c) Wolframite   d) Hubnerite

2. Write note on **any five** of the following :   **10**

   1) Hydrothermal deposits

   2) Replacement deposits

   3) Early-magmatic deposits

   4) Tenor

   5) Fissure-vein deposits

   6) Minerals.

3. A) Write in brief on **any two** of the following :   **6**

   1) Occurrence of chromite

   2) Copper deposits of India

   3) National Mineral Policy, 1990

B) Write the answers : **4**

1) Indian coal deposits

2) Gem-stones.

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

1) Radio-Active mineral deposits of India.

2) Iron ore deposits of India.

3) Manganese ore deposits of India.

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

1) Oxidation and supergene enrichment deposits.

2) Explain the formation of late magmatic deposits.

3) The process of residual concentration.

———————————

Seat No.

B.Sc. – III (Semester – VI) Examination, 2014
MICROBIOLOGY
Medical Microbiology (Special Paper – XVI)

Day and Date : Tuesday, 15-04-2014   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. Rewrite the sentences by selecting **correct** alternative.   **10**

    i) Vibrio cholerae was discovered by _____
        a) Metchnikoff   b) Koch
        c) John Snow   d) Virchow

    ii) Leprosy spreads by _____
        a) Droplets   b) Contacts   c) Mosquitoes   d) Blood

    iii) Virus causing rabies is _____
        a) Toga virus   b) Paramyxovirus
        c) Retrovirus   d) Rhabdovirus

    iv) In Rabies Negribodies are demonstrated by using _____
        a) Seller's technique   b) Semnle's technique
        c) Widal test   d) Sailors technique

    v) Culture medium for clostridial species is _____
        a) Mac Conkey's agar   b) Robertson's cooked meat medium
        c) Lowenstein Jensen's medium   d) Sabourauds agar

    vi) Treponema pallidum was discovered by _____
        a) Schaudinn and Hoffmann   b) Robert Koch
        c) Louis Pasteur   d) Edward Jenner

    vii) Screening test of AIDS is _____
        a) Widal test   b) Karpus test   c) VDRL test   d) ELISA test

    viii) In Malaria the parasite is seen in _____

        a) Erythrocyte   b) Eosinophil   c) Plasma cell   d) Neutrophil

    ix) Moniliasis is caused by _____

        a) Aspergillus Spp   b) Pseudomonas aeruginosa

        c) Candida albicans   d) Vibrio cholerae

    x) Streptomycin is obtained from _____

        a) Proteus Vulgaris   b) Streptococcus spp

        c) Streptomyces griseus   d) S. Aureus

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

    i) Transmission of hepatitis.

    ii) What is hydrophobia ?

    iii) Mode of transmission of HIV.

    iv) Define - 'Biological weapons'.

    v) Define - Drug resistance.

    vi) Give examples of antimicrobial drugs acting on cell wall.

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

    i) Pigments produced by Pseudomonas.

    ii) Treatment of cholera.

    iii) List out various infections caused by candida albicans.

  B) Write a note on - 'Structure of HIV'.   **4**

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

    i) Write an essay on leprosy.

    ii) Explain life cycle of Plasmodium falciparum.

    iii) Give symptoms, laboratory diagnosis and control of disease caused by klebsiella pneumoniae.

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

    i) Give symptoms, lab diagnosis and control of disease caused by pseudomonas aeruginosa.

    ii) Give characteristics, symptoms and control of disease caused by clostridium perfringens.

    iii) Write an essay on 'candidiasis'.

_____

Seat	
No.	

B.Sc. – III (Semester – VI) Examination, 2014
COMPUTER SCIENCE (Special Paper – XVI)
Data Communications and Networking – II

Day and Date : Tuesday, 15-4-2014   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 alternatives :   **10**

   1) User authentication and nonrepiduation is handled in _____ layer.
     a) Data link   b) Network   c) Transport   d) Application

   2) _____ allows user to monitor and control printing in windows server 2003.
     a) WMI   b) GUI
     c) API   d) None of the above

   3) _____ server is a web indexing and search system designed for small networks or intranets.
     a) Samba   b) Tux   c) Dig   d) Squid

   4) A repeater takes a weakened or corrupted signal and _____ it.
     a) Amplified   b) Regenerates
     c) Resamples   d) Reroutes

   5) The combination of an IP address and a port number is called a _____
     a) Transport number   b) Emphemeral port number
     c) Well known port number   d) Socket address

   6) _____ partition has no mount point in Linux Server.
     a) Swap   b) Root   c) Boot   d) Home

   7) _____ members can go anywhere in the enterprise network.
     a) Gobal Group   b) System group
     c) Universal   d) Security group

8) Firewalls are installed in _____ layer to keep good packets and bad packets out.

a) Network   b) Data link   c) Transport   d) Application

9) _____ is the acquisition of information about an object without making physical contact with the object.

a) Wi-Fi   b) Remote sensing
c) VPN   d) Virtual LAN

10) _____ is a combination of FTP and SMTP.

a) WWW   b) DNS   c) HTTP   d) ARP

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

1) Mention the types of user profiles in Windows Server 2003.

2) What is a anonymous FTP ?

3) Mention user del command in Linux.

4) What is a transposition cipher ?

5) Which are the various cells used in GSM ?

6) Which are the various roles of server in Windows Server 2003 ?

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

1) Which are various services offered by GPRS ?

2) Explain limitations of Firewall.

3) Explain classful addressing.

B) How can you configure local user accounts in Windows Server 2003 ?   **4**

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

1) Virtual LAN

2) Digital signature

3) ARP.

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

1) Samba Server

2) Hardware profile of Windows Server 2003

3) MPEG video compression.

_____

Seat No.

B.Sc. – I (Semester – I) (Old) Examination, 2014
CHEMISTRY (Paper – I)
Physical Chemistry

Day and Date : Wednesday, 4-6-2014　　　　　　　　　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.
　　　　　　　　4) ***Use*** of logarithemic table and scientific calculator is ***allowed***.
　　　　　　　　　(At.Wts. H = 1, C = 12, O = 16, N = 14, Na = 23, Cl = 35.5)

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

　　1) Decomposition of an oxalic acid is an example of
　　　　a) zero order reaction　　　　　　b) first order reaction
　　　　c) second order reaction　　　　　d) third order reaction

　　2) The curves representing variations of volume and pressure at constant temperature are called
　　　　a) isotherms　　　　　　　　　b) isohors
　　　　c) isobars　　　　　　　　　　d) isotons

　　3) Y = MX, is the equation of
　　　　a) straight line intercept on Y axis
　　　　b) straight line passing through origin
　　　　c) straight line with negative slope
　　　　d) none of these

　　4) In chemical kinetics half change method is used to determine the _____ of a reaction.
　　　　a) molecularity　　　　　　　b) order
　　　　c) both molecularity and order　　d) rate constant

5) For an adiabatic change

   a) q = w   b) q ≠ 0   c) q = 1   d) q = 0

6) The parameter z is used to compare deviations of gases from ideal behaviour is called

   a) gas constant   b) critical constant

   c) compressibility factor   d) Van der Waal's constant

7) Derivative of constant term is

   a) zero   b) one   c) two   d) one half

8) The units of rate constant for a first order reaction are

   a) $mol.dm^3.sec^{-1}$.   b) sec.

   c) $dm^3.mol^{-1}.sec^{-1}$.   d) sec^{-1}.

9) Carnot's cycle is represented by plotting

   a) temperature against volume

   b) pressure against temperature

   c) pressure against volume

   d) none of these

10) Van der Waal's equation explains the behaviour of

   a) mixture of gases   b) ideal gas

   c) real gas   d) none of these

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

   1) Define the terms :

     a) Slope

     b) Intercept.

   2) What are the essential conditions for liquefaction of gases ?

   3) A first order reaction is half completed in 30 minutes. Calculate velocity constant of a reaction.

   4) What are the causes of deviations of gases from ideal behaviour ?

   5) Give two statements of second law of thermodynamics.

   6) Using equation $\dfrac{1}{(a-x)} = kt + \dfrac{1}{a}$, plot a graph of $\dfrac{1}{(a-x)}$ against t. Find the value of slope.

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

   1) Distinguish between order and molecularity of a chemical reaction.

   2) Give different forms of straight line equation.

   3) A heat engine working between 400 K and 300 K. Calculate % efficiency of the engine.

   B) Show that the reaction between $K_1S_2O_8$ and KI is a second order reaction. **4**

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

   1) What is zero reaction ? Explain with suitable example.

   2) Define the terms :

      a) Integration

      b) Derivation.

      Give simple rules of each.

   3) Following results were obtained for the decomposition of ammonia at constant temperature.

Initial pressure $(p \times 10^5)P_0$	0.0658	0.132	0.263
Half change period (min.)	3.520	1.820	0.960

   Find the order of a reaction.

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

   1) What is spontaneous and non-spontaneous processes ? Discuss with examples.

   2) What is an isotherm ? Explain Andrew's isotherms for CO_2.

   3) Discuss kinetics of decomposition of nitrogen pentoxide.

_____

Seat
No.

B.Sc. – I (Semester – I) Examination, 2014
GEOLOGY (Paper – I) (Old)
Introduction to General Geology

Day and Date : Friday, 13-6-2014   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. Fill in the blanks with correct answers :   **10**

   1) The "Nebular Hypothesis" was proposed by
      a) Kant   b) Kant and Laplace
      c) Laplace   d) None of these

   2) The continents are _____ features on the earth.
      a) 3rd order   b) 2nd order
      c) 1st order   d) None of the above

   3) The opening through which steam, gases and vapour is ejected known as
      a) Solfataras   b) Fumeroles
      c) Geysers   d) All the above

   4) Recent volcanic activity in India took place at
      a) West Bengal   b) Bihar
      c) Barren Island   d) Narcondam

   5) Farthest planet to the sun in the solar system is _____
      a) Pluto   b) Jupiter   c) Earth   d) Mercury

   6) A group of stars and constellation is called as
      a) Solar system   b) Black hole
      c) Galaxy   d) All the above

P.T.O.

7) The orbit of all the planets fall in the same plane except the orbit of

    a) Pluto   b) Venus   c) Jupiter   d) Saturn

8) _____ is the fast moving planet of our solar system.

    a) Saturn   b) Neptune   c) Jupiter   d) Earth

9) The shooting star is a _____

    a) Comet   b) Asteroid   c) Meteorite   d) Meteor

10) Big-bang theory explains the origin of

    a) Earth   b) Moon   c) Galaxy   d) Universe

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

    1) Properties of seismic waves

    2) Major planets

    3) Physical features of the earth

    4) Scope of geology

    5) Physical data of the earth

    6) Geysers.

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

    1) Causes of earthquake

    2) Volcanic belt

    3) Nebular's Hypothesis

  B) Write notes on :   **4**

    1) Mantle of the earth

    2) Theories of origin of earth.

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

    1) Interior of the earth

    2) Types of eruption with location

    3) Products of volcano.

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

    1) Principal division of the earth

    2) Hypsographic curve

    3) Hot springs with location .

_____

SLR-C – 21

Seat No.	

B.Sc. – I (Semester – I) (Old) Examination, 2014
MICROBIOLOGY (Paper – I)
Fundamentals of Microbiology

Day and Date : Friday, 13-6-2014   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 following sentences by selecting correct answer from the given alternatives.   **10**

   i) _____ is structural component of cell membrane.

     a) phospholipid   b) amino sugar

     c) polysaccharide   d) protein

   ii) 1 micron = _____ cm.

     a) 10^{-6} b) 10^{-3}

     c) 10^{-9} d) 10^{-5}

   iii) _____ is discovered by Ivanowsky.

     a) HAV   b) HIV

     c) TMV   d) HBV

   iv) _____ increases virulence of bacteria.

     a) capsule   b) cell wall

     c) nuclear material   d) cytoplasm

   v) _____ observed bacteria first time under microscope.

     a) Robert Hook   b) Louis Pasteur

     c) Lister   d) Antony Van Leeuwen Hock

   vi) The flagellar arrangement in which the flagella are present all over the cell is called

     a) monotrichous   b) Lophotrichous

     c) Amphitrichous   d) Peritrichous

   vii) The percentage of _____ is more in the cell wall of gram negative bacteria.

     a) Peptidoglycan   b) Teichoic acid

     c) Lipid   d) Polysaccharide

                                                        P.T.O.

viii) Rickettsia show characteristics of both bacteria and
   a) Yeast
   b) Protozoa
   c) Viruses
   d) Fungi

 ix) Fluid mosaic model explains the structure of
   a) Capsule
   b) Cell membrane
   c) Cell wall
   d) Flagella

  x) Methanogenic bacteria is an example of
   a) Actinomycetes
   b) Rickettsia
   c) Archae bacteria
   d) Mycoplasma

2. Answer in short (**any five**) :   **10**
   i) Define taxonomy
   ii) Functions of pili
   iii) Soil Microbiology
   iv) Joseph Lister
   v) Define fermentation
   vi) Mention shapes of bacteria.

3. A) Answer in brief (**any 2**) :   **6**
      i) Contribution of Robert Koch
     ii) Ribosomes
     iii) Structure of flagella.

   B) Draw a well labelled diagram of eukaryotic cell.   **4**

4. Describe **any two** of the following :   **10**
   i) General characteristics of actinomycetes
   ii) Structure of bacteriophage
   iii) Differentiate between procaryotic and eukaryotic cell.

5. Answer **any two** of the following :   **10**
   i) Functions of cell wall
   ii) General principles of bacterial nomenclature
   iii) Contribution of Louis Pasteur.

_____

Seat No.

B.Sc. – I (Semester – I) (Old) Examination, 2014
ELECTRONICS
Digital Fundamentals (Paper – II)

Day and Date : Saturday, 14-6-2014

Max. Marks : 50

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

N.B. : 1) **All** questions are **compulsory**.

2) Draw figures **wherever** necessary.

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

   1) The base of the hexadecimal number system is _____

      a) 2 b) 8 c) 10 d) 16

   2) The binary equivalent of decimal number $(36)_{10}$ is _____

      a) 111100 b) 100000 c) 100010 d) 100100

   3) The excess 3 code for decimal number $(86)_{10}$ is _____

      a) 1000 0110 b) 1011 1001 c) 1000 1110 d) 1111 1001

   4) The IC 7404 is a _____ gate.

      a) NOT b) AND c) OR d) XOR

   5) _____ gate is used as a universal building block.

      a) AND b) OR c) XOR d) NAND

   6) $A.\overline{A} =$ _____

      a) 0 b) 1 c) A d) $\overline{A}$

   7) Half adder adds _____ bits at a time.

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

   8) Octet eliminates _____ variables in K-map.

      a) 2 b) 3 c) 4 d) 5

   9) When inputs are same the output of XOR gate is _____

      a) 0 b) 1 c) 10 d) 11

   10) In NOR gate _____ follows _____ gate.

      a) AND, NOT b) OR, NOT c) AND, OR d) OR, AND

P.T.O.

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

   i) What is octal number system ?

   ii) Convert decimal number $(26)_{10}$ in to equivalent hexadecimal number.

   iii) Draw the logic diagram of $Y = A\overline{B} + \overline{A}B$.

   iv) Explain signed binary numbers.

   v) Simplify using laws and rules of Boolean algebra.

   $A(\overline{A} + B) = AB$.

   vi) Define logic family.

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

   i) Explain 1's compliment, solve using 1's compliment.

   $(11101)_2 - (10100)_2$

   ii) Explain 8421 code. Solve following example using 8421 code.

   $(26)_{10} + (36)_{10}$

   iii) Explain AND gate using NAND gate.

   B) Explain working of Half subtractor with logic diagram. **4**

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

   i) State and prove De-Morgan's theorems.

   ii) Simplify the following logic equation using K-map.

   $Y = \overline{A}\,\overline{B}\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}D + \overline{A}\,\overline{B}CD + \overline{A}\,\overline{B}C\overline{D} + AB\overline{C}\,\overline{D} + AB\overline{C}D + ABCD + ABC\overline{D} + A\overline{B}CD + A\overline{B}C\overline{D}$.

   iii) Explain how XOR gate can be used as a parity checker.

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

   i) Explain parallel binary adder.

   ii) Explain 2 input TTL NAND gate.

   iii) Explain Excess .3 code. Solve following example using excess 3 code.

   $(36)_{10} + (46)_{10}$.

   _____

SLR-C – 24

B.Sc. (Part – I) (Semester – I) (Old) Examination, 2014
GEOLOGY (Paper – II)
Mineralogy and Palaentology

Day and Date : Saturday, 14-6-2014   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. Fill in the blanks with correct answer from the given options :   **10**

    1) (OH) and F ions are constituent of _____ group of minerals.
      a) Mica   b) Felspar   c) Amphibole   d) Pyroxene

    2) Olivine mineral mainly occurs in
      a) Granite   b) Dunite   c) Sandstone   d) Marble

    3) _____ is important property for ore minerals.
      a) Colour   b) Cleavage   c) Streak   d) Fracture

    4) $K.Al.Si_3O_8$ is composition of
      a) Plagioclase   b) Muscovite   c) Augite   d) Orthoclase

    5) Actinolite mineral belongs to _____ group.
      a) Amphibole   b) Pyroxene   c) Felspar   d) Mica

    6) The main characteristic of fossil is its preservation in
      a) Soil   b) Sediments   c) Groundwater   d) Lava

    7) Gastropod shell is
      a) Bivalved   b) Equilateral   c) Univalved   d) Inequilateral

    8) Fossil ogygia belongs to
      a) Arthropoda   b) Anthozoa   c) Gastropoda   d) Cephalopoda

P.T.O.

9) Plant leaves are preserved in _____ rocks.
   a) Arenaceous   b) Rudaceous   c) Lava   d) Argillaceous

10) In _____ the form of umbo is winglike projection.
   a) Pecten   b) Trigonia   c) Graphea   d) Cardita

2. Answer **any five** of the following :   **10**
   a) Augite
   b) Colour of mineral
   c) Hardness
   d) Body whorl of gastropod
   e) Thorax of trilobite
   f) Index fossil.

3. A) Answer **any two** of the following :   **6**
   a) Physical properties of felspar group
   b) Olivine group
   c) Lustre and its types.

   B) What is fossil ? Explain conditions for fossilisation.   **4**

4. Answer **any two** of the following :   **10**
   a) Describe fracture, cleavage and their types with example.
   b) Describe physical properties, varities and occurrence of mica group of minerals.
   c) Four forms of minerals with example.

5. Explain **any two** of the following :   **10**
   a) Uses of fossils
   b) Morphological characters of lamellibranchia.
   c) Modes of fossil preservation.

————————

Seat No.

B.Sc. – I (Semester – I) (Old) Examination, 2014
MICROBIOLOGY (Paper – II)
Microbial Techniques

Day and Date : Saturday, 14-6-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the following sentences by selecting correct option from the given :   **10**

   1) The microscope is a basic tool used to _____ the image of small objects.

   a) Reduce   b) Retard   c) Magnify   d) Retain

   2) The oil immersion lens has N.A. of the value _____

   a) 1.1μ b) 0.25μ c) 0.65μ d) 1.4μ

   3) A substance which increases affinity of stain for object is called _____
   a) Mordant   b) Stain
   c) Chromophore   d) Auxochrome

   4) _____ is an example of acidic stain.
   a) Crystal violet   b) Congo red
   c) M. blue   d) Basic fuchsin

   5) ZNCF is used as a primary stain in _____ staining.

   a) Grams   b) Capsule   c) Acid-fast   d) Negative

   6) The volutine granules are composed of _____
   a) Polyphosphate   b) Polypeptide
   c) Polysaccharide   d) Poly B hydroxy butyrate

   7) The temperate of 121.5°C in an autoclave is achieved at _____ pressure.

   a) 5 lb   b) 15 lb   c) 20 lb   d) 10 lb

   8) _____ of embryonated chicken egg is not used for cultivation of organisms.
   a) Embryo   b) Yolk sac
   c) Chorioallantoic membrane   d) Shell

P.T.O.

9) The addition of _____ makes blood agar enriched medium.

   a) Blood   b) Hemoglobin   c) Serum   d) Plasma

10) The gas pack jar is not suitable to allow growth of _____ organisms.
   a) Aerobic   b) Facultative anaerobic
   c) Strict anaerobic   d) Microaerophilic

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

   i) Write in short about bright field microscope.

   ii) Write functions of condenser.

   iii) What is plasmolysis ?

   iv) Write functions of mordant.

   v) What is a dye ?

   vi) What is the use of U.V. radiations ?

3. A) Answer **any two** of the following :   **6**
   i) Write on magnification of light microscope.
   ii) Give an account of hot air oven.
   iii) Write on sterilization by heavy metals.

   B) Give an account of animal tissue culture.   **4**

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

   i) Give an account of numerical aperture and resolving power of light microscope.

   ii) Write on capsule staining by Maneval's method.

   iii) Give an account of filtration as a method of sterilization.

5. Answer **any two** of the following :   **10**
   i) Give an account of semisynthetic media.
   ii) Describe streak plate method for isolation of pure culture.
   iii) Explain the methods for maintenance of pure culture by freezing, soil stock and paraffin method.

_____

Seat No.

B.Sc. – I (Sem. – II) Examination, 2014
CHEMISTRY (Paper – III) (Old)
Organic Chemistry

Day and Date : Friday, 9-5-2014　　　　　　　　　　　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 correct alternative for each of the following :　　　　**10**

　 1) A carbon atom which is attached to four different atoms or groups is known as _____
　　　a) primary carbon atom　　　　b) secondary carbon atom
　　　c) symmetric carbon atom　　　d) asymmetric carbon atom

　 2) Carbocations are _____ species.
　　　a) electron rich　　　　　　　b) electron deficient
　　　c) neutral　　　　　　　　　d) free radical

　 3) Decarboxylation of carboxylic acid involves _____
　　　a) removal of OH group　　　　b) removal of CHO group
　　　c) removal of CO_2　　　　　d) removal of CH_3CO-group

　 4) Alkenes on catalytic hydrogenation give _____
　　　a) aldehydes　　b) ketones　　c) alkanes　　d) alkynes

　 5) All carbon atoms of benzene are _____
　　　a) sp hybridised　　　　　　　b) sp^2 hybridised
　　　c) sp^3 hybridised　　　　　d) $d^2 sp^3$ hybridised

　 6) The bond angle in acetylene molecule is _____
　　　a) 109.5°　　　b) 120°　　　c) 180°　　　d) 240°

　 7) 1, 3 butadiene is an example of _____
　　　a) conjugated diene　　　　　b) isolated diene
　　　c) cumulated diene　　　　　　d) homocyclic diene

8) Which of the following atom or group shows-I effect ?

   a) CH_3 b) C_2H_5 c) Na   d) Cl

9) Racemic modification is an _____ mixture of d and l isomers.

   a) equal weight   b) equimolar

   c) equivolume   d) none of these

10) Resonance is represented by _____

   a) half headed arrow   b) single headed arrow

   c) double headed arrow   d) curved arrow

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

  i) Write Friedel-Craft's acylation reaction of benzene. Which electrophile is involved in this reaction ?

  ii) What is dehydrohalogenation reaction ? Give suitable example.

  iii) Define :

    a) bond angle

    b) bond length.

  iv) State Huckel's rule and explain it in short.

  v) $CH_3\ CH = CH_2 + HBr$ propene

$$\begin{array}{l} \xrightarrow[\text{Peroxide}]{\text{NO}} A \\[2em] \xrightarrow[H_2O_2]{\text{Peroxide}} B \end{array}$$
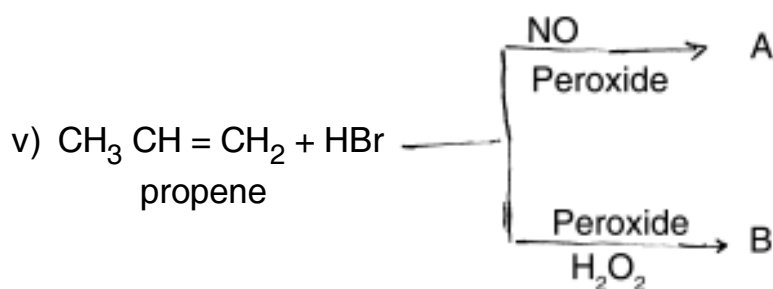
    In above reaction what is A and B ?

  vi) Define the term hybridization ? What are different types of hybridization ?

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

   i) Define mesomeric effect. Explain types of mesomeric effect with suitable examples.

   ii) Define and explain addition reactions.

   iii) What happens when :
      a) ethylene is treated with water in presence of H_2SO_4
      b) ethylene is treated with cold aqueous $KMnO_4$ solution
      c) ethylene is treated with perbenzoic acid.

   B) Discuss optical isomerism in 2, 3 dihydroxy butanoic acid. **4**

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

   i) Explain steric effect with respect to mesitoic acid.

   ii) What is conjugated diene ? Give any two methods of preparation of 1, 3 butadiene.

   iii) Discuss the free radical mechanism for chlorination of methane.

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

   i) Discuss mechanism of halogenation of benzene.

   ii) Explain homolytic and heterolytic bond fission with suitable example.

   iii) What is geometrical isomerism ? Explain its cause. What are the necessary conditions for exhibiting geometrical isomerism ? Give suitable examples.

_____

SLR-C – 30

B.Sc. I (Semester – II) Examination, 2014
COMPUTER SCIENCE (Paper – IV) (Old)
Programming Using 'C' – II

Day and Date : Saturday, 10-5-2014   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) If function does not return any value then its return type is _____

      a) int   b) char   c) float   d) void

   2) _____ storage class helps in faster execution.

      a) auto   b) register   c) static   d) extern

   3) Value contained in the pointer is nothing but _____ of another variable.

      a) name   b) value   c) address   d) none

   4) _____ is the user defined data type.

      a) structure   b) union   c) both a & b   d) none

   5) _____ function is used to release the dynamically allocated memory.

      a) malloc( )   b) calloc( )   c) alloc( )   d) free( )

   6) The parameters which are used at function call are called as _____
      parameters.

      a) actual   b) formal   c) dummy   d) none

   7) _____ operator is used to declare pointer variable.

      a) &   b) #   c) *   d) +

   8) The same variable names can be used in different function body.

      a) true   b) false

   9) 'C' program may contain more than one main( )

      a) true   b) false

   10) One pointer can not hold address of another pointer.

      a) true   b) false

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

   1) Define "Function".

   2) Define "Pointer".

   3) List out any four functions which belongs to alloc.h header file.

   4) Define the term – local and global variable.

   5) Define "Structure".

   6) What is Recursion ?

3. A) Answer **any two** of the following : **6**
   1) Write short note on 'sizeof' operator.
   2) What is static and dynamic memory allocation ?
   3) Explain 'extern' storage class.

   B) Write a program to check entered number is Armstrong or not by using any type of user defined function. **4**

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

   1) What is array of structure ? Explain with example.

   2) What is file ? Explain any two file handling functions.

   3) Write a program to check entered number is positive or negative by using pointer.

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

   1) What is call by value and call by pointer ?

   2) Explain different file opening modes.

   3) Write short note on "Nested structure".

——————————

Seat
No.

B.Sc. – I (Semester – II) Examination, 2014
PHYSICS (Paper – III) (Old)
Classical Thermodynamics

Day and Date : Monday, 12-5-2014　　　　　　　　　　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) According to Van der Waal's equation $V_c = $ _____

　　a) 2b　　　　　b) 3b　　　　　c) 4b　　　　　d) 5b

　ii) Internal friction of He II decreases rapidly with _____ in temperature.

　　a) Increase　　　　　　　　　b) Decrease

　　c) Constant　　　　　　　　　d) None of the above

　iii) Any device which converts heat into mechanical work is called as _____

　　a) Refrigerator　　　　　　　b) Diesel engine

　　c) Heat engine　　　　　　　d) Auto generator

　iv) In an isothermal process _____ remains constant.

　　a) Pressure　　　　　　　　　b) Temperature

　　c) Volume　　　　　　　　　d) Pressure and temperature

　v) The coefficient of self diffusion of a gas (D) is related to its coefficient of viscosity (η) as _____

　　a) $D \, \alpha \, \eta$　　　　b) $D = \dfrac{1}{\eta}$　　　　c) $D = \sqrt{\eta}$　　　　d) $D = \eta^{2/3}$

vi) According to second law of thermodynamics, heat by itself cannot pass from _____ body.

   a) Colder to warmer   b) Warmer to colder

   c) Lighter to heavy   d) Heavy to lighter

vii) All natural process taking place in the universe are _____

   a) Reversible   b) Irreversible

   c) Isothermal   d) Adiabatic

viii) The ratio of critical temperature to critical pressure in case of a gas is equal to _____

   a) $\dfrac{8b}{R}$ b) $3b$ c) $\dfrac{8}{3}$ d) $\dfrac{R}{8b}$

ix) Entropy in any natural process tends to _____

   a) Decrease

   b) Increase

   c) Remain constant

   d) Varies exponentially

x) Effect which undergoes during adiabatic expansion of gas is _____

   a) Joule effect   b) Thomson effect

   c) Joule-Thomson effect   d) Kelvin effect

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

   i) Give an account of third law of thermodynamics.

   ii) What is entropy ? Give its physical significance.

   iii) What are the reduced pressure, volume and temperature ?

   iv) State the types of transport phenomena in a gas.

   v) Give an account of thermodynamic equilibrium.

   vi) Define the first law of thermodynamics.

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

    i) Derive an equation for mean free path as given by Claussius.

    ii) Show that entropy increases during heat conduction.

    iii) In Carnot's engine the source is at a temperature 400°C and sink at temperature 100°C. What is efficiency ?

  B) Derive expression for critical pressure of a gas starting from Van der Waal's equation.   **4**

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

    i) What is Mechano-Caloric effect ?

    ii) Derive an expression for work done in isothermal change.

    iii) Describe Andrew's experiment in brief. Discuss the nature of Andrew's isotherms.

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

    i) Show that coefficient of viscosity of gas $\eta = \dfrac{1}{3}\rho\, \bar{c}\lambda$.

    Hence show that coefficient of viscosity is

      a) Directly proportional to square root of absolute temperature.

      b) Independent of pressure.

    ii) With the Schematic diagram, describe Linde's method of liquefaction of air.

—————————————

SLR-C – 33

B.Sc. (Part – I) (Semester – II) Examination, 2014
PHYSICS (Old)
Paper – IV : Electrisity, Magnetism and Electronics

Day and Date : Tuesday, 13-5-2014   Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

Instructions : 1) ***All*** questions are ***compulsory*** carrying ***equal*** marks.
               2) Draw ***neat*** labelled diagram ***wherever*** is required.
               3) ***Use*** of calculator and logtable is ***allowed***.
               4) Write only answers of ***objective*** type question. No need of
                 rewriting the ***complete*** sentence.

1. Choose the correct answer from the given alternatives :   **10**

    1) During the discharging of condensor, time taken to decay the charge up to
       _____ times of its maximum storing capacity is called as time constant.
       a) 0.632   b) 0.368   c) 0.638   d) 0.362

    2) At series resonance, in LCR AC series circuit
       a) Current lags behind applied voltage
       b) Current and applied voltage are in the same phase
       c) Current leads ahead than applied voltage
       d) Phase angle is 90 degree

    3) Reciprocal of reactance is called
       a) resistance   b) succeptance   c) impedance   d) admittance

    4) In LCR series circuit, at resonance current is
       a) minimum   b) maximum   c) zero   d) infinite

    5) Figure of merite of Ballastic Galvanometer is measured in
       a) $mm/\mu A$ b) $\mu A/mm$ c) $mm/\mu V$ d) $\mu V/mm$

    6) The frame of coil of Deadbeat Galvanometer is made up of
       a) Ebonite   b) Suitable metal
       c) Bamboo   d) Ivery

7) Width of depletion layer in junction diode is
   a) directly preportional to dopping concentration
   b) inversely preportional to dopping concentration
   c) more
   d) smaller

8) In transistor _____ layer is highly dopped.
   a) Collector   b) Emitter
   c) Base   d) Semiconducting

9) Frequency of Direct current is
   a) Finite   b) Zero   c) 50 Hz   d) 60 Hz

10) A transistor as an amplifier in common emitter mode the phase change between input and output is
   a) Zero degree   b) 180 degree   c) 90 degree   d) 360 degree

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

   i) What is Admittance ? Give its unit.

   ii) What is ripple ? Give the ripple factor of bridge rectifier.

   iii) Define a time constant. Give its unit.

   iv) Define the current sensitivity of BG. Give its unit.

   v) How PNP and NPN transistor can shown by their symbols ?

   vi) What is filter ? Which filter is superior ?

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

   i) Draw circuit diagram for forward and reverse biasing of junction diode. Show graphically knee voltage and breakdown voltage.

   ii) Which is the condition for LCR series resonant circuit ? Derive the formula for series resonance frequency.

   iii) Calculate inductive reactance of a coil having self inductance of 10 mH connected to an AC source of 230 volt and 50 Hz.

   B) What is dampping in B.G. ? Which are the types of damppings in B.G. ? How the correction is made for the dampping ?   **4**

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

   i) Write short note on Owen's bridge.

   ii) Filter circuits used in DC power supply.

   iii) Resonance in LCR parallel circuit.

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

   i) Derive an expression for current at any instant flowing through LCR in series circuit. Interpret the result for various frequencies of the source and hence explain the concept of series resonance.

   ii) Derive an expression for growth of charge an condensor through resistance. Define the time constant of CR circuit.

_____

Seat No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
Paper – IV : PHYSICAL GEOGRAPHY (Old)
Oceanography

Day and Date : Tuesday, 13-5-2014   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** 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) In general, the continental shelf contributes _____ % area of the ocean floor.

      a) 10   b) 12   c) 18   d) 26

   2) Oceanography is the science which scientifically studies _____

      a) Rivers and Streams   b) Springs and Streams

      c) Oceans and Seas   d) Underground Water

   3) There are _____ major oceans on the surface of the earth.

      a) 3   b) 4   c) 5   d) 7

   4) _____ are the lines which join the places of equal depth.

      a) Isotherms   b) Isobars   c) Isohalines   d) Isobaths

   5) _____ islands of India are made up of corals.

      a) Hawaii   b) Lakshadweep

      c) Madagaskar   d) Srilanka

   6) _____ deposits of deep sea floor are known as biogeneous deposits.

      a) Organic   b) Inorganic   c) Alluvial   d) Saline

   7) Kurile is a cold current flowing along the coast of _____ ocean.

      a) N. Atlantic   b) N. Pacific   c) S. Atlantic   d) S. Pacific

8) North Pole is surrounded by _____ ocean.

   a) Indian   b) Atlantic   c) Pacific   d) Arctic

9) The earthquakes are responsible for _____ waves in the ocean.

   a) Tidal   b) Tsunami   c) Standing   d) Oscillary

10) Mariana trench is one of the deepest parts in _____ ocean.

   a) Atlantic   b) Indian   c) Pacific   d) Arctic

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

   1) What is a 'Continental Slope' ?

   2) Name the oceans of the world.

   3) What is a 'tide' ?

   4) What is the effect of Gulf stream on the coastline of NW Europe ?

   5) The Grandbanks are located in which ocean ?

   6) What is meant by salinity of ocean ?

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

   1) Describe the salinity of Atlantic Ocean.

   2) Explain the Kurisio current.

   3) Describe the origin of ocean deposits.

   B) Draw a neat diagram of 'Ocean floor'.   **4**

4. Answer **any two** questions from the following :   **10**

   1) What are the causes of change in the salinity of ocean water ?

   2) Explain the subsidence theory of coral formation.

   3) State the importance of oceans to man.

5. Answer **any two** questions from the following :   **10**

   1) Describe the ocean currents in North Pacific Ocean.

   2) State the effects of temperature changes of the ocean water.

   3) Write in brief 'The Continental Shelf'.

_____

Seat No.

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

Day and Date : Thursday, 15-5-2014   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) The limits of Karl Pearson's coefficient of correlation is

      a) – 1 to 0   b) 0 to 1   c) –1 to 1   d) None of these

   ii) In Paache's price index, _____ is used as a weight.

      a) Quantity in base year   b) Quantity in current year
      c) Price in current year   d) None of these

   iii) The number of positive class frequencies for n attributes is

      a) 3^n b) 2^n c) $2^n – 1$ d) None of these

   iv) Index number of base year is always taken as

      a) 100   b) 0   c) 1   d) 50

   v) If two variables are uncorrelated then the two regression lines are

      a) Coincide
      b) Parallel to each other
      c) Perpendicular to each other
      d) None of these

   vi) Given (A) = 4, (AB) = 4 and N = 8. The coefficient of association for A and B
       is equal to

      a) – 0.8   b) 0.8   c) +1   d) –1

vii) Two independent variables are

    a) Positively correlated   b) Negatively correlated

    c) Uncorrelated   d) None of these

viii) The formula for rank correlation coefficient in case of without ties is

    a) $1 - \dfrac{6\Sigma d^2}{n^3 - n}$ b) $1 + \dfrac{6\Sigma d^2}{n^3 - n}$ c) $\dfrac{6\Sigma d^2}{n^3 - n}$ d) None of these

ix) When one regression coefficient is positive then the other would be ?

    a) Negative   b) Positive   c) 0   d) None of these

x) The value of Cov $(10x + 10, 5y + 10)$ is equal to

    a) 50 Cov (x, y)   b) 100 Cov (x, y)

    c) 15 Cov (x, y)   d) None of these

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

   i) Define (a) an attribute and (b) order of a class.

   ii) Prove that the A.M. of the regression coefficients is greater than or equal to the correlation coefficient.

   iii) Define Laspeyre's and Paasche's price index numbers.

   iv) Define a fundamental set of class frequencies with example.

   v) Explain the term 'regression'.

   vi) Define Karl Pearson's coefficient of correlation. State its limits.

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

   i) If the attributes A and B are independent then show that α and β are also independent.

   ii) Interpret the cases (a) r = + 1, (b) r = – 1 and (c) r = 0.

   iii) Explain the weighted aggregate method of calculating index number.

  B) Show that the regression coefficients are independent of change of origin but not the scale.   **4**

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

i) If $\delta = (AB) - (AB)_0$ then show that $\delta = \dfrac{(B)\ (\beta)}{N} \left\{ \dfrac{(AB)}{(B)} - \dfrac{(A\beta)}{(\beta)} \right\}$.

ii) State the equations of line of regression of Y on X and X on Y. Explain why we have two lines of regression.

iii) Explain family budget method for construction of cost of living index.

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

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

ii) Spearman's rank correlation between X and Y is 2/3. If the sum of square of differences between ranks is 55 then assuming that no rank is repeated, find the number of pairs in the series.

iii) What are the conditions of consistency for three attributes A, B and C ?

_____

Seat No.

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

Day and Date : Thursday, 15-5-2014　　　　　　　　　　Max. Marks : 50

Time : 3.00 p.m. 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 appropriate answer for each of the following and complete the sentence. **10**

　　1) Petromyzon have _____ pairs of gills.

　　　　a) Seven　　　　b) Five　　　　c) Four　　　　d) Fourteen

　　2) The subphylum vertebrata includes

　　　　a) fishes　　　　　　　　b) amphioxus

　　　　c) herdmania　　　　　　d) salpa

　　3) Heart of frog is _____ chambered.

　　　　a) one　　　　b) two　　　　c) three　　　　d) four

　　4) Uriniferous tubules of frog do not have

　　　　a) Loop of Henley　　　　b) Glomerulus

　　　　c) Proximal tubule　　　　d) Bowman's capsule

5) The proteiolytic enzymes of pancrease are

   a) Lipase   b) Trypsin and chymotrypsin

   c) Erepsin   d) Bile

6) Medulla oblongata of frog centrols

   a) memory   b) sense of smell

   c) reflexes   d) respiration and peristalsis

7) Blastula formation forms a cavity called

   a) archenteron   b) coelenteron   c) spongocoel   d) blastocoel

8) Eye of frog is protected from water by

   a) lower eye lid   b) upper eye lid

   c) both a and b   d) nictitating membrane

9) In female frog oviducts opens in

   a) uterus   b) urinary bladder

   c) collecting tubules   d) ureter

10) In Labeo _____ scales are present.

   a) cycloid   b) placoid   c) ganoid   d) ctenoid

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

   i) Describe the general characters of cephalochordata

  ii) Bile of frog

 iii) Leucocytes of frog

 iv) Homocercal tail in fishes

  v) Functions of scales in fishes

 vi) Sexual diamorphism in frog.

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

    i) Give the general characters of cyclostomata.

    ii) Describe pulmonary respiration in frog.

    iii) Describe gastric digestion in frog.

   B) Describe the process of clotting of blood in frog.   **4**

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

    i) Describe the structure of uriniferous tubule in frog.

    ii) Describe the gastrula of frog.

    iii) Describe forebrain of frog with their functions.

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

    i) Describe the male urinogenital system of frog.

    ii) Describe the internal structure of heart of frog.

———————————

SLR-C – 37

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

Day and Date : Friday, 16-5-2014   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) If $E(X) = 5$, $V(X) = 5$ then $V(X + 10)$ is

      a) 10   b) 15   c) 5   d) 0

   ii) If $\mu_1^1 = 2$ and $\mu_2^1 = 5$ then variance is

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

   iii) If X and Y are independent then

      a) $E(XY) = 0$ b) $E(XY) = E(X) \cdot E(Y)$
      c) $E(X + Y) = 0$ d) None of these

   iv) If $X \sim B\left(1^2, \frac{1}{2}\right)$ then $E\left(\frac{X - 2}{3}\right) = $ _____

      a) $\frac{1}{3}$ b) 0   c) $\frac{4}{3}$ d) 2

   v) The pgf of Bernoulli distribution is

      a) $(s + pq)$ b) $(p + qs)$
      c) $(p + s + q)$ d) $(q + ps)$

   vi) Variance of one point distribution is

      a) 1   b) 2   c) 0   d) None of these

   vii) If X and Y are independent then Cov (X, Y) is

      a) 0   b) 1   c) $V(X) + V(Y)$ d) None of these

viii) A committee of 5 persons is to be formed from a group of 10 ladies and 15 men using sampling without replacement. Then number of ladies in the committee will follow

    a) Two point distribution   b) Uniform distribution

    c) Binomial distribution   d) Hypergeometric distribution

ix) For hypergeometric distribution number of parameters are

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

x) The first factorial moment is

    a) Mean   b) Variance

    c) Median   d) None of these

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

  i) Define expectation of a r.v.X.

  ii) Define binomial distribution with one example in real life situation.

  iii) If $P_X(s)$ is the pgf of X then find pgf of X + 1.

  iv) Find mean of hypergeometric distribution.

  v) Obtain marginal distribution of X for the following joint pmf of r.v. (X, Y)

X＼Y	0	1
0	$\frac{1}{2}$	0
1	$\frac{1}{4}$	$\frac{1}{4}$

  vi) Prove $E(aX + b) = QE(X) + b$.

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

  i) The joint pmf of (X, Y) is

X＼Y	– 1	1
0	$\frac{2}{25}$	$\frac{3}{25}$
1	$\frac{8}{25}$	$\frac{12}{25}$

  Discuss independence of (X, Y).

ii) State and prove the recurrence relation for probabilities of B(n, p).

iii) Show that the pgf of the sum of two independent r.v.s is equal to the product of their pgf.

B) Prove that $V(aX + b) = a^2 V(X)$. Find $V(2X)$. **4**

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

i) The joint probability distribution of (X, Y) is given by

X \ Y	0	1	2	3
0	k	3k	2k	4k
1	2k	6k	4k	8k
2	3k	9k	6k	12k

Find :

i) k

ii) P(X = Y)

iii) P(X/Y = 1).

ii) The mean of binomial distribution is 3 and second moment about mean is 2. Find the parameters of binomial distribution.

iii) Find mean and variance of discrete uniform distribution.

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

i) If X and Y are independent random vartiables with means 10 and 20 and variances 2 and 3 respectively. Find mean and variance of (3X + 4Y).

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

$$P(x, y) = \frac{2x + 5y}{42} \qquad \begin{array}{l} x = 1, 2 \\ y = 1, 2 \end{array}$$

Find :

a) Marginal pmf of Y

b) Conditional pmf of X given Y = 2

c) E(X/Y = 2).

iii) Define two point distribution and obtain its mean and variance.

Seat No.

B.Sc. I (Semester – II) (Old) Examination, 2014
MATHEMATICS (Paper – III)
Geometry

Day and Date : Saturday, 17-5-2014
Time : 11.00 a.m. to 1.00 p.m.
Max. Marks : 50

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) If the direction cosines of op are l, m, n and if op = r then the coordinate of p are

    a) (lr, mr, nr) b) $\left(\dfrac{l}{r}, \dfrac{m}{r}, \dfrac{n}{r}\right)$ c) $\left(\dfrac{r}{m}, \dfrac{r}{n}, \dfrac{r}{l}\right)$ d) None of these

    2) The direction cosines of the line equally inclined to the coordinate axes are

    a) $\left(\pm\dfrac{1}{2}, \pm\dfrac{1}{\sqrt{2}}, \pm\dfrac{1}{\sqrt{2}}\right)$ b) $\left(\pm\dfrac{1}{\sqrt{3}}, \pm\dfrac{1}{\sqrt{3}}, \pm\dfrac{1}{\sqrt{3}}\right)$

    c) $\left(\pm\dfrac{1}{3}, \pm\dfrac{1}{3}, \pm\dfrac{1}{3}\right)$ d) None of these

    3) The direction cosines of the normals to the plane 2x – 3y + 6z = 7 are

    a) $\left(\dfrac{2}{7}, \dfrac{3}{7}, \dfrac{6}{7}\right)$ b) $\left(\dfrac{2}{7}, \dfrac{-3}{7}, \dfrac{-6}{7}\right)$

    c) $\left(\dfrac{2}{7}, \dfrac{-3}{7}, \dfrac{6}{7}\right)$ d) $\left(\dfrac{-2}{7}, \dfrac{-3}{7}, \dfrac{6}{7}\right)$

4) The equation of line passing through the point $(2, -1, 5)$ having the direction ratio's $(3, 2, 4)$ are

a) $\dfrac{x+2}{3} = \dfrac{y+1}{2} = \dfrac{z-5}{4}$

b) $\dfrac{x-2}{3} = \dfrac{y-1}{2} = \dfrac{z-5}{4}$

c) $\dfrac{x+2}{3} = \dfrac{y+1}{2} = \dfrac{z+5}{4}$

d) $\dfrac{x-2}{3} = \dfrac{y+1}{2} = \dfrac{z-5}{4}$

5) The equation of line passing through $(4, -3, 5)$ and parallel to $\dfrac{x}{2} = \dfrac{y}{4} = \dfrac{z}{3}$ are

a) $\dfrac{x-4}{2} = \dfrac{y-3}{4} = \dfrac{z+5}{3}$

b) $\dfrac{x}{2} = \dfrac{y}{4} = \dfrac{z}{3}$

c) $\dfrac{x-4}{2} = \dfrac{y+3}{4} = \dfrac{z-5}{3}$

d) $\dfrac{x-4}{2} = \dfrac{y-3}{4} = \dfrac{z-5}{3}$

6) If $\dfrac{x-x_1}{l} = \dfrac{y-y_1}{m} = \dfrac{z-z_1}{n} = r$ (say) is the equation of line then the coordinate of a point p on the line are

a) (x_1, y_1, z_1)

b) $(x_1 + lr, \ y_1 + mr, \ z_1 + nr)$

c) $(lr, \ mr, \ nr)$

d) None of these

7) The equation of the sphere whose centre at $(2, 3, -4)$ and radius 5 is

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

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

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

d) None of these

8) The angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$ is

a) $\dfrac{\pi}{6}$

b) $\dfrac{\pi}{3}$

c) $\dfrac{\pi}{4}$

d) $\dfrac{\pi}{2}$

9) The equation of sphere with given diameter whose extremities are $(-2, 4, -5)$ and $(2, -4, 5)$ is

    a) $x^2 + y^2 + z^2 = 44$ b) $x^2 + y^2 + z^2 = 45$

    c) $x^2 + y^2 + z^2 = 43$ d) $x^2 + y^2 + z^2 = 46$

10) The intersection of a sphere and a plane is

    a) a line   b) plane   c) circle   d) sphere

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

    1) Define orthogonality of two spheres.

    2) Find the centre and radius of the sphere $x^2 + y^2 + z^2 - 6x + 8y - 10z + 1 = 0$.

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

    4) Find the angle between the lines whose direction ratios are $(5, -12, 13)$ and $(-3, 4, 5)$.

    5) Find the coordinates of the point of intersection of the line $\dfrac{x+1}{1} = \dfrac{y+3}{3} = \dfrac{z-2}{-2}$

    with the plane $3x + 4y + 5z = 5$.

    6) Find the value of K if the following lines are perpendicular

    $\dfrac{x-1}{1} = \dfrac{y-2}{k} = \dfrac{z-3}{4}$ and $\dfrac{x-3}{3k} = \dfrac{y-5}{2} = \dfrac{z}{1}$.

3. A) Attempt **any two** from the following.   **6**

    1) Show that the general equation of the first degree in x, y, z represents a plane.

    2) Find the symmetrical form, the equation of the line $x + y + z + 1 = 0$, $4x + y - 2z + 2 = 0$.

    3) Find the equation of the tangent plane to the sphere.

    $x^2 + y^2 + z^2 - 6x - 4y + 10z + 12 = 0$ at $(2, -1, -1)$.

B) Find the radical plane of the sphere $x^2 + y^2 + z^2 - x + 2y - 5z + 12 = 0$ and $x^2 + y^2 + z^2 + 4x - y + 3z + 10 = 0$.   **4**

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

   1) Find the normal form of the equation of a plane.

   2) Find the equation of the line through the point (1, 2, 4) parallel to the line
       $3x + 2y - z = 4$ and $x - 2y - 2z = 5$.

   3) Find the coordinates of the points where the line $\dfrac{x+3}{4} = \dfrac{y+4}{3} = \dfrac{z-8}{-5}$ intersects
       the sphere $x^2 + y^2 + z^2 + 2x - 10y - 23 = 0$.

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

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

   2) Find the equation of the plane through the three points A (1, 1, 1), B (1, –1, 1)
       and C (–7, –3, – 5) and show that it is perpendicular to the xz-plane.

   3) Find the point of intersection of the lines.

       $\dfrac{x-4}{1} = \dfrac{y+3}{-4} = \dfrac{z+1}{7}$ and $\dfrac{x-1}{2} = \dfrac{y+1}{-3} = \dfrac{z+10}{8}$.

_____

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
BOTANY (Paper – III) (Old)
Vascular Plants

Day and Date : Saturday, 17-5-2014

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 sentences by choosing correct alternative : **10**

   1) The pteridophytes are classified into _____ divisions by Smith.

   a) Three   b) Four   c) Five   d) Six

   2) A leafless, wire like structure arising from the stem branching of <u>Selaginella</u> is called _____

   a) Rhizopus   b) Rhizophore

   c) Rhizomorph   d) Ligule

   3) In <u>Selaginella</u> a tongue like structure present at the base of leaf is called _____

   a) Stipule   b) Petiole

   c) Ligule   d) None of these

   4) In gymnosperms the seeds are _____

   a) Enclosed   b) Naked

   c) Half enclosed   d) None of these

5) Resin canals are found in _____

   a) <u>Selaginella</u>   b) <u>Mucor</u>

   c) <u>Pinus</u>   d) <u>Riccia</u>

6) In Pinus the photosynthetic leaves are _____

   a) Needle shaped   b) Scale like

   c) With broad lamina   d) Simple

7) The rules for naming the plants are framed by _____

   a) IDBI   b) ICICI   c) ISRI   d) ICBN

8) <u>Polyanthes</u> <u>tuberosa</u> belongs to the family _____

   a) Amaryllidaceae   b) Nyctaginaceae

   c) Solanaceae   d) Caesalpinaceae

9) The capitulum inflorescence is found in _____

   a) Sunflower   b) Chiana-rose

   c) Ficus   d) Cassia

10) _____ are accessory whorls of the flower.

   a) Androecium and Gynoecium

   b) Calyx and corolla

   c) Androecium and calyx

   d) Gynoecium and corolla

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

   i) Write the habit and habitat of <u>Selaginella</u>.

   ii) Draw the structure of male cone of <u>Pinus</u>.

   iii) Write floral formula of the family Solanaceae.

   iv) Write classification of <u>Selaginella</u>.

   v) Define aggregate fruit with example.

   vi) Write any two merits of Bentham and Hooker's system.

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

    i) Write the morphology of <u>Selaginella</u> sporophyte.

    ii) Describe the structure of pinus ovule.

    iii) Write the general characters of gymnosperms.

  B) Write salient features of Angiosperms. **4**

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

    i) Give distinguishing characters of the family caesalpinaceae

    ii) Write the economic importance of Gymnosperms.

    iii) Write general characters of pteridophytes.

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

    i) Describe the diversity of Angiosperms w.r.t. Habit and nutrition.

    ii) Describe the stem T. S. of <u>Selaginella</u>.

    iii) Describe the anatomy of <u>Pinus</u> needle.

_____

SLR-C – 41

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

   i) A differential equation $Mdx + Ndy = 0$ is
     a) First order and first degree   b) Second order and first degree
     c) First order and second degree   d) None of these

   ii) An expression $x^2y + 2x^3 + 3xy^2 + y^3$ is
     a) Homogeneous of second degree   b) Homogenous of third degree
     c) Non-homogeneous of 2nd degree   d) None of these

   iii) The equation $\dfrac{dx}{dy} + px = Q$ is

     a) Bernoulli's in x   b) Liner in y
     c) Linear in x   d) None of these

   iv) If the roots of an auxiliary equation are m_1, m_2 and m_3 then complementary function is
     a) $c_1e^{m_1x} + c_2e^{m_2x} + c_3e^{m_3x}$ b) $c_1e^{-m_1x} + c_2e^{m_2x} + c_3e^{m_3x}$
     c) $(c_1 + c_2x + c_3x^2)e^{mx}$ d) $c_1e^{-m_1x} + c_2e^{-m_2x} + c_3e^{-m_3x}$

   v) Differential equation of the 1st order and 1st degree is of the form

     a) $\dfrac{dy}{dx} = f(x, y)$ b) $\dfrac{dy}{dx} = \dfrac{f'(x, y)}{f''(x, y)}$

     c) $\dfrac{dy}{dx} = (ax + by + c)\dfrac{d^2y}{dx^2}$ d) $y + 4xy' + 8x^2y'' = e^x$

P.T.O.

vi) $e^{\int pdx}$ is an integrating factor of

    a) $Mdx + Ndy = 0$ b) $\dfrac{dy}{dx} + Px = Q$

    c) $\dfrac{dy}{dx} + py = Q$ d) $Pp + Qq = Rr$.

vii) If $X = x^m$ where m is +ve integer then particular integral is

    a) $\dfrac{1}{f(a)} e^{ax}$ b) $e^{ax} \dfrac{1}{f(D+a)} e^{-ax}$

    c) $[f(D)]^{-1} X^m$ d) X^m

viii) $\dfrac{1}{D^2 + 16} \cos 4x$

    a) $\dfrac{x \sin 4x}{8}$ b) $\dfrac{x \cos 4x}{16}$ c) $\dfrac{-x \cos 4x}{16}$ d) $-16 \cos 4x$

ix) The general solution of $\dfrac{d^3 y}{dx^3} - 6\dfrac{d^2 y}{dx^2} + 11\dfrac{dy}{dx} - 6y = 0$ is

    a) $y = e^x + e^{2x} + e^{3x}$ b) $y = c_1 e^x + c_2 e^{2x} + c_3 e^{3x}$

    c) $y = c_1 + c_2 x e^x + c_3 e^{2x}$ d) $y = (c_1 + c_2 x + c_3 x^2)e^x$

x) $\dfrac{1}{D^2} x^4$ is

    a) $\dfrac{x^5}{5}$ b) $\dfrac{x^6}{6}$ c) $\dfrac{x^6}{30}$ d) $\dfrac{x^6}{6!}$

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

    i) Solve $(x+1)\dfrac{dy}{dx} = 2e^{-y} - 1$.

    ii) Solve $y\, dx - x dy = 0$.

    iii) Find $\dfrac{1}{D^2 + a^2} e^{iax}$.

    iv) Solve $(D^4 - m^4)y = 0$.

v) Obtain the particular integral of $f(D)y = e^{ax}.v$ where v is function of x.

vi) Evaluate $\dfrac{1}{D+2} \sin x$.

vii) Find the solution of linear equation $\dfrac{dy}{dx} + py = Q$.

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

  i) Explain the method of solving homogeneous differential equation.

  ii) Solve $\tan y \dfrac{dy}{dx} = \sin(x+y) + \sin(x-y)$.

  iii) Solve $(D^4 + 2D^3 + 3D^2 + 2D)y = 0$.

  B) Define the Bernoulli's differential equation and explain the method of solving it.   **4**

4. Solve **any two** out of three of the following :   **10**

  i) State and prove the necessary and sufficient certain for the equation
    Mdx + Ndy = 0 to be exact.

  ii) $\dfrac{dy}{dx} - \dfrac{\tan y}{1+x} = (1+x)e^x \sec y$.

  iii) Solve $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + y = e^{2x} \sin 2x$.

5. Solve **any two** out of three of the following :   **10**

  i) Solve $\left(1+x^2\right)\dfrac{dy}{dx} + 2xy = \cos x$.

  ii) Explain the method of solving the a non-homogeneous differential equation of
    the form $\dfrac{dy}{dx} = \dfrac{ax+by+c}{a'x+b'y+c'}$.

  iii) Solve $\dfrac{d^2y}{dx^2} - y = x^2 \cos x$.

_____

SLR-C – 42

B.Sc. (Part – I) (Semester – II) (Old) Examination, 2014
BOTANY
Paper – IV : Cell Biology and Plant Biotechnology

Day and Date : Monday, 19-5-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

1. Rewrite the sentence by choosing proper answer.   **10**

   i) Nuclear membrane is absent in

     a) Prokaryotic cell   b) Eukaryotic cell

     c) Plant cell   d) Animal cell

   ii) In mitosis during _____ phase, chromosomes oriented on equatorial plane.

     a) Prophase   b) Metaphase

     c) Anaphase   d) Telophase

   iii) The cells containing single nucleus is called

     a) Mononucleate   b) Binucleate

     c) Anucleate   d) Polynucleate

   iv) In 80 S ribosome larger sub unit has _____ sedimentation coefficient.

     a) 40 S   b) 60 S

     c) 50 S   d) 30 S

   v) _____ of Golgi apparatus are central, flattened, plate like closed compartments.

     a) Cisternae   b) Tubules

     c) Vesicles   d) All of these

   vi) Catalase is present in crystalloid core of

     a) Mitochondrion   b) Chloroplast

     c) Peroxisome   d) Glyoxysome

   vii) _____ is present in only plant cells.

     a) Cell wall   b) Golgi apparatus

     c) Cell membrane   d) Mitochondrion

viii) _____ suggested Sandwich model of biological membranes.

    a) Danielli and Davson   b) Harvey

    c) Danielli and Harvey   d) Singer and Nicolson

ix) Any plant part used for tissue culture technique is called

    a) Ex-plant   b) Cell

    c) Tissue   d) Organ

x) Root nodules of leguminious plant contain _____ bacterium.

    a) Rhizobium   b) Bacillus

    c) Xanthomonos   d) Azatobacter

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

  i) Define Eukaryotic cell.

  ii) What is meiosis ? Enlist various sub phases occurring in prophase of Meiosis – I.

  iii) Draw neat and labelled diagram of nucleus.

  iv) Define apoptosis.

  v) Mention any two functions of golgi apparatus.

  vi) What is ribosome ? Enlist chemical constituents of 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 functions of cell wall.

    iii) Write in brief about multidisciplinary nature of Biotechnology.

  B) What are microbodies ? Describe the functions of peroxisomes.   **4**

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

  i) What is cell division ? Describe anaphase of mitosis.

  ii) Define tissue culture. Explain in brief the general technique of tissue culture.

  iii) What is BGA ? Explain the role of Blue Green algae in increasing the soil fertility.

5. Write short notes on **any two** of the following :   **10**

  i) Role of Rhizobium as biofertilizer

  ii) Cell cycle

  iii) Nucleosome concept.

_____

Seat No.

B.Sc. (Part – I) (Sem. – II) Examination, 2014
GEOLOGY (Paper – III) (Old)
Introduction to Physical Geology

Day and Date : Tuesday, 20-5-2014   Total 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) Dendritic drainage pattern is associated with
       a) Uniform lithology   b) Folded rock
       c) Jointed rocks   d) None of the above

   2) Hydration is the process of
       a) Addition of water   b) Removal of water
       c) Ionization of water   d) Evaporation of water

   3) Wind erosion is manifested by _____ action.
       a) Solution   b) Deflation   c) Frost action   d) Attrition

   4) _____ are the tillite deposits formed by melting of water of the glacier.
       a) Moraines   b) Varves   c) Esker   d) Kames

   5) Pointbar deposits are characteristic of _____ deposits.
       a) Wind   b) Sea   c) River   d) Glacier

   6) A product of weathering of basalt is
       a) Murum   b) Cliff   c) Tors   d) Till

   7) Parabolic dunes are generally associated with
       a) River   b) Wind   c) Glacial   d) Sea coast

8) Most susceptible mineral to weathering is
   a) Olivine   b) Augite   c) Biotite   d) Diopside

9) Crag and tail topography is produced due to the action of
   a) Sea   b) Wind   c) Stream   d) Glacier

10) Large scale wind deposits are
   a) Longitudinal dunes   b) Loess
   c) Deltas   d) Barchans

2. Answer **any five** of the following :   **10**
   a) Two erosional features of glacier.
   b) Three depositional features of river.
   c) Three depositional features of wind.
   d) Types of deltas.
   e) Bifurcation ratio.
   f) Spits and bars.

3. A) Answer **any two** of the following :   **6**
      a) Water fall   b) Tors   c) Soil profile
   B) Write the answer/notes :   **4**
      a) Hanging valley b) Yardangs.

4. Answer **any two** of the following :   **10**
   a) Define weathering. Describe physical weathering with example.
   b) Marine cycle.
   c) Depositional features produced by glacier.

5. Answer **any two** of the following :   **10**
   a) Hydrologic cycle.
   b) Describe in short the stream deposits.
   c) Describe glacial erosion.

_____

Seat No.

B.Sc. – I (Semester – II) Examination, 2014
MICROBIOLOGY (Paper – III) (Old)
Microbial Physiology

Day and Date : Tuesday, 20-5-2014   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.

3) Draw **neat** labelled diagrams **wherever** necessary.

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

   1) A protein is a polymer of _____
      a) Amino acids   b) Glucose
      c) Nucleotides   d) Vitamins

   2) The linkage present in carbohydrates is _____ linkage.
      a) Peptide   b) Glycosidic
      c) Phosphodiester   d) Ester

   3) Gelatinase enzyme acts on _____
      a) Casein   b) Pepsin
      c) Trypsin   d) Gelatin

   4) The acidic nature of DNA is due to the presence of _____
      a) Phosphate   b) Deoxyribose
      c) Ribose   d) Adenine

   5) Hexokinase enzyme helps in _____ of glucose.
      a) Lysis   b) Reduction
      c) Phosphorylation   d) Transfer

P.T.O.

6) In _____ type of relationship both the partners get benefited.

   a) Amensalism   b) Mutualism

   c) Commensalism   d) Parasitism

7) Glyceraldehyde is an example of _____ type of sugar.

   a) Triose   b) Tetrose

   c) Pentose   d) Hexose

8) One glucose molecule links with another glucose molecule by α 1-4 link to form _____

   a) Maltose   b) Sucrose

   c) Cellobiose   d) Lactose

9) The secondary structure of protein results because of _____ bonds.

   a) Hydrogen   b) Glycosidic

   c) Peptide   d) Ionic

10) The high energy compounds transfer _____ group.

   a) Sulfate   b) Phosphate

   c) Nitrate   d) Acetate

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

   i) What is a polysaccharide ? Give one example.

   ii) What is an active site of enzyme ?

   iii) Define metabolism.

   iv) What is the role of Na taurocholate ?

   v) What is amensalism ?

   vi) Write main features of TCA cycle.

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

    i) Describe DNA by specifying physical properties.

    ii) Give a brief account of classification of microorganisms based on energy source.

    iii) Describe constitutive and inducible enzymes.

  B) Give an account of common ingredients of media. **4**

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

    i) Describe structure and types of RNA.

    ii) Draw TCA cycle schematically.

    iii) Give an account of harmful associations.

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

    i) Describe growth phases of bacteria.

    ii) Give an account of high energy compound.

    iii) Give an account of rumen symbiosis.

––––––––––––

Seat No.

B.Sc. I (Semester – II) Examination, 2014
ELECTRONICS (Old)
Digital Electronics (Paper – IV)

Day and Date : Wednesday, 21-5-2014   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 alternative for the following :   **10**

    i) IC 74147 is a _____
       a) D flip flop   b) MSJK flip flop
       c) Decoder   d) Priority encoder

    ii) 16 to 1 multiplexer has _____ number of control lines.
       a) 1   b) 2   c) 3   d) 4

    iii) In RS flipflop, when R = 1, and S = 0, then flip flop in _____
       a) Set condition   b) Reset condition
       c) Toggle mode   d) None of these

    iv) IC 7476 is _____
       a) D flip flop   b) MSJK flip flop
       c) Decoder   d) Encoder

    v) IC 7495 is a _____
       a) Decode counter   b) Binary ripple counter
       c) Updown counter   d) Shift register

    vi) In 4 bit SISO shift register number of clock pulses required to load 4 bit data
       are _____
       a) 2   b) 3   c) 4   d) 5

    vii) IC 7490 is a _____
       a) Shift register   b) Decode counter
       c) Updown counter   d) Bindry ripple counter

viii) To construct MOD 5 counter _____ flip flops are required.
   a) 2   b) 3   c) 4   d) 5

ix) ROM is a _____ memory.
   a) Volatile   b) Temporary
   c) Non volatile   d) None of these

x) The most commonly used ouptut device is _____
   a) Monitor   b) Printer
   c) Plotter   d) Mouse

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

   i) Explain demultiplexer with block diagram.

   ii) Give truth table of positive edge triggered D flip flop.

   iii) State types of shift registers.

   iv) Explain why synchronous counter is faster than asynchronous counter ?

   v) List the applications of computer.

   vi) Draw logic diagram of 4 to 1 multiplexer.

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

   i) Draw timing diagram of 4 bit ripple counter.

   ii) Draw logic symbol of master slave JK flip flop with preset and clear inputs. Give its truth table.

   iii) Draw neat diagram of decimal to BCD encoder.

   B) Write a short note on operating system used in computer.   **4**

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

   i) Explain 3 to 8 decoder.

   ii) Write a short note on Johnson Counter.

   iii) Explain 4 bit asynchronous counter.

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

   i) Draw and explain block diagram of computer system.

   ii) With logic diagram, explain working of JK flip flop.

   iii) Draw pin diagram of IC 74154 and give its truth table.

_____

Seat No.	

B.Sc. – I (Semester – II) Examination, 2014
GEOLOGY (Paper – IV) (Old)
Igneous Sedimentary and Metamorphic Petrology

Day and Date : Wednesday, 21-5-2014   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 options given in the bracket :　　　**10**

　　1) Process of compaction is related to the formation of _____ rocks.
　　　　(a) Sedimentary　　　　　　　b) Metamorphic
　　　　c) Igneous　　　　　　　　　　d) Thermal metamorphic)

　　2) Minerals formed from fire i.e. magma or lava are called as _____ minerals.
　　　　(a) Clastic　　　　　　　　　　b) Fine grained
　　　　c) Metamorphic　　　　　　　d) Pyrogenetic)

　　3) Dyke belongs to _____ rocks.
　　　　a) Metamorphic　　b) Igneous　　　c) Cataclastic　　d) Plutonic)

　　4) Petrology means the study of _____
　　　　(a) Fossils　　　b) Minerals　　　c) Rocks　　　d) Geology)

　　5) Roof pendent is present in _____ rocks.
　　　　(a) Igneous　　　　　　　　　　b) Metamorphic
　　　　c) Sedimentary　　　　　　　　d) Flaser)

　　6) Obsidian shows _____ structure.
　　　　(a) Granitic　　　b) Glassy　　　c) Graphic　　　d) Boss)

　　7) Alternate schistose and granulose minerals are present in _____ structure.
　　　　(a) Sedimentary　　b) Igneous　　c) Flow　　　d) Gneissose)

8) Phenocryst is present in _____ structure.

   (a) Granitic   b) Porphyritic   c) Banded   d) Oolitic)

9) The minerals that are formed after the formation of igneous rock are called as _____ minerals.

   (a) Secondary   b) Accessory   c) Essential   d) Pyrogenetic)

10) Granite is igneous _____ rock.

   (a) Hypabyssal   b) Volcanic   c) Sedimentary   d) Platonic)

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

   1) Describe sill.

   2) Describe dyke.

   3) Describe bedding structure.

   4) Describe current bedding.

   5) Slaty structure, describe.

   6) Describe maculose structure.

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

     1) Composite and multiple intrusions.

     2) Oolitic and pisolitic structures.

     3) Stress and antistress minerals.

   B) Describe flaser and granulose structures.   **4**

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

   1) Describe Laccoliths and Lopoliths.

   2) Describe Lamination and Nodular structures.

   3) Describe augen structures.

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

   1) Depth zones of metamorphism.

   2) Describe formation of sedimentary rock.

   3) Definition of igneous petrology and add note on composition of magma.

————————————————

SLR-C – 5

| Seat No. | |

B.Sc. – I (Sem. – I) (Old) Examination, 2014
COMPUTER SCIENCE (Paper – II)
Programming using 'C' – I

Day and Date : Thursday, 5-6-2014   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.

1. Choose correct alternative :   **10**

   1) C language is _____ language.
      a) High level language   b) Assembly level
      c) Object oriented language   d) None of above

   2) _____ is size of double data type.
      a) 2 byte   b) 4 byte
      c) 8 byte   d) 10 byte

   3) String in C language is _____
      a) One dimensional char array   b) Two dimensional char array
      c) One dimensional int array   d) Word

   4) _____ function used to input string.
      a) printf   b) gets( )
      c) getch( )   d) all of above

   5) C Language consist of 42 keywords.
      a) True   b) False

   6) _____ format code is used to print the value of double data type.
      a) % lf   b) % ld
      c) % d   d) % dd

   7) Maximum value that an integer constant can have is _____
      a) –32,767   b) 32767
      c) 32768   d) 32665

                                                                                    P.T.O.

8) Break statement is structured goto statement.

    a) False   b) True

9) Which operator has highest priority ?

    a) *   b) +

    c) –   d) &&

10) The value of relational operator is zero if the relation is

    a) False   b) True

2. Answer **any five** :   **10**

   1) Strcmp ( ) and strlen ( ).

   2) Bitwise operator's in C.

   3) Write primary data types and size.

   4) Break and continue.

   5) Algorithm and flowchart.

   6) Statement in C language.

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

     1) Write features of algorithm.

     2) Write a note on dowhile loop.

     3) Write a note on unary operators.

  B) Explain structure of C program.   **4**

4. Answer **any two** :   **10**

   1) Write a program to check no. is prime or not.

   2) Explain two dimensional array with e.g.

   3) Write symbol's used in flowchart.

5. Answer **any two** :   **10**

   1) Write a program for addition of two matrix.

   2) Write a program to calculate factorial of given number.

   3) Write characteristics of C language.

———————

SLR-C – 51

B.Sc. II (Semester – III) Examination, 2014
CHEMISTRY
Organic Chemistry (Paper – V)

Day and Date : Thursday, 22-5-2014   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.
   4) **Use** of log table or calculator is allowed.
   5) Atomic weight : H = 1, C = 12, N = 14, O = 16, Cl = 35.5, I = 127, Ag = 108.
   6) Spectroscopic chart is **supplied**.

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

   i) UV spectroscopy is also known as _____ spectroscopy.

      a) rotational   b) vibrational   c) electronic   d) Raman

   ii) In R and S nomenclature system the priority order or sequence is based on
       _____

      a) atomic weight   b) atomic number

      c) electronegativity   d) none of these

   iii) Reimer-Tiemann reaction is useful for the preparation of _____

      a) benzaldehyde   b) acetophenone

      c) toluene   d) salicyaldehyde

   iv) Aldol condensation of acetaldehyde involves the formation of the _____
       intermediate.

      a) carbanion   b) carbocation   c) free radical   d) carbene

P.T.O.

v) Epoxides are _____
  a) open chain ethers   b) three membered cyclic ethers
  c) crown ether   d) none of these

vi) Hell-Volhard-Zelinsky reaction is used to prepare _____
  a) hydroxy acids   b) halo acids
  c) dicarboxylic acids   d) unsaturated acids

vii) Diazonium salt reacts with Cuprous bromide to form aryl bromide, this reaction
     is known as _____
  a) Kolbe reaction   b) Gatterman reaction
  c) Sandmeyer reaction   d) Wurtz reaction

viii) _____ is an example of homo annular diene.

  a)   b)   c)   d)
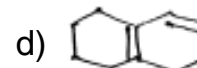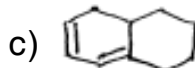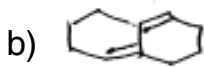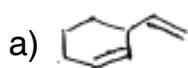
ix) The stability order of conformations of ethane is _____.
  a) staggered > skew > eclipsed   b) eclipsed > skew > staggered
  c) skew > eclipsed > staggered   d) eclipsed > staggered > skew

x) Migration of acyl group of phenyl ester takes place in _____
  a) Pinacol-Pinacolone rearrangement   b) Claisen rearrangement
  c) Fries rearrangement   d) Gatterman reaction

2. Answer **any five** of the following :   **10**
  i) Explain the following terms :
    a) Chromophore   b) Auxochrome
  ii) Assign E and Z nomenclature of the following :

  a)   b)

  iii) Complete the following reaction
    a) Glycerol + $KHSO_4$ $\xrightarrow{\text{heat}}$?

    b) Glycerol + $ConHNO_3$ $\xrightarrow{ConH_2SO_4}$?
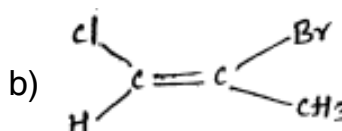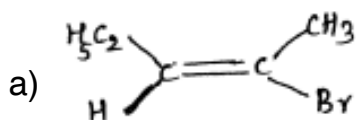
iv) Give the general mechanism of Nucleophilic addition to carbonyl compound.

v) Give the one method of preparation of anisole. What is action of ConHI ?

vi) Give two methods for the preparation of acrylic acid.

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

i) Calculate the λ_{max} of the following dienes and enone by using Woodward - Fieser rule.

a)   b)   c)
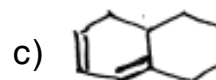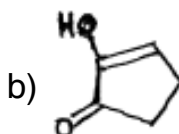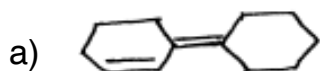
ii) How is the configuration of aldoxime is determined ?

iii) Explain the mechanism of pinacol-pinacolone rearrangement.

B) A compound having the formula $C_8H_{10}O$ is subjected to Ziesel's method for estimating methoxy group. It was found that, 1.147×10^{-4} kg of this compound forms 2.21×10^{-4} kg silver iodide. Calculate the percentage of $-OCH_3$ group and their number per molecule.   **4**

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

i) Complete the following reaction

a) $C_6H_5 - CHO + (CH_3CO)_2O \xrightarrow[180C°]{CH_3COONa} ?$

b) $2C_6H_5 - CHO \xrightarrow{NaOH} ?$

c) $CH_3 - CHO + H_2N - NH_2 \xrightarrow[DEG]{KOH} ?$

d) $2C_6H_5 - CHO \xrightarrow{KCN / aqous\ ethanol} ?$

e) $+ CH_3Mg - Br \xrightarrow{ether} ? \xrightarrow{H^+/H_2O} ?$
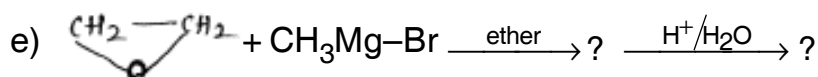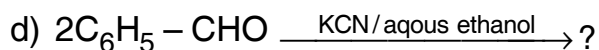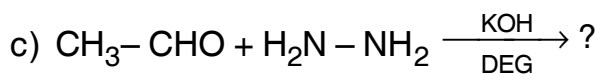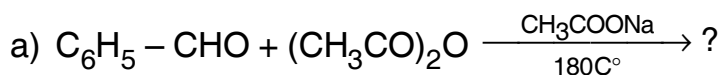
ii) What is diazotization ? Give synthesis and uses of methyl orange.

iii) How will you prepare Malic acid ? What is the action of a) heat b) HI on it ?

Give uses of malic acid.

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

   i) Discuss the different types of electronic transitions involved in UV spectroscopy.

  ii) Draw the different conformers of n-butane. Explain their stability with the help of energy profile diagram.

  iii) Complete the following reaction :

a) O–CH_2–CH=CH_2 on phenol, $\xrightarrow{473 K}$?

b) O–H phenol + HCN + HCl $\xrightarrow[ii] H^+/H_2O]{i] AlCl_3}$?

c) O–Na phenol $\xrightarrow[ii] dilute HCl]{i] CO_2 \\ 150°C/5-7\ atmosphere}$?

d) $\begin{array}{l} CH_2-OH \\ | \\ CH_2-O-H \end{array}$ + HI $\longrightarrow$?

e) $\begin{array}{l} CH_2-OH \\ | \\ CH_2-OH \end{array}$ $\xrightarrow[Oxidation]{HNO_3}$?

_____
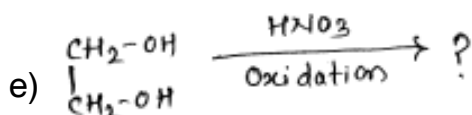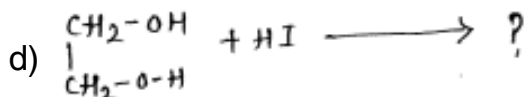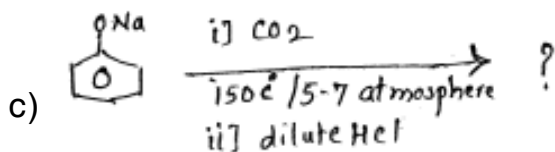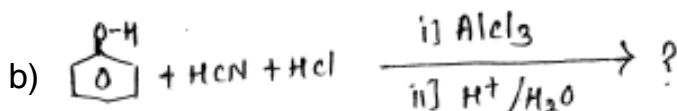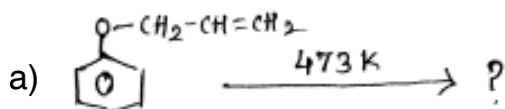
Spectroscopic Chart

Woodward's-Fieser's rules for calculating ultraviolet absorption maxima

A) For substituted dienes (Ethanol solution)

No.	Basic Value	λ_{max}(nm)
1)	Acyclic and heteroannular dienes	214
2)	Homoannular dienes	253
3)	Addition for each substituent	
	a) – R alkyl (including part of carbocyclic ring)	5
	b) – OR (alkoxy)	6
	c) – Cl, –Br	5
	e) – 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 $\alpha, \beta -$ 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 Correlation

	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

_____

Seat
No.

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

Day and Date : Thursday, 22-5-2014　　　　　　　　　　　　　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) A base class contain pure virtual function is called _____
      a) Derived class　　　　　　　　b) Abstract base class
      c) Inheritance　　　　　　　　　d) None of these

   2) Whenever an object is destroyed which function is called as _____
      a) Constructor　　　　　　　　b) Destructor
      c) Copy constructor　　　　　　d) All of above

   3) The C++ language is developed by _____
      a) Dennis Ritche　　　　　　　b) Bjourne Stroutup
      c) Yashwant Kanetkar　　　　　d) All of above

   4) _____ used for automatically initialization of object of its class.
      a) Destructor　　　　　　　　b) Constructor
      c) Terminator　　　　　　　　d) All of above

   5) Which of the following operator can not overloaded ?
      a) ++　　　　　　b) – –　　　　　　c) ? :　　　　　　d) >>

6) Identified invalid character constant.

    a) 'c'   b) 'I'   c) 'A'   d) 'a'

7) _____ contains the sequence of zero or more characters enclosed in double quotes.

    a) character   b) array   c) string   d) 'in'

8) In operator overloading unary operator passes _____ number of arguments.

    a) No argument   b) One argument

    c) Two argument   d) None of these

9) A constructor may or may not has the same name as that of class.

    a) True   b) False

10) Find out the odd operator from the following group :

    a) &&   b) !!   c) !   d) ? :

2. Answer the following :   **10**

    1) Define pure virtual function.

    2) State the data types in C++.

    3) Define pointer.

    4) Define 'Destructor' and their rules.

    5) What are the rules of operator overloading ?

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

    1) What are the advantages of in line Member Function.

    2) Explain the term 'Parameterised constructor'.

    3) Explain Pointer Arithmetic Operation.

  B) Write a program in C++ to calculate Face Value of given number by using default constructor.   **4**

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

   1) Differentiate actual argument and formal argument.

   2) Explain different forms of inheritance.

   3) Write a program in C++ to calculate Fibonacci series by using unary operator (++) prefix overloading.

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

   1) Explain call by value and call by reference.

   2) Define runtime polymorphism with example.

   3) Explain Friend Function with example.

   _____

SLR-C – 53

B.Sc. – II (Semester – III) Examination, 2014
CHEMISTRY
Inorganic Chemistry (Paper – VI)

Day and Date : Friday, 23-5-2014　　　　　　　　　　　　Total 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.

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

　　1) Ligand is the _____
　　　　a) Acceptor species
　　　　b) Donor species
　　　　c) Acceptor as well as donor species
　　　　d) None of these

　　2) The valence bond theory is based on _____
　　　　a) Hybridisation　　　　　　　　b) Ionisation
　　　　c) Oxidation　　　　　　　　　　d) Reduction

　　3) EDTA is _____ dentate chelating agent.
　　　　a) Hexa　　　　　　　　　　　　b) Penta
　　　　c) Hepta　　　　　　　　　　　　d) Mono

　　4) According to Lewis concept acids are electron pair _____
　　　　a) Acceptor　　　　　　　　　　b) Donor
　　　　c) Solvent　　　　　　　　　　　d) Oxygen

P.T.O.

5) Liquid Ammonia is _____ solvent.

   a) Universal   b) Protonic

   c) Aqueous   d) Non-protonic

6) Transition elements belongs to _____ of periodic table.

   a) s-block   b) p-block

   c) d-block   d) F-block

7) HSAB concept was first introduced by _____

   a) Lewis   b) Usanovich

   c) Lowry   d) Person

8) Magnetic properties of substance are mainly due to _____

   a) Neutrons   b) Protons

   c) Electrons   d) All of these

9) Ferrous ammonium sulphate is _____ salt.

   a) Simple   b) Double

   c) Complex   d) Double and Complex

10) Poly dentate ligands acts as _____

   a) Complexing agent   b) Chelating agent

   c) Reducing agent   d) None of these

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

   i) What is co-ordination number ? Give two examples.

   ii) Define effective atomic number. Give effective atomic number of
   CO^{3+} in $[CO\ (NH_3)_6]^{3+}$.

   iii) Give structural diagrams for geometrical isomers of $[pt\ (NO_3)_2\ (NH_3)_2]$.

   iv) Define protic and non-protic solvents.

   v) Why Fe^{3+} show highest magnetic moment.

   vi) Give structural representation of Ni – DMG chelate.

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

   i) Explain formation of co-ordinate covalent bond in $BF_3.NH_3$.

   ii) Give the structural requirements of Chelate Formation.

   iii) Discuss what will happen if CH_3COOH is dissolved in liquid ammonia ? What ions will be formed ?

  B) Give Electronic Configuration of 3d-block elements. **4**

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

   i) Give difference between double salt and complex salt.

   ii) Explain the structure of $COCl_3.4NH_3$ and $COCl_3.3NH_3$ on the basis of Werner's theory.

   iii) Explain the acid-base reaction of liquid sulphur dioxide.

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

   i) Give application of EDTA.

   ii) Explain the oxidation state of first transition series.

   iii) What is Person's rule ? Write limitations of HSAB concept.

——————————

Seat
No.

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

Day and Date : Friday, 23-5-2014   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 function of DBA.

      a) Schema definition

      b) Routine Maintenance

      c) Aranting for authorozation for data access

      d) All of these

   2) Most of the RDBMS supports distributed databases.

      a) True   b) False

   3) If a select statement is defined as a subquery, the innermost select statement gets executed first.

      a) True   b) False

   4) _____ key represent relationship between tables.

      a) Primary   b) Unique

      c) Foreign   d) Composite

   5) SGA stands for _____

      a) Show Global Area   b) Start Global Area

      c) System Global Area   d) Shut Global Area

6) Which of the following are pre-defined error conditions ?

   a) NO_DATA_FOUND   b) TOO_MANY_ROWS

   c) CASE_NOT_FOUND   d) All of these

7) A package is an oracle object, which holds other objects within it.

   a) True   b) False

8) In implicit cursor _____ attributer are always evalates to false.

   a) % ISOPEN   b) % FOUND

   c) % NOTFOUND   d) % ROWCOUNT

9) SQL has facility for programmed handling of errors that arise during manipulation of data.

   a) True   b) False

10) _____ is another name/alias to a table or view.

   a) Sequence   b) Synonym

   c) Cluster   d) Index

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

   i) What is Database ?

   ii) Explain inbrief Outer Join.

   iii) What is constraints ?

   iv) What is difference between primary key and unique key ?

   v) What is Procedure ?

   vi) What is a cursor ?

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

   i) Write note on sequence.

   ii) Write a PL/SQL block to display Prime Number between 1 to 500.

   iii) Write a PL/SQL block which use cursor to select ten highest earners from emp. table.

   B) Differentiate between SQL and PL/SQL.   **4**

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

   i) Explain different types of constraints with example.

   ii) Explain the following operators with example.
      i) Like   ii) IN   iii) Between

   iii) Explain the role of DBA.

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

   i) What is Trigger ? Explain its type.

   ii) Explain Exception Handling in PL/SQL.

   iii) Explain different types of Join with example.

_____

SLR-C – 55

B.Sc. – II (Semester – III) Examination, 2014
PHYSICS (Paper – V)
General Physics and Sound

Day and Date : Saturday, 24-5-2014　　　　　　　　　　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) **Use** of log table or calculator is **allowed**.

iv) **Neat** diagrams must be drawn **whenever** necessary.

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

   i) The coefficient of absorption of an open window is _____

   　a) One　　　　　　　　　　b) Zero

   　c) One-half　　　　　　　　d) Two

   ii) Accelaration due to earth's gravity is independent of _____

   　a) Mass of a body　　　　　b) Mass of earth

   　c) Position of body on earth　d) Mass of sun

   iii) By giving vertical oscillations to the spring we can determine _____

   　a) Young's modulus　　　　b) Bulk modulus

   　c) Modulus of rigidity　　　d) Any constant

   iv) Decay of sound energy in a hall is _____

   　a) Linear　　　　　　　　　b) Exponential

   　c) Constant　　　　　　　　d) Non-linear

   v) Rankin's method is used to determine the viscosity of _____

   　a) Gas　　　　　　　　　　b) Gas and Liquid

   　c) Liquid　　　　　　　　　d) All

   vi) For making the hall acoustically good, the reverberation time must be _____

   　a) Small　　　　　　　　　b) Large

   　c) Optimum　　　　　　　　d) Constant

P.T.O.

vii) The change of plane of rotation of rotating disc is called _____

    a) Precession   b) Nutation

    c) Rotation   d) Gyration

viii) A spiral spring is said to be the flat if the angle made by the plane of spiral to the horizontal is _____

    a) Zero   b) Equal to 90°

    c) Less than 90° d) 180°

ix) Gravitational constant G is constant _____

    a) On earth only   b) On sun only

    c) In the universe   d) In solar system

x) The dimensions of coefficient of viscosity are _____

    a) $[\, m^1 \, L^1 \, T^{-1} \,]$ b) $[\, m^1 \, L^{-1} \, T^{-1} \,]$

    c) $[\, m^2 \, L^{-2} T^{-2} \,]$ d) $[\, m^{-1} \, L^{-1} \, T^{-1} \,]$

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

  i) State the dimensions of gravitation constant G.

  ii) What is precession ?

  iii) State Lanchester's rule.

  iv) Define – Phon.

  v) What is noise ?

  vi) What is microphone ?

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

  i) Explain the term loudspeaker.

  ii) Write note on-gyroscope.

  iii) Explain how mass of sun is determined ?

  B) A bar having breadth and depth equal, each equal to 10^{-2}m is clamped in a horizontal position at a point 1m from one end A, mass of 1 kg is applied at the free end. What is the depression produced ?

    (Given y – 9.8×10^{10} N.m^{-2}, g = 9.8 m.s^{-2}).   **4**

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

   i) Explain the variation of acceleration due to earth's gravity with change in depth.

   ii) Obtain the expression for period of gyrostatic pendulum.

   iii) Discuss Theory of Rotation Viscometer.

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

   i) Obtain the expression for modulus of rigidity of the material of flat spiral spring.

   ii) Derive Sabine's formula for reverberation time.

————————

B.Sc. (Part – II) (Semester – III) Examination, 2014
BIOCHEMISTRY (Paper – I)
Biomolecules

Day and Date : Saturday, 24-5-2014   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) Write biochemical reactions **wherever** possible.

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

   i) _____ is a disaccharide.

      a) Ribose   b) Xylose

      c) Lactose   d) Galactose

   ii) In cellulose glucose units are joined through _____ linkages.

      a) $\alpha 1 \rightarrow 4$ b) $\beta 1 \rightarrow 4$

      c) $\alpha 1 \rightarrow 6$ d) $\alpha 1 \rightarrow \beta 2$

   iii) _____ is a basic amino acid.

      a) Arginine   b) Glycine

      c) Aspartic acid   d) Serine

   iv) _____ is not a fibrous protein.

      a) Collagen   b) Elastin

      c) Keratin   d) Albumin

   v) Numerically Michaelis-Menten constant (Km) is equal to the substrate concentration _____

      a) At maximum velocity (Vmax)   b) At half maximum velocity $\left(\dfrac{V \max}{2} \right)$

      c) Equal to zero   d) At different values

P.T.O.

vi) Xerophthalmia results due to deficiency of _____ vitamin.

    a) Thiamine   b) Niacin

    c) Retinol   d) Riboflavin

vii) Pantothenic acid is a component of _____

    a) NAD$^+$ b) FAD

    c) TPP   d) Coenzyme A

viii) Diterpenes contain _____ number of carbon atoms.

    a) 10   b) 20

    c) 30   d) 40

ix) Glycogen is a _____

    a) Monosaccharide   b) Disaccharide

    c) Oligosaccharide   d) Polysaccharide

x) _____ is a sulphur containing amino acid.

    a) Cysteine   b) Valine

    c) Leucine   d) Proline

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

    1) How is the isoelectric pH (pI) value of an amino acid calculated ?

    2) Name three subclasses of derived proteins.

    3) What is optical specificity of enzymes ?

    4) Give names of coenzymes involved in redox reactions.

    5) Define – monosaccharides. Give two examples.

    6) What are phospholipids ? Give two examples.

3. A) Attempt **any two** :   **(2×3=6)**

    1) How monosaccharides are oxidised ?

    2) What are differences between fat soluble and water soluble vitamins ?

    3) Which organs are affected in beriberi ? How ?

  B) Write a note-isoenzymes of lactate dehydrogenase.   **4**

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

   1) What is the importance of lipids in the body ?

   2) Discuss – globular proteins and fibrous proteins.

   3) Explain the titration curve for glycine.

5. Attempt **any two** : **(2×5=10)**

   1) Describe the active site of enzyme.

   2) Classify carbohydrates with one example of each class.

   3) Write and explain the phenyl hydrazine reaction for monosaccharides.

———————

Seat No.

B.Sc. – II (Semester – III) Examination, 2014
PLANT PROTECTION (Paper – I)
Major Crops and Methods of Integrated Plant Protection

Day and Date : Saturday, 24-5-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

   1) _____ variety of jowar which grown in Sangli, Satara and Kolhapur district of Maharashtra.

     a) Satpani   b) Maldandi

     c) Dukari   d) Khedi 2-2-10

   2) _____ crop is grown in Rabi season.

     a) Gram   b) Mug

     c) Tur   d) Mataki

   3) _____ worked on Indian wheat.

     a) Boriagh   b) Howard

     c) Rao   d) Bose

   4) Bt-cotton is _____ variety.

     a) Hybrid   b) Wild

     c) Transgenic   d) Selection

   5) Brinjal is called _____

     a) Egg plant   b) Symbol of love

     c) Ladies finger   d) 4-o'clock

6) The plants gives us _____

   a) Money only

   b) Gold only

   c) Cloth only

   d) Food, shelter and cloths

7) _____ is used as weedicide.

   a) B.H.C.

   b) DDT

   c) 2-4 D

   d) GA

8) The edible oil shows yellow colour due to presence of _____

   a) Iodine

   b) Iron

   c) Copper

   d) Gold

9) Application of domestic quarantine is _____ method of plant-protection.

   a) Legal

   b) Physical

   c) Biological

   d) Chemical

10) Botanical name of Rose is _____

   a) Catharanthus roses

   b) Rosa indica

   c) Hibiscus rosasinensis

   d) Jasmin Sambac

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

  i) Morphology of cotton.

  ii) Economic importance of Rice.

  iii) Morphology of Tuberose.

  iv) Enlist the physical and chemical methods of plant protection.

  v) What is tillage ?

  vi) Economic importance of Brinjal.

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

   i) Role of 2-4. Dichloro phenoxy acetic acid.

   ii) Significance of plant protection.

   iii) Enlist the types of fertilizers are used for major crops.

  B) Economic importance of Grapes.   **4**

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

   i) Describe the morphology of Rose and Tuberose.

   ii) Write in brief, Biological control of insect pests and diseases.

   iii) Give the economic importance of wheat and jowar.

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

   i) What are the cash crops ? Describe the cultural practices in Ground nut.

   ii) Describe the mechanical methods of plant protection.

   iii) What is plant-quarantine ? Describe the need of quarantine in India.

_____

SLR-C – 58

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

Day and Date : Monday, 26-5-2014 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) **Use** *of log table or calculator is* **allowed**.

iv) **Neat** *diagrams must be drawn* **wherever** *necessary.*

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

1) If the medium on both sides of an optical system is same, the relation between lateral magnification m and longitudinal magnification m_x is _____
a) $m_x = 2m$ b) $m.m_x = 1$ c) $m_x = m^2$ d) $m^2_x = m$

2) When the source of light is at distance infinity, the incident wavefront at an obstacle is _____

a) Plane   b) Spherical   c) Cylindrical   d) Elliptical

3) If (H_1, H_2) a pair of principal points and (N_1, N_2) a pair of nodal points then for an optical system _____

a) $H_1 N_1 < H_2 N_2$ b) $H_1 N_1 > H_2 N_2$

c) $H_1 N_2 = H_2 N_1$ d) $H_1 N_1 = H_2 N_2$

4) The fringe width in FP interferometer compared to Michelson's interferometer _____

a) Large   b) Very large

c) Small   d) Very small

P.T.O.

5) The path difference between the waves from any two successive zones is
_____

a) $\dfrac{\lambda}{4}$ b) $\dfrac{\lambda}{3}$ c) $\dfrac{\lambda}{2}$ d) λ

6) In zone plate, an image is formed due to _____

a) Diffraction   b) Interference   c) Reflection   d) Polarisation

7) Resolving power of a plane diffraction grating with N number of lines in an order n is _____

a) 2nN   b) $\dfrac{N}{n}$ c) $\dfrac{n}{N}$ d) nN

8) In a Half Wave Plate, the path difference produced between E-ray and O-ray is _____

a) $\dfrac{\lambda}{5}$ b) $\dfrac{\lambda}{4}$ c) $\dfrac{\lambda}{3}$ d) $\dfrac{\lambda}{2}$

9) For the positive crystals _____

a) $V_e = V_o$ b) $V_e = 2V_o$ c) $V_e > V_o$ d) $V_e < V_o$

10) In Ruby laser _____ pumping is used.

a) Optical   b) Electrical   c) Chemical   d) Thermal

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

1) State the Abbe's sine condition.

2) Draw a neat ray diagram to represent a pair of principal points.

3) What is a consonance ?

4) Describe the Dextro-rotatory optically active substances.

5) Define the term Resolving Power of an optical instruments.

6) Explain the process of the spontaneous emission of radiation.

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

   i) Describe the Einstein's coefficients related to absorption and emission of radiations.

   ii) What is a zone plate ? How it is constructed ?

   iii) State three laws of the rotation of plane of polarisation.

   B) A point source of light of wavelength 5500A$^\circ$ is placed at a distance of 40 cm from circular aperture of radius 0.5 mm along the axis. Calculate the farthest point along the axis where the intensity is minimum. **4**

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

   i) Draw a neat ray diagram for graphical construction of an image and obtain the Newton's Formula.

   ii) Explain the use of Michelson's Interferometer to determine the wavelength of monochromatic source of light.

   iii) Describe the construction and working of Helium-Neon Laser.

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

   i) Describe briefly how the Laurentz Half Shade Polarimeter is used to determine the specific rotation of sugar solution.

   ii) For an optical system, obtain the relationship between the focal lengths and refractive indices.

_____

Seat No.

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

Day and Date : Monday, 26-5-2014   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 the following sentences by selecting most **correct** answer from given options. **(10×1=10)**

   i) In polymerase chain reaction _____ is used to change and accurately control the reaction temperature.

      a) Electro blotter   b) ELISA plate

      c) Thermal cycler   d) Pressure dampener

   ii) For the production of large amounts of immunoglobulins _____ technology is used.

      a) Western blotting   b) ELISA

      c) Northern blotting   d) Hybridoma

   iii) Southern blotting technique is used for blot transfer of _____

      a) DNA   b) RNA

      c) Proteins   d) Carbohydrates

   iv) Yeast cells are immobilised by _____ method.

      a) Ionic binding   b) Physical adsorption

      c) Entrapment in a gel   d) Covalent binding

P.T.O.

v) Indian Patent Act came in the year _____

   a) 1947   b) 1960

   c) 1970   d) 2000

vi) _____ is an intellectual property.

   a) New biochemical process   b) House

   c) Land   d) Ornaments

vii) _____ is used in spectrophotometer to resolve a single beam of light into different rays of different wavelengths.

   a) Collimating mirror   b) Prism

   c) Reflecting mirror   d) Mercury lamp

viii) In HPLC fine adsorbing particles are used to get _____

   a) Rapid separation   b) Better flow rate

   c) Best resolution   d) Constant pH of medium

ix) In gel permeation chromatography _____ is called the void volume.

   a) Volume of gel   b) Volume of water inside the gel

   c) Total volume of gel and water   d) Volume of water outside the gel

x) Electrophoresis is used to _____

   a) Separate ionic particles   b) Identify carbohydrates

   c) To separate uncharged molecules d) None of a, b, c

2) Answer **any five** form below :   **(5×2=10)**

   1) How are proteins stained after their separation by starch gel electrophoresis ?

   2) Define distribution ratio in chromatography. How does partitioning of solute affects chromatographic resolution ?

   3) How is the molecular weight determined using gel permeation chromatography ?

4) What are differences between Southern blotting and Northern blotting techniques.

5) How is immobilised enzyme used for production of semisynthetic penicillins ?

6) State and explain Lambert's law.

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

1) What are monoclonal antibodies ? How are they produced ?

2) List various applications of ELISA technique.

3) Write an account of trade mark.

B) Draw a labelled diagram of an electroblotter used in Western blotting technique. **4**

4) Answer **any two** : **(2×5=10)**

1) Describe the technique of thin layer chromatography.

2) Which factors affect electrophoretic mobility ?

3) Which types of detector are used in HPLC ? How do they function ?

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

1) State and explain Beer's law. Derive an equation for optical density and explain the terms involved.

2) Describe the use of immobilised yeast cells for production of ethanol.

3) Illustrate the technique of polymerase chain reaction.

_____

SLR-C – 6

B.Sc. – I (Sem. – I) (Old) Examination, 2014
PHYSICS (Paper – I)
Mechanics and Properties of Matter

Day and Date : Friday, 6-6-2014   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) Use of log-table is **allowed**.
4) **Neat** diagrams must be drawn **wherever** necessary.

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

   i) Greater the value of K as compared to R _____ the time taken by a body rolling down an incline plane.
   a) Zero   b) Smaller   c) Greater   d) Infinite

   ii) Moment of Inertia of a spherical shell about its tangent is

   a) $\frac{2}{3}MR^2$ b) $\frac{7}{5}MR^2$ c) $\frac{5}{3}MR^2$ d) MR^2

   iii) The angular acceleration of a compound pendulum is directly proportional to its
   a) Linear displacement   b) Mass
   c) Angular displacement   d) Velocity

   iv) Minimum period of compound pendulum is

   a) $T = 2\pi\sqrt{\dfrac{K}{g}}$ b) $T = 2\pi\sqrt{\dfrac{2K}{g}}$

   c) $T = 4\pi\sqrt{\dfrac{K}{g}}$ d) $T = 2\pi\sqrt{\dfrac{K}{2g}}$

P.T.O.

v) The gravitational field at any point in the interior of the shell, due to the shell is
   a) Maximum
   b) Zero
   c) Minimum
   d) Infinite

vi) The dimension of gravitational constant G is given by
   a) $[M^{-1} L^3 T^{-2}]$
   b) $[M^1 L^2 T^{-2}]$
   c) $[M^{-1} L^{-3} T^{-2}]$
   d) $[M^{-2} L^3 T^{-2}]$

vii) The angle of contact between glass and mercury is
   a) A right angle
   b) An acute angle
   c) An obtuse angle
   d) Zero

viii) The C.G.S. unit of surface tension is

   a) dyne.cm
   b) dyne/cm^2
   c) dyne/cm
   d) $\dfrac{cm}{dyne}$

ix) Viscosity of a liquid increases with _____ in pressure on the liquid.
   a) Increase
   b) Decrease
   c) No change
   d) None of the above

x) Poiseulle's capillary flow method is used to determine _____ of liquid.
   a) Coefficient of viscosity
   b) Surface tension
   c) Density
   d) Mass

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

   1) A spherical shell of mass 400 gm has diameter 30 cm. Calculate its moment of inertia about (i) the diameter and (ii) the tangent.

   2) Define center of suspension and center of oscillation.

   3) Draw the schematic diagram of Kater's pendulum.

   4) State Newton's law of gravitation.

   5) Define surface tension and explain the factors affecting surface tension.

   6) What do you mean by streamline and turbulent flow of liquid ?

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

    i) Derive expression for MI of solid cylinder about a diameter of one of its face.

    ii) Derive the Poiseulle's formula for viscosity of liquid.

    iii) Write a note on angle of contact.

   B) For a Kater's pendulum the distance between two knife edges is 1m. The time taken for 100 oscillations of the pendulum are 200 sec. and 202 sec. about two knife edges respectively. Find the value of acceleration due to gravity. **4**

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

    i) What is Bifilar pendulum ? Discuss the theory of Bifilar pendulum.

    ii) State and prove Bernoulli's theorem for the flow of liquid in pipes.

    iii) Derive an expression for MI of a spherical shell about its diameter.

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

    1) Derive relation between surface tension, pressure and radius of curvature for a curved liquid surface.

    2) Describe the Poiseulle's capillary flow method to determine the coefficient of viscosity of liquid.

_____

Seat
No.

B.Sc. – II (Semester – III) Examination, 2014
PLANT PROTECTION
Crop Diseases (Paper – II)

Day and Date : Monday, 26-5-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : I) **All** questions are **compulsory**.
II) Draw a **neat** labelled diagrams **wherever** necessary.
III) Figures to the **right** indicate **full** marks.

1. Rewrite the sentences by selecting **correct** answer from the given alternative.   **10**

   1) On the basis of symptoms, the plant diseases are groped into _____
   types.
      a) Six   b) Three
      c) Four   d) Five

   2) Plant pathology or phytopathology is that branch of _____ , botanical or
   biological sciences.
      a) Agriculture   b) Sericulture
      c) Floriculture   d) None

   3) Early blight of tomato is caused by _____ pathogen.
      a) Fungal   b) Bacterial
      c) Viral   d) Phytoplasma

   4) Causal organism of Whip Smut of sugarcane is _____
      a) Cercospora arachidicola   b) Ustilago Scitaminea
      c) Xanthomonas citri   d) Sphacelotheca Sorghi

   5) Rust of groundnut is caused by _____ Sp. of fungus.
      a) Puccinia   b) Cercospora
      c) Albugo   d) Aspergillus

                                                                          P.T.O.

6) Grain Smut of Jowar is controlled by _____ wash.

   a) Chlorine   b) Formalin

   c) Benzene   d) None

7) Rust of soyabean is a _____ disease.

   a) Viral   b) Bacterial

   c) Fungal   d) None

8) Downy mildew disease is found on _____ plants.

   a) Lemon   b) Grape

   c) Jackfruit   d) Orange

9) Powdery mildew of cucurbits is controlled by diathane _____

   a) S – 78   b) Z – 78

   c) X – 78   d) Z – 79

10) Wilt of tomato is _____ disease.

   a) Bacterial   b) Fungal

   c) Viral   d) None

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

   i) Define symptoms.

   ii) What is incubation period ?

   iii) What is epiphytotic ?

   iv) Define eradication.

   v) Name any two disease caused by bacteria in plant disease.

   vi) Define disease control measures.

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

   i) Describe the concept of disease studied by you.

   ii) Explain the symptoms and causal organism of early blight of tomato.

   iii) Give the causal organism and control measures of citrus canker.

  B) Describe the classification of plant diseases based on pathogen.   **4**

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

   i) Describe the principles of plant disease management studied by you.

   ii) Define infection. Give the methods of infection of plant pathogens.

   iii) Describe the symptoms, causal organism and control measures of grain smut of jowar.

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

   i) Explain the symptoms, causal organism and control measures of Whip Smut of sugarcane.

   ii) Give the symptoms, causal organism and control measures of little leaf of brinjal.

   iii) Describe the transmission of pathogen through air and soil.

————————————

Seat No.

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

Day and Date : Tuesday, 27-5-2014 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 **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) Cockroach belongs to class _____ of phylum Arthropoda.
      a) Crustacea   b) Arachnida
      c) Myriapoda   d) Insecta

   2) In cockroach nervous system number of abdominal ganglia is _____
      a) Three   b) Four
      c) Six   d) Eight

   3) The olfactory function in Pila is performed by _____
      a) Statocyst   b) Nuchal lobe
      c) Radula   d) Osphradium

   4) Pila heart is _____ chambered.
      a) Two   b) Three
      c) Four   d) Six

   5) Excretory organ in pila is _____
      a) Malpighian tubules   b) Kidney
      c) Green gland   d) Coxal gland

6) Filaria is caused by _____

   a) Amoeba   b) Trematode

   c) Microfilaria   d) Cestode

7) Piercing and sucking type of mouth parts are present in _____

   a) Honey bee   b) Mosquito

   c) House fly   d) Butterfly

8) Byssus threads are present in _____

   a) Mytilus   b) Sepia

   c) Octopus   d) Pila

9) Cephalic arms are present in _____

   a) Gastropoda   b) Pelecypoda

   c) Amphineura   d) Cephalopoda

10) Cockroach heart is made up of _____ chambers.

   a) 10   b) 12   c) 13   d) 14

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

  i) Salient features of mollusca.

  ii) Leg of cockroach.

  iii) Dengue disease.

  iv) Statocyst of Pila.

  v) Malpighian tubules in cockroach.

  vi) Foot in cephalopoda.

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

    i) Salivary glands of cockroach.

    ii) Shell of Pila.

    iii) Gizzard of cockroach.

   B) Give the Affinities of Hemichordata. **4**

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

   i) Describe the male reproductive system of cockroach.

   ii) Describe the structure of heart of Pila.

   iii) Describe foot in Gastropoda.

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

   i) Describe the nervous system of Pila.

   ii) With suitable diagram describe nervous system of cockroach.

_____

Seat No.

B.Sc. II (Semester – III) Examination, 2014
STATISTICS (Paper – VI)
Discrete Probability Distributions and Statistical Methods

Day and Date : Wednesday, 28-5-2014   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**

   1) If $X \sim P(\lambda)$ and second raw moment about origin μ_2^1 is 12, then the mean of the Poisson variate is
      a) 4   b) 12   c) 3   d) -4

   2) In usual notations
      a) $b_{13.2}^2 \times b_{31.2}^2 = r_{13.2}$ b) $b_{13.2} \times b_{31.2} = r_{13.2}^2$

      c) $b_{13.2} + b_{31.2} = r_{31.2}$ d) $b_{13.2} \times b_{13.2} = r_{13.2}$

   3) If $X \sim P(1)$ and $Y \sim P(2)$ are independent then $P\left[X = K \big/ X + Y = n\right]$ is _____ distribution.
      a) Poisson   b) Binomial   c) Geometric   d) Hypergeometric

   4) If $V(X_{1.23}) = 0$ then $R_{1.23}$ is
      a) 1   b) 0   c) 0.5   d) None of these

   5) If $X \sim NB(K, p)$ such that $E(X) = 15$ and $V(X) = 60$, then
      a) $K = 5, P = \dfrac{3}{4}$ b) $K = 15, P = \dfrac{1}{2}$

      c) $K = 5, P = \dfrac{1}{4}$ d) $K = 3, P = \dfrac{1}{5}$

P.T.O.

6) Let (X_1, X_2, X_3, X_4) be a random vector follows multinomial distribution with usual notations, then cov (X_2, X_3) is

   a) $4p_2p_3$ b) $p_2(1 - p_3)$

   c) $-np_2p_3$ d) $4p_1p_2p_3p_4$

7) In the usual notations $r_{21.3}$ is equal to

   a) $\dfrac{r_{12}^2 - r_{13}r_{23}}{\sqrt{\left(1 - r_{13}^2\right)\left(1 - r_{23}^2\right)}}$

   b) $\dfrac{r_{13}r_{23} - r_{12}^2}{\sqrt{\left(1 - r_{13}\right)^2 \left(1 - r_{23}\right)^2}}$

   c) $\dfrac{r_{12} - r_{13}r_{23}}{\sqrt{\left(1 - r_{13}^2\right)\left(1 - r_{23}^2\right)}}$

   d) $\dfrac{r_{13} - r_{12}}{\sqrt{\left(1 - r_{13}^2\right)\left(1 - r_{12}^2\right)}}$

8) The range of multiple correlation coefficient is

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

9) If $R_{1.23} = 0$ then all total and partial correlation coefficients involving X, are

   a) 0   b) 1   c) -1 d) 0.5

10) Negative Binomial distribution NB (K, p) reduces to geometric distribution when K equal to

   a) ∞ b) 1   c) 0   d) none of these

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

   i) Show that for negative binomial, variance is greater or equal to mean.

   ii) Show that a multiple correlation coefficient cannot be negative.

   iii) In a trivariate data

   $r_{12} = 0.6$ $r_{13} = -0.4$ $r_{23} = 0.7$.

   Are these values consistent ?

   iv) Find pgf of Poisson distribution.

   v) Find mean of Geometric distribution with parameter p.

   vi) If X is a Poisson variate such that P (X = 2) 9P (X = 4) + 90 P (X = 6). Find λ.

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

   i) For a Poisson distribution, P [X = 1] = 0.03 and P [X = 2] = 0.15. Find P [X = 0] and P [X = 3].

   ii) Let X be geometric variate with parameter p then show that $P(X \geq x) = (1-p)^x$.

   iii) Define the partial regression coefficients $b_{13.2}$ ad $b_{12.3}$. Write the equation of regression plane of X_1 on X_2 and X_3.

   B) With usual notations prove that $R^2_{1.23} = b_{12.3}\, r_{12}\, \dfrac{\sigma_2}{\sigma_1} + b_{13.2}\, r_{13}\, \dfrac{\sigma_3}{\sigma_1}$. **4**

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

   i) Prove that $b_{12} = \dfrac{b_{12.3} + b_{13.2}\, b_{32.1}}{1 - b_{13.2}\, b_{31.2}}$.

   ii) Derive Poisson distribution as a limiting form of a Binomial distribution.

   iii) If X_1, X_2, X_3 satisfy the relation $a_1 X_1 + a_2 X_2 + a_3 X_3 = k$ prove that $r_{12} = \dfrac{a_3^2\, \sigma_3^2 - a_1^2\, \sigma_1^2 - a_2^2\, \sigma_2^2}{2\, a_1 a_2 \sigma_1 \sigma_2}$.

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

   i) Define multinomial distribution and obtain its moment generating function.

   ii) 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 $R_{1.23}$.

   iii) State and prove the lack of memory property of geometric distribution with parameter p.

———————————

Seat No.

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

Day and Date : Wednesday, 28-5-2014　　　　　　　　　Total 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 atmosphere during initial first stage was largely composed of _____
　　　a) N_2　　　　b) O_3　　　　c) CO_2　　　　d) CH_4

　　2) In _____ layer of atmosphere there is no strong vertical circulation exists.
　　　a) Troposphere　　　　　　　b) Stratosphere
　　　c) Hemisphere　　　　　　　d) Troposphere and Hemisphere

　　3) The discontinuity between mantle and core is _____
　　　a) Mohorovicic　　　　　　　b) Gutenberg
　　　c) Conrad　　　　　　　　　d) Lehman

　　4) The bulk composition of the earth is determined by _____
　　　a) Sial and Sima　　　　　　b) Sial
　　　c) Mantle and Core　　　　　d) Mantle

　　5) Pallasites belong to _____ group of meteorite.
　　　a) Siderite　　　　　　　　　b) Siderolites
　　　c) Aerolites　　　　　　　　　d) Siderite and Aerolite

P.T.O.

6) The common accessory minerals in siderites are _____

   a) Quartz and mica

   b) Mica and calcite

   c) Troilite and graphite

   d) Graphite and mica

7) The average salinity in the open ocean is about _____ %.

   a) 35   b) 40   c) 10   d) 50

8) The average pH value of river water is between _____

   a) 4 to 8   b) 4 to 6   c) 6 to 10   d) 2 to 4

9) Chalcophile elements have affinity for _____

   a) Iron   b) Sulphide   c) Silicate   d) Atmosphere

10) The most abundant element in the sun is _____

   a) N   b) Si   c) He   d) H

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

   i) Atmophile elements

   ii) Hydrosphere

   iii) Salinity

   iv) Losses of elements in the oceanic water

   v) Mantle

   vi) Sial and Sima.

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

   i) Atmospheric additions during geological time.

   ii) Nature of solar system.

   iii) Siderolites.

   B) Describe Aerolites.   **4**

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

   i) Cosmic abundance of the elements.

   ii) Composition of the earth as a whole.

   iii) Structure of atmosphere.

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

   i) Composition of seawater.

   ii) Primary differentiation of elements.

   iii) Meteorites and their importance.

_____

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

Day and Date: Wednesday, 28-5-2014   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 **neat** labelled diagrams **wherever** necessary.

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

   1) Crossing over occurs in _____ stage.

      a) Leptotene   b) Pachytene

      c) Diplotene   d) Diakinesis

   2) _____ is the ratio of the complementary factor.

      a) 9 : 3 : 4   b) 9 : 7

      c) 13 : 3   d) 15 : 1

   3) Lactose is commonly called as _____ sugar.

      a) Milk   b) Cane

      c) Beet   d) Carrot

   4) _____ RNA contains genetic codons.

      a) r-RNA   b) t-RNA

      c) m-RNA   d) sn-RNA

   5) Waxes are chemically _____

      a) Proteins   b) Nucleic acid
      c) Lipids   d) Carbohydrates

   6) _____ is prepared by rapid evaporation of water from milk with constant
      stirring.

      a) Butter   b) Curd

      c) Khoa   d) Ice cream

   7) Honey bee belongs to _____ phylum.

      a) Annelida   b) Arthropoda

      c) Mollusca   d) Echinodermata

8) Double helical structure of DNA is discovered by _____

   a) Bateson and Punnet   b) Watson and Crick

   c) Morgan and Sutton   d) Danier and Davison

9) Ranikhet is a common disease in _____

   a) Fishery   b) Poultry

   c) Piggery   d) Sericulture

10) _____is a fertile female in honey bee colony.

   a) Queen   b) Worker

   c) Drone   d) Hive

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

   i) Queen bee

   ii) Biological significance of RNA

   iii) Mulberry plant

   iv) Significance of crossing over

   v) Maltose

   vi) Honey.

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

   i) Economic importance of goat farming

   ii) Poultry diseases

   iii) Economic importance of apiculture.

   B) Rearing of silkworm.   **4**

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

   i) Describe complimentary factors with suitable example.

   ii) Types of RNA

   iii) Classification of proteins.

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

   i) Describe various milk products.

   ii) Various stages in mitosis.

_____

Seat
No.

B.Sc. (Part – II) (Semester – III) Examination, 2014
MATHEMATICS (Paper – V)
Differential Calculus – II

Day and Date : Thursday, 29-5-2014   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) If u, v, w are a functions of x, y, z then the corresponding Jacobian is determinant of order

   a) 9   b) 3   c) 1   d) n

   2) If x = u (1 + v), y = 1 + u, then $\dfrac{\partial(x,y)}{\partial(u,v)} = $

   a) 1 + u   b) 1 + u + v   c) 2u   d) – u

   3) If x = r cos θ, y = r sin θ, then $\dfrac{\partial(x,y)}{\partial(r,\theta)} = $

   a) x   b) y   c) r   d) 0

   4) With usual meanings $\dfrac{dx}{ds} = $

   a) sin ψ   b) sec ψ   c) cosec ψ   d) cos ψ

   5) The intrinsic formula for the radius of curvature is

   a) $\rho = \dfrac{dy}{dx}$ b) $\rho = \dfrac{1}{s}\dfrac{ds}{d\psi}$ c) $\rho = s\dfrac{d\psi}{ds}$ d) $\rho = \dfrac{ds}{d\psi}$

   6) Radius of curvature of the curve $p^2 = ar$ is

   a) p^2/a^2 b) $2p^3/a^2$ c) $2p/a^2$ d) $p^3/2a^2$

P.T.O.

7) 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

8) The maximum value of sinx + cosx is

    a) 2   b) $\sqrt{2}$ c) 1   d) $1 + \sqrt{2}$

9) If a continuous function $f(x)$ changes sign as x passes through 'c' then

    a) $f(c) = 0$ b) $f(c) > 0$

    c) $f(c) < 0$ d) $f'(c)$ does not exist

10) Sinx $(1 + cosx)$ is a maximum at

    a) $\pi/3$ b) π c) $\pi/2$ d) 0

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

1) If $u^3 + v^3 = x + y$, $u^2 + v^2 = x^3 + y^3$, show that $\dfrac{\partial(u,v)}{\partial(x,y)} = \dfrac{1}{2}\dfrac{y^2 - x^2}{uv(u-v)}$.

2) If $u = 3x + 2y - z$, $v = x - 2y + z$, $w = x (x + 2y - z)$ show that $\dfrac{\partial(u,v,w)}{\partial(x,y,z)} = 0$.

3) Find the radius of curvature at any point on the curve $y = c \cosh(x/c)$.

4) Find the radius of curvature of $x^{2/3} + y^{2/3} = a^{2/3}$ at any point.

5) Find the maximum and minimum values of the polynomial $f(x) = 8x^5 - 15x^4 + 10x^2$.

6) Find the extreme values of the function $u = x^2 + xy + y^2$.

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

    i) If $x = a (u + v)$, $y = b (u - v)$ and $u = r^2 \cos 2\theta$, $v = r^2 \sin2\theta$, Find $\dfrac{\partial(x,y)}{\partial(r,\theta)}$.

    ii) For the cycloid $x = a (t + \sin t)$, $y = a (1 - \cos t)$, prove that $\rho = 4a \cos(t/2)$.

    iii) Find the point on the sphere $x^2 + y^2 + z^2 = 1$ which is at maximum distance from the point (2, 1, 3).

  B) Derive the formula for the curvature for pedal equation.   **4**

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

　　i) If J denotes the Jacobian of u, v, w w.r.to x, y, z and J' is the Jacobian of x, y, z w.r. to u,v,w then prove that $J.J' = 1$.

　　ii) Find the stationary values of $x^2 + y^2 + z^2$, subject to the conditions $x + 3y + 2z = 0$, and $2x^2 + 6y^2 + 3z^2 = 12$.

　　iii) With usual notation prove that $\rho = a^2 b^2/p^2$ for the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$.

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

　　i) Find the surface of the right circular cylinder of greatest surface which can be inscribed in a sphere of radius r.

　　ii) For $x = \sqrt{vw}$, $y = \sqrt{uw}$, $z = \sqrt{uv}$, $u = r\sin\theta\cos\phi$, $v = r\sin\theta\sin\phi$, $w = r\cos\theta$, find $\dfrac{\partial(x, y, z)}{\partial(r, \theta, \phi)}$.

　　iii) Find the expression for the radius of curvature of the curve given by $r = f(\theta)$.

SLR-C – 7

Seat No.	

B.Sc. – I (Semester – I) (Old) Examination, 2014
GEOGRAPHY
Physical Geography (Paper – I) (Geomorphology)

Day and Date : Friday, 6-6-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

   1) The materials of the lithosphere are generally called as _____
      a) Rocks   b) Sediments   c) Minerals   d) Elements

   2) Basalt is an example of _____ type of rocks.
      a) Intrusive   b) Extrusive   c) Plutonic   d) Hypabassal

   3) The breakdown and alteration of rock minerals is called as _____
      a) Leaching   b) Weathering   c) Solution   d) Oxidation

   4) The plains formed by deposition action of wind are called as _____
      a) Terrarossa   b) Till plains   c) Mudflats   d) Loess

   5) The chemical weathering produces more _____ compositions of minerals.
      a) Unstable   b) Stable   c) Soluble   d) Crystalline

   6) According to the cycle of erosion, the landforms have _____ changes through time.
      a) Sudden   b) Abrupt   c) Sequential   d) Random

   7) The nature of coast line is responsible for presence of a _____
      a) Town   b) Village   c) Hamlet   d) Harbour

   8) Coastal transport development requires the presence of a _____
      a) Sea   b) Dam   c) Tank   d) River

P.T.O.

9) The evolution of surface features of the earth are studied in _____

   a) Hydrology   b) Pedology

   c) Geomorphology   d) Climatology

10) According to Sir _____ the SIAL is floating on SIMA.

   a) Wegner   b) Airy   c) Wilson   d) Taylor

2. Write answers of **any five** questions :   **10**

   1) What do you know about 'Panthalasa' ?

   2) Define "Geomorphology".

   3) What are the 'L' waves ?

   4) What is a 'Mantle' ?

   5) State the types of volcanoes.

   6) What are the epearogenic movements ?

3. A) Answer **any two** questions :   **6**

     1) Draw a diagram of 'Anticlines'.

     2) State the types of earthquake waves.

     3) Give the chemical composition of the earth's interior in brief.

   B) Describe the effects of earthquakes.   **4**

4. Write answer of **any two** questions :   **10**

   1) Critically examine the 'continental drift' theory.

   2) Describe the effects of orogenic movements.

   3) Write in brief the importance of geomorphic studies.

5. Give answers for **any two** questions :   **10**

   1) Describe the landforms produced by volcanic activities.

   2) State the evidences for drifting of the continents.

   3) Describe the types of folding with suitable examples.

_____

SLR-C – 70

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

Day and Date : Thursday, 29-5-2014   Total 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 by choosing **correct** alternative :   **10**

   1) The three zones dermatogen, plerome and periblem are suggested in
      _____ theory.

     a) Apical cell   b) Histogen

     c) Tunica-Corpus   d) None of these

   2) Hydathodes are found in _____

     a) Fern   b) <u>Ficus</u>

     c) <u>Pinus</u>   d) <u>Citrus</u>

   3) The apical meristem is responsible for _____

     a) Increasing girth   b) Lateral growth

     c) Increasing height   d) Secondary growth

   4) Stellate hair is an example of _____ hair.

     a) Glandular   b) Multicellular

     c) Bicellular   d) Unicellular

   5) The growth of the plant body due to addition of secondary tissues is called
      _____ growth.

     a) Secondary   b) Primary

     c) Lateral   d) Primitive

6) Digestive glands are present in _____

    a) Maize   b) <u>Drosera</u>

    c) <u>Dracaena</u>   d) None of these

7) Resin ducts are present in _____ stem.

    a) Sugarcane   b) Sunflower

    c) <u>Pinus</u>   d) Maize

8) Anomalous secondary growth is found in _____ stem.

    a) Mango   b) Jowar

    c) <u>Moringa</u>   d) <u>Dracaena</u>

9) Vessels of heart wood are blocked by _____

    a) Tyloses   b) Stomata

    c) Latex   d) Hydathodes

10) Multiple epidermis is found in _____ leaf.

    a) Sugarcane   b) Nerium

    c) Sunflower   d) Groundnut

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

  i) What is secondary growth ?

  ii) What is mechanical tissue ?

  iii) Which type of vascular bundles are present in dicot stem ?

  iv) Define anomalous secondary growth.

  v) Define annual rings or growth rings.

  vi) What is meristem ?

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

    i) Describe the types of meristems based on their position.

    ii) Give functions of epidermal tissues.

    iii) Describe the xylem tissues.

  B) Describe in brief the organization of higher plant body. **4**

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

    i) Describe anomalous secondary growth in Bignonia.

    ii) Give structure and function of periderm.

    iii) Describe internal structure of maize stem.

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

    i) Basic structure of wood and its types.

    ii) Trichomes.

    iii) Nectaries.

————————————

SLR-C – 73

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

1) The current gain of Darlington pair is _____

   a) $\beta_1 + \beta_2$ b) $\beta_1 - \beta_2$ c) $\beta_1\beta_2$ d) β_1 / β_2

2) The voltage gain of emitter follower circuit is _____

   a) Zero   b) One   c) High   d) None

3) The maximum conversion efficiency of class – B power amplifier is
_____

   a) 25%   b) 50%   c) 78.5%   d) None

4) In class – A power amplifier, current in the output circuit flows for

   a) 360° b) 180° c) 90° d) 0°

5) Bandwidth of amplifier _____ with negative feedback.

   a) Increases   b) Decreases

   c) Remains same   d) None

6) To increase stability _____ feedback is used.

   a) Positive   b) Negative

   c) Both a and b   d) None

7) In Wien bridge oscillator, the phase shift introduced by RC network is _____

   a) 0°　　　　　b) 60°　　　　　c) 90°　　　　　d) 180°

8) If inductor is tapped, then it is known as _____ oscillator.
   a) Phase shift　　　　　　　　　b) Wien bridge
   c) Hartley　　　　　　　　　　d) Colpitt's

9) CMRR is given by CMRR = _____
   a) Ad + Ac　　　b) Ad – Ac　　　c) Ad/Ac　　　d) None

10) In differential amplifier, O/P voltage is proportional to _____

   a) $V_1 + V_2$　　　b) $V_1 - V_2$　　　c) V_1/V_2　　　d) None

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

   i) Draw the small signal ac equivalent circuit of transistor CE amplifier.

   ii) Give the important characteristics of transistor CB amplifier.

   iii) Draw the circuit diagram of transformer coupled class – A power amplifier.

   iv) In amplifier with feedback, Av = 90 and β = – 0.1. Calculate the gain with feedback.

   v) What is Barkhausen criterion for sustained oscillations ?

   vi) In differential amplifier, Ad = 1000 and Ac = 0.01. Calculate CMRR in dB.

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

   i) What is constant current source ? Explain current mirror bias in brief.

   ii) Explain in brief the effect of negative feedback on noise.

   iii) What is power amplifier ? How they are classified ?

   B) Explain crystal oscillator in brief.　　　　　　　　　　　　**4**

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

   i) Explain two stage RC coupled amplifier.

   ii) Explain class B push pull power amplifier.

   iii) Explain the effect of negative feedback on gain and bandwidth.

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

   i) What is oscillator ? Explain Hartley oscillator.

   ii) Explain emitter coupled differential amplifier.

   iii) Explain FET CS amplifier.

_____

SLR-C – 75

B.Sc. (Part– II) (Semester – III) Examination, 2014
GEOGRAPHY (Paper – V)
Biogeography

Day and Date : Saturday, 31-5-2014 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.*
3) ***Use*** *of stencils is* ***allowed****.*

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

   1) Plants depends on _____ for their nutrient supply water and anchorage.

   (air, soil, water, sunlight)

   2) _____ is often described as father of plant geography.

   (Ritter, Humboldt, Ratzel, Blache)

   3) _____ is mainly concerned with the study of plant and animal.

   (Biogeography, Oceanography, Plant Geography, Zoology)

   4) _____ is known as phytogeography.

   (Animal geography, Oceanography, Plant Geography, Hydrology)

   5) _____ energy is used by plants to prepare their food through the process photosynthesis.

   (Thermal, Wind, Solar, Star)

   6) The world is divided in to _____ major biomes.

   (3, 5, 7, 9)

P.T.O.

7) A tropical forest exhibits _____ tier structure.

(One, Two, Three, Four)

8) Project tiger is a type of insity_____ of diversity.

(Conservation, Distortion, Erosion, Deposition)

9) India has _____ hotspots of biodiversity.

(2, 4, 6, 8)

10) Change in the height and _____ both show more or less similar effects upon the types of major vegetation of the world.

(Latitude, Longitude, Height, Depth)

2. Answer in short **(any five)** : **10**

1) Define biogeography.

2) What are the types of consumers ?

3) Define the word habitats.

4) Carbon cycle.

5) What are the types of ecosystem ?

6) Laws of energy flow.

3. Answer in short **(any two)** : **6**

A) 1) Describe the nature and scope of biogeography.

2) Explain in brief the major types of forests.

3) Describe the energy pyramid.

B) Write a note on marine ecosystem. **4**

4. Answer the question in short **(any two)** : **10**

   1) Element of plant geography.

   2) Food chain and food web.

   3) Deforestation.

5. write in short **(any two)** : **10**

   1) Explain the types of biodiversity.

   2) Major biomes of the world.

   3) What are the types of conservation ?

————————————

Seat
No.

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

Day and Date : Saturday, 31-5-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

   i) Chemically volutin granules are _____
   a) Sulphate   b) Nitrate
   c) Polyphosphate   d) Glycogen

   ii) Swelling of cell due to hypotonic solution is known as _____

   a) Plasmolysis   b) Plasmoptysis

   c) Shrinking   d) Bursting

   iii) _____ play important role in conjugation bridge formation.

   a) Flagella   b) Cell wall

   c) Sex pili   d) Cell membrane

   iv) <u>Clostridium</u> <u>tetani</u> is an _____ spore forming organism.

   a) Anaerobic   b) Aerobic

   c) Facultative   d) Microaerophilic

   v) To counter act gravitational pool some bacterial cells possess _____

   a) Carboxysomes   b) Gas vesicle

   c) Protoplast   d) Chlorobium vesicle

P.T.O.

vi) Thymine dimer is formed by the action of _____

   a) Heavy metal   b) U. V. rays

   c) X-ray   d) Surface tension

vii) Carboxysomes are involved in _____ activity.

   a) CO_2 fixation   b) CO_2 evolution

   c) Nitrification   d) N_2 fixation

viii) _____ is an example of broad spectrum antibiotic.

   a) Penicillin   b) Actinomycin D

   c) Streptomycin   d) Cephalosporin

ix) Reverse transcriptase enzyme is present in _____ virus.

   a) HIV   b) TMV

   c) T_4 phage   d) Hepatitis virus

x) Embryonated hens egg is used for cultivation of

   a) Bacteria   b) Yeast

   c) Viruses   d) Bacteriophages

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

   i) Define plasmolysis and plasmoptysis.

   ii) Define thermophilic organism with two examples.

   iii) Explain the role of chlorobium vesicle in bacteria.

   iv) Define photoreactivation.

   v) Define enzyme inhibitors with example.

   vi) Explain cyanophycin granules.

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

   i) Diauxic growth.

   ii) Volutin granules.

   iii) Homolactic fermentation.

  B) Describe effect of pH on growth of microorganisms with types and examples.   **4**

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

   i) Cell wall of gram negative bacteria.

   ii) Cyclic photophosphorylation.

   iii) Classification of enzymes.

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

   i) Continuous growth.

   ii) Animal tissue culture technique.

   iii) Direct microscopic count.

––––––––––––––

SLR-C – 78

B.Sc. (Part – II) (Semester – III) Examination, 2014
ELECTRONICS (Paper – VI)
Pulse and Switching Circuits

Day and Date : Monday, 2-6-2014   Total 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) The circuit that introduces a dc level into an ac input signal is called
     _____

     a) Integrator   b) Differentiator
     c) Clipper   d) Clamper

   ii) _____ circuit produces triangular wave output from a square wave input.

     a) Integrator   b) Differentiator
     c) Clipper   d) Clamper

   iii) In UJT if RB1 is the bulk resistance between emitter and base – 1 and RB2 is the bulk resistance between emitter and base – 2, then the intrinsic stand-off ratio will be _____

     a) RB1/RB2   b) RB2/RB1

     c) $\dfrac{RB1}{RB1+RB2}$ d) $\dfrac{RB2}{RB1+RB2}$

P.T.O.

iv) The method used to obtain linear time-base output is

   a) Exponential charging   b) Constant current charging

   c) Miller integration   d) Both b and c

v) To use transistor as a switch, the transistor must be operated in _____

   a) Saturated region   b) Cut-off region

   c) Active region   d) Both a and b

vi) If 1kHz sine wave signal is applied to a Schmitt-trigger circuit, the rectangular output frequency will be _____

   a) 500 Hz   b) 1 kHz

   c) 2 kHz   d) 100 Hz

vii) In an astable multivibrator using BJT, if TON = 1 m Sec, TOFF = 4 m Sec, then the duty cycle of the output wave will be _____

   a) 10%   b) 20%   c) 80%   d) 25%

viii) _____ multivibrator can be used as a flip-flop.

   a) Astable   b) Monostable

   c) Bistable   d) All of these

ix) For a supply voltage of + 12V applied to IC 555 used as astable mutlivibrator, the threshold and trigger levels will be _____

   a) 8 V & 4 V   b) 9 V & 4.5 V

   c) 12 V & 0 V   d) 12 V & 6 V

x) For IC555 used as monostable multivibrator, if the timing components used are 100 kΩ and 100μ F, the gate width will be _____ seconds.

   a) 1.1   b) 10   c) 11   d) 110

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

    i) Draw the circuit diagram of biased series negative clipper.

    ii) Give the construction of UJT.

    iii) Give the operation of transistor as a switch.

    iv) Draw the input-output waveforms for schmitt trigger circuit and comment.

    v) Explain the role of discharge transistor in the functional block diagram of IC555.

    vi) Give the significance of figure "555" in timer IC555.

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

    i) Explain integrator circuit. Write the equation for output voltage.

    ii) Explain the terms slope error and sweep speed for time base circuit.

    iii) Draw the circuit diagram for astable multivibrator using IC555.

   B) Discuss about transistor switching times.   **4**

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

    i) Explain Miller integrator.

    ii) Discuss the application of IC555 as battery charger.

    iii) Explain in brief the operation of collector coupled astable multivibrator. Show the waveforms.

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

    i) Discuss any one application of Schmitt-trigger circuit.

    ii) Explain the operation of IC 555 as monostable multivibrator. Obtain the expression for gate width.

    iii) Explain the working of collector-coupled bistable multivibrator. Draw the timing diagrams.

—————————————

B.Sc. – II (Semester – III) Examination, 2014
GEOGRAPHY (Paper – VI)
Soil Science

Day and Date: Monday, 2-6-2014　　　　　　　　　　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.

3) Use of stencil is **allowed**.

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

   1) The word pedology coming from the _____ word pedon.

      a) Arabian　　　　　　　　b) Indian

      c) Greek　　　　　　　　　d) Roman

   2) Soil is one of the most significant _____ components.

      a) Geological　　　　　　　b) Geomorphological

      c) Ecological　　　　　　　d) Land

   3) Parent material is an example of _____ factors.

      a) Passive　　　　　　　　b) Active

      c) Deed　　　　　　　　　d) None of these

   4) Physical weathering is also known as _____ weathering.

      a) Biotic　　　　　　　　　b) Chemical

      c) Mechanical　　　　　　　d) None of these

   5) The influence of temperature on the formation of soil is in _____ ways.

      a) Two　　　　　　　　　　b) Three

      c) Five　　　　　　　　　　d) Seven

   6) Soil _____ is a very important characteristics in the designation of soil type.

      a) Colour　　　　　　　　　b) Feature

      c) Profile　　　　　　　　　d) Moisture

P.T.O.

7) A lower _____ value indicates a greater degree of acidity.

   a) pH   b) PQ

   c) HP   d) QP

8) _____ colour of soil is associated with the oxides of iron.

   a) Black   b) Grey

   c) Red   d) Yellow

9) Faulty method of agriculture causes _____ % of soil erosion.

   a) 40   b) 30

   c) 20   d) 10

10) The _____ of land is necessary to protect our cultivated farms.

   a) Conservation   b) Degradation

   c) Utilization   d) Protection

2. Answer in short **(any five)** :   **10**

   1) Meaning of soil

   2) What is soil profile ?

   3) Regur soil

   4) Soil texture

   5) Soil conservation

   6) Soil pH.

3. a) Answer in short (**any two**) :   **6**

   1) Explain in brief mechanical elements of soil.

   2) Classify the soils into their major types.

   3) Describe various soils conservation measures.

   b) Write a note on soil management.   **4**

4. Answer the questions (**any two**) :   **10**

   1) What is soil profile ?

   2) What are the causes of soil degradation ?

   3) Methods of soil conservation.

5. Answer the questions **any two** :   **10**

   1) Explain in brief the importance of soil resource.

   2) Explain soil horizons.

   3) Discuss chemical elements of soil.

——————————

Seat No.

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

Day and Date : Monday, 2-6-2014　　　　　　　　　　Total 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.
　　　　3) Draw diagrams **wherever** necessary.

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

　1) _____ induces frame shift mutation.

　　a) Acridine dyes　　　　　　　　b) 5 – Bromouracil
　　c) Alkylating agent　　　　　　　d) Nitrous acid

　2) _____ number of codons, do not specify any amino acid.

　　a) 64　　　　　　b) 3　　　　　　c) 2　　　　　　d) 61

　3) Major role played in bacterial conjugation is by _____

　　a) Flagella　　　　　　　　　　b) Cell wall

　　c) Sex pili　　　　　　　　　　d) Cell membrane

　4) _____ is the minimal genetic unit capable of mutation.

　　a) Muton　　　　　　　　　　b) Recon

　　c) Cistron　　　　　　　　　　d) Exon

　5) _____ is an initiation codon.

　　a) UUU　　　　　b) AUG　　　　　c) GGG　　　　　d) CCC

　6) _____ discovered the process of transformation.

　　a) Zinder and J. Lederberg　　　　b) Griffith

　　c) Lederberg and Lederberg　　　　d) Lederberg and Tatum

7) 5 – Bromouracil is an analogue of

   a) Adenine   b) Guanine

   c) Cytosine   d) Thymine

8) _____ is a plasmid without any function, except self replication.

   a) Cryptic   b) T: c) Col.   d) PBR 322

9) The average that divides the distributions into two equal halves is called _____

   a) Mean   b) Mode

   c) Median   d) All of these

10) _____ values represents most frequently occurring value of the population.

   a) Mean   b) Mode

   c) Median   d) Variance

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

   i) What is a genotype ?

   ii) What is interrupted gene ?

   iii) Define transfection.

   iv) What is initiation codon ?

   v) Define plasmid, give its significance.

   vi) Describe Mean.

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

   i) What is abortive transduction ?

   ii) Write an account on fate of exogenote.

   iii) Give an account of 'Fluctuation test'.

  B) Explain in detail 'Dark Repair Mechanism'.   **4**

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

   i) What is recombination ? Write details of conjugation.

   ii) Give an account on 'Applications of biostatistics in biology'.

   iii) Explain properties and types of plasmids.

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

   i) What is the mechanism of mutation induced by 2-aminopurine and hydroxyl amine ?

   ii) Write an essay on 'Genetic Code'.

   iii) Explain the structure of genetic material and its various forms.

———————————

SLR-C – 83

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

Day and Date : Friday, 25-4-2014   Max. Marks : 50
Time : 11.00 a.m. to 1.00 p.m.

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

ii) Draw **neat** diagrams and give equations **wherever** necessary.

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

iv) **Use** of logarithmic tables and scientific calculator is **allowed**.
(At. wts. : H = 1, C = 12, O = 16, N = 14, Na = 23,
Cl = 35.5)

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

1) Transport number of the cation depends upon the transport number of
_____ attached to it.

   a) +ve ion   b) molecules   c) anion   d) all of these

2) For thermodynamically reversible process, the entropy change is _____

   a) zero   b) one   c) two   d) three

3) If the plane of crystal cuts the two co-ordinate axes and is parallel to third
axis, then it is known as _____ plane.

   a) cubic   b) cubic diagonal

   c) simple   d) diagonal

4) Molecules in which effective centers of +ve and –ve charges coincide are
called _____ molecules.

   a) non-polar   b) polar   c) colloidal   d) none of these

P.T.O.

5) When a solution of weak electrolyte is diluted, the molar conductivity of the solution _____

   a) increases   b) decreases

   c) remains same   d) none of these

6) Which of the following is not an extensive property ?

   a) enthalpy   b) boiling point   c) entropy   d) mass

7) Three dimensional array of points in space is called _____

   a) crystal structure   b) unit cell

   c) crystal lattice   d) lattice plane

8) Which of the following molecule is expected to have finite value of dipole moment ?

   a) CH_4 b) H_2 c) benzene   d) bromobenzene

9) The unit of equivalent conductance is _____

   a) $S.cm^2 \, eq^{-1}$ b) $S.cm^{-2} \, eq^{-1}$ c) $mhos \, cm^{-1}$ d) $S.cm^{-1}$

10) In electrolytic cell, whatever may be the speed of ions, ions are always discharged in _____

   a) equivalent amount

   b) different amount

   c) equivalent or different amount

   d) none of these

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

   i) Explain conductance.

   ii) State third law of thermodynamics.

   iii) Define dipole moment.

   iv) Explain plane of symmetry.

   v) Explain pOH of a solution.

   vi) Define equivalent conductance.

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

   i) How you would determine the degree of dissociation of weak electrolyte by using Kohlrausch's law ?

   ii) Explain how the use of dipole moment helps in the study of triatomic molecules.

   iii) Discuss any two factors affecting transport number.

   B) Calculate the entropy change involved in thermodynamic expansion of 2 moles of a gas from a volume of 5 litres to a volume of 75 litres at 303K. **4**

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

   i) How the Kohlrausch's law be applied to determine the solubility of a sparingly soluble salts ?

   ii) What is crystallography ? Explain unit cell.

   iii) What is meant by refraction of light ? Explain the term refractive index.

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

   i) Explain Weiss indices and miller indices.

   ii) Physical significance of entropy.

   iii) Explain equivalent conductance at infinite dilution.

_____

Seat No.

B.Sc. – II (Semester – IV) Examination, 2014
COMPUTER SCIENCE (Paper – VII)
Data Structure

Day and Date : Friday, 25-4-2014   Max. 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 postfix expression of given expression a ∗ b/c + d is _____

      a) ab ∗ cd + 1   b) ab / ∗ cd +   c) ab ∗ c/d +   d) abc / ∗ d +

   2) _____ condition is checked for inserting element in stack of size MAX.

      a) top == MAX   b) top == – 1   c) top == 0   d) top == MAX – 1

   3) The element with _____ priority will be deleted first in priority queue.

      a) same   b) low   c) zero   d) high

   4) Tree is a non linear data structure.

      a) True   b) False

   5) Find out odd one of the following list.

      a) Stack   b) Queue   c) Tree   d) Linked list

   6) For storing data permanently array may be useful solution.

      a) True   b) False

   7) In link list the node contain next (link) part which contain _____

      a) Data of that node   b) Data of next node
      c) Address of next node   d) All of above

8) Degree of leaf node is always _____

    a) zero   b) one   c) two   d) –one

9) An array can be collection of _____ data item.

    a) Same   b) Different

    c) Both a) and b)   d) None of these

10) _____ operation on stack is used to perform to add element in stack.

    a) add   b) insert   c) push   d) pop

2. Answer the following :   **10**

    1) Definition of stack.

    2) Write the application of queue.

    3) Hash collision.

    4) Write the advantage of B^+ trees.

    5) State data types.

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

    1) List out advantages of AVL tree over other binary trees.

    2) Differentiate Array and linked list.

    3) Explain indexed sequential search.

  b) Write a program to implementation insertion sort.   **4**

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

    1) Differentiate between stack and queue.

    2) What are different operations on list ?

    3) Explain representation of binary trees.

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

    1) Write a program to implementation of recursion.

    2) Write a short note on 'Priority Queue'.

    3) Write a program to implement stack.

_____

Seat No.

B.Sc. – II (Semester – IV) Examination, 2014
COMPUTER SCIENCE
Paper – VIII : System Analysis and Design

Day and Date : Saturday, 26-4-2014   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) Which of the following feasibility study always focuses on the existing computer hardware, software ?

   a) Operational   b) Technical   c) Manpower   d) Economic

2) A deterministic system operates in a predictable manner.

   a) True   b) False

3) System analyst should create models/prototypes of the system.

   a) True   b) False

4) Interviews, questionnaires, observations are different fact finding technique used by analyst.

   a) True   b) False

5) MIS means

   a) More Infinity System
   b) Most Information System
   c) Major Information System
   d) Management Information System

6) Normalization is necessary for

   a) To avoid redundancy   b) To increase flexibility
   c) Maintenance of data easier   d) All of these

7) In an E-R diagram to represent an attribute we use

   a) Rectangle   b) Ellipse   c) Diamond   d) Line

8) _____ is a process of executing programming with object of finding error.
   a) S/W testing   b) S/W analysis
   c) S/W Design   d) None of above

9) If the system is in routine in nature then it gives negative feed back.
   a) True   b) False

10) Aliases means different names of data items.
   a) True   b) False

2. Answer **any five** of the following :   **10**
   i) Explain deterministic and probabilistic system.
   ii) Explain the technical skills required in system analyst.
   iii) Explain decision tree in brief.
   iv) What is implementation ?
   v) Explain advantages of sequential file organization.
   vi) Define Entity.

3. A) Answer **any two** of the following :   **6**
   i) What is system ? Explain characteristics of system.
   ii) Write short note on interview.
   iii) Discuss the different methods of conversion from old system to new system.

   B) What skills are expected in system analyst ?   **4**

4. Answer **any two** of the following :   **10**
   i) Explain various roles of system analyst.
   ii) Write a note on advantages and disadvantages of a decision table.
   iii) What is normalization ? Explain upto 3 NF.

5. Answer **any two** of the following :   **10**
   i) Explain system development life cycle in detail.
   ii) Explain different types of file.
   iii) Write short note on program flowchart.

_____

Seat No.

B.Sc. II (Semester – IV) Examination, 2014
BIOCHEMISTRY (Paper – III)
Nutrition and Metabolism

Day and Date : Monday, 28-4-2014   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) In nutrition, elements for which daily requirements are greater than _____ are called as minerals.

   a) 100 microgram   b) 100 milligram

   c) 100 gram   d) 100 picogram

   ii) RBCs utilise _____ as a source of energy for metabolism.

   a) proteins   b) lipids   c) glucose   d) glycogen

   iii) Lipmann stated that _____ functions in a cyclic manner to transfer energy from anabolic and catabolic processes.

   a) coenzyme Q   b) cytochromes

   c) flavoproteins   d) ATP

   iv) _____ acid is a starting substrate for tricarboxylic acid cycle reactions.

   a) pyruvic   b) citric   c) oxalic   d) succinic

   v) All spontaneous reactions proceed with _____ in free energy.

   a) increase   b) equilibrium   c) decrease   d) zero value

   vi) _____ buffer system is a prominant buffer system of blood.

   a) Protein   b) Bicarbonate   c) Phosphate   d) Hemoglobin

   vii) _____ amino acid is involved in urea cycle.

   a) Glycine   b) Valine   c) Tyrosine   d) Arginine

viii) For oxidation of fatty acids _____ molecules transport them into mitochondria.

a) carnitine   b) cyclic AMP   c) pyruvate   d) citrate

ix) Ammonia eliminated through urine is mostly derived from _____

a) arginine   b) aspartic acid

c) glutamine   d) alanine

x) Principal use of BMR in clinical practice is in the diagnosis of _____ disease.

a) diabetes   b) thyroid   c) addison's   d) phenylketonuria

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

1) What is the role of antidiuretic hormone in the body ?

2) State the causes of dehydration.

3) How is metabolic acidosis controlled by the body ?

4) Explain the phosphate buffer system of body.

5) What are the functions of water in the body ?

6) State various uses of calcium in the body.

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

1) Write an account of role of fatty acids in diet.

2) Discuss exergonic and endergonic reactions.

3) Which factors affect BMR ? How ?

B) Write an account of components involved in respiration.   **4**

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

1) Draw a labelled diagram of a constant volume adiabatic bomb colorimeter and explain its use.

2) Write and explain the reactions of energy yielding phase of glycolysis.

3) Illustrate – ATP as a high energy molecule.

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

1) Explain different deamination reactions of amino acid metabolism.

2) Discuss the importance of proteins in diet.

3) Write and explain the reactions of β-oxidation of fatty acid – palmitic acid.

_____

SLR-C – 9

Seat No.	

B.Sc. (Part – I) (Semester – I) (Old) Examination, 2014
GEOGRAPHY
Physical Geography (Paper – II) Climatology

Day and Date : Saturday, 7-6-2014   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) Answers to **both** Sections should be written in **one** answer book.*
   *4) **Neat** diagram must be drawn **wherever** necessary.*
   *5) **Use** of map stencils is **allowed**.*

1. Choose the correct alternatives given in the bracket and correct the following sentences.   **10**

   1) _____ may be defined as an average weather condition for a long period of time.

      (Weather, Climate, Climatology, Meteorology)

   2) _____ zone extends between the tropics of capricorn an cancer.

      (Frizid, Temperate, Troposphere, Tropical)

   3) The lines joining the places of equal _____ are called isotherms.

      (Pressure, Rainfall, Humidity, Temperature)

   4) _____ winds are the westerlies.

      (Trade, Antitrade, Polar, Seasonal)

P.T.O.

5) The standard atmospheric pressure at sea level is _____ mb.

(1013.20, 1020.13, 1310.20, 1320.10)

6) In troposphere temperature _____ with increasing height.

(Decreases, Increases, Remains constant, Rises)

7) Oxygen gas accounts for _____ % volume of the atmosphere.

(78, 29, 71, 21)

8) Amount of water vapour present in the atmosphere is called _____

(Evaporation, Condensation, Humidity, Precipitation)

9) The _____ sphere of the earth is called as atmospher.

(hydro, litho, cryo, gaseous)

10) Roaring fourties are the _____ winds.

(Easterlies, Westerlies, Polar, Trade)

2. Answer **any five** questions from the following : **10**

1) Define climatology.

2) State different elements of climate.

3) Define isobars.

4) What is an insolation ?

5) What is meant by annual range of temperature ?

6) Explain the roaring fourties.

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

1) Explain inversion of temperature.

2) Element of climate.

3) Describe troposphere.

B) Explain pressure belts of the globe. **4**

4. Answer **any two** questions from the following : **10**

   1) Explain the horizontal distribution of temperature.

   2) Discuss antitrade winds.

   3) Importance of climatology.

5. Answer **any two** questions from the following : **10**

   1) Explain factors affecting insolation.

   2) Describe trade winds in detail.

   3) Heat budget of the globe.

———————————

Seat No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
PHYSICS (Paper – VIII)
Modern Physics

Day and Date : Tuesday, 29-4-2014　　　　　　　　　　　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) Neat diagrams must be drawn **whenever** necessary.

　　　iv) **Use** of log-tables and calculators is **allowed**.

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

　　i) The inertial frame of reference is _____ frame of reference.
　　　a) on accelerated　　　　b) un-accelerated
　　　c) a rotating　　　　　　d) constant

　　ii) For a moving observer, the time interval appears to _____
　　　a) remain constant　　　b) be lengthened
　　　c) be shortened　　　　　d) unchanged

　　iii) A moving particle of matter is always associated with _____
　　　a) wave　　　　　　　　b) photon
　　　c) radiation　　　　　　d) charge

　　iv) The concept of matter waves was proposed by _____
　　　a) Newton　　　　　　　b) Einstein
　　　c) de-Broglie　　　　　　d) Bohr

　　v) X-rays are the _____ waves.
　　　a) electromagnetic　　　b) mechanical
　　　c) longitudinal　　　　　d) transverse

　　vi) In compton scattering, the wavelength of scattered radiation is _____-
　　　than that of incident radiation.
　　　a) less　　　　　　　　b) greater
　　　c) same　　　　　　　　d) independent

P.T.O.

vii) The equation of any one of the lines on a MOSLAY diagram is given by
D = _____
   a) $a(z - b)$
   b) $a(z - b)^2$

   c) $a(z - b)^3$
   d) $\sqrt{a(z-b)^2}$

viii) Normal Zeeman effect is observed when _____ magnetic field is applied to sodium line.
   a) weak
   b) medium
   c) strong
   d) constant

ix) Orbital quantum number (l) takes the values from 0 to _____
   a) n
   b) $n - 1$
   c) $n + 1$
   d) $2n - 1$

x) The β-particle is identified as _____
   a) an electron
   b) a neutron
   c) a photon
   d) proton

2. Attempt **any five** of the following :   **10**
   i) Write down the Lorentz transformation equations.
   ii) Define phase velocity and group velocity.
   iii) State Duone-Hunt's law.
   iv) What is de-Broglie wavelength of electron accelerated through 54 volts ?
   v) State Pauli's exclusion principle.
   vi) State displacement law of radioactive transformation.

3. A) Answer **any two** of the following :   **6**
      i) Explain Galilean transformation.
      ii) Obtain the expression for de-Broglie wavelength of matter-waves.
      iii) Explain in short spin-orbit coupling.

   B) Write a note on carbon dating.   **4**

4. Attempt **any two** of the following :   **10**
   i) Explain in brief various quantum numbers associated with vector atom model.
   ii) Obtain the expression for relativistic variation of mass with velocity.
   iii) Derive Bragg's law of X-ray diffraction.

5. Attempt **any one** of the following :   **10**
   i) Obtain the expressions for half life and mean life of a radioactive element.
   ii) Describe Stern Gerlach experiment.

_____

Seat No.

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

Day and Date : Tuesday, 29-4-2014   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 by selecting most correct answer from given options. **(10×1=10)**

   1) Chargaff showed that

      a) in DNA number of purine bases is always equal to the number of pyrimidine bases.

      b) DNA is a double helix

      c) mRNA is polycistronic

      d) tRNA is clover leaf like in structure

   2) Template strand is present in

      a) tRNA   b) Ribosome

      c) DNA   d) Reverse transcriptase

   3) DNA directed RNA polymerase enzyme is involved in

      a) replication of DNA   b) transcription of DNA

      c) translation of mRNA   d) synthesis of C-DNA

   4) _____ Codon on mRNA initiates protein biosynthesis.

      a) UAA   b) UAG

      c) UGA   d) AUG

   5) Concept of lac operon was proposed by

      a) Watson and Crick   b) Meselson and Stahl

      c) Jacob and Manod   d) Chargaff

P.T.O.

6) Translation means the process of biosynthesis of

   a) DNA   b) RNA

   c) Protein   d) Fats

7) Bacteria commonly used in recombinant DNA work are

   a) Vibrio cholereae   b) Salmonella typhosa

   c) Aspergillus niger   d) Escherichia coli

8) Cervical cancer is caused by

   a) human papilloma virus   b) asbestos

   c) tobacco   d) ultraviolet rays

9) _____ is a peculiarity of HIV.

   a) Replication in vitro   b) Presence of reverse transcriptase

   c) Transmission through air   d) Double stranded DNA genome

10) In diabetes mellitus function of _____ hormone is not normal.

   a) growth   b) insulin

   c) aldosterone   d) thyroxine

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

   1) What is innate immunity ?

   2) Give two differences between natural passive immunity and artificial passive immunity.

   3) How does body respond to HIV infection during early acute phase ?

   4) What is difference between a nucleoside and a nucleotide ?

   5) How are Okazaki fragments formed ?

   6) What are concatemers ? How are they formed ?

3. A) Attempt **any two :**   **(2×3=6)**

   1) Discuss clonal selection theory of antibody production.

   2) Explain production of insulin using gene cloning technique.

   3) Write a note on-tumor markers.

   B) With the help of graph describe natural course of AIDS.   **4**

4. Answer **any two :** **(2×5=10)**

   1) Discuss in details about restriction endonucleases.

   2) Describe the structure and regulation of Lac operon gene.

   3) Describe the replication of DNA in brief.

5. Attempt **any two :** **(2×5=10)**

   1) What are the features of genetic code ?

   2) Discuss the structure of immunoglobulin G (IgG).

   3) What are the ways for management of insulin dependent diabetes and non insulin dependent diabetes ?

   _____

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

Day and Date: Tuesday, 29-4-2014   Total Marks : 50
Time: 3.00 p.m. to 5.00 p.m.

N.B. : i) **All** questions are **compulsory**.

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

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

1. Select the **correct** answer and rewrite the sentences :   **10**

   1) Grasshopper is the common pest of _____ crop.

      a) Groundnut   b) Mango

      c) Rice   d) Brinjal

   2) _____ is the pest of stored grains.

      a) Anar Butterfly   b) Stem borer

      c) Pulse bettle   d) Mealybug

   3) There are/is _____ no. of generations of mealybug in a year.

      a) 1   b) 2

      c) 3   d) 4

   4) <u>Virachola isocrates</u> is the scientific name of _____

      a) Leafhopper of sugarcane   b) Grasshopper

      c) Brinjal fruit borer   d) Anar Butterfly

   5) A chemical or physiological source which induce insects to move away from it is called _____

      a) Repellent   b) Antifeedent

      c) Chemosterilant   d) Attractant

   6) _____ is plant origin insecticide.

      a) DDT   b) Nicotine sulphate

      c) Carbofuran   d) Toxaphene

P.T.O.

7) The mango female mealybug completes its life cycle within _____ days.

   a) 77 to 135   b) 67 to 119

   c) 50 to 100   d) 40 to 90

8) _____ is the most important insecticidal chemical constituent obtained from Neem plant.

   a) Anabasine   b) Pyrethrin

   c) Azadirachtin   d) Cinerin

9) The life cycle of an insect is divided into _____ stages.

   a) Four   b) Five

   c) Three   d) Two

10) _____ is not insectide.

   a) Diazonin   b) 2-4-D

   c) Carbofuran   d) Pongram

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

   i) Give the general characters of insects.

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

   iii) Write about mouthparts of Grasshopper.

   iv) How to manage the damage caused by fruit borer of Brinjal ?

   v) Give the range of host of pod borer.

   vi) What you know about Antifeedents and Attractants ?

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

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

   ii) Give the Scientific name and host range of Grasshopper.

   iii) Give the classification of insects based on mouth parts.

  B) Give the life cycle of mealybug   **4**

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

   i) State the safety applications of pesticides.

   ii) Describe the chemical insecticides.

   iii) Give an account of Jowar stem borer with respect to morphology and life cycle.

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

   i) Give the mode of action of pesticides.

   ii) Give an account of Gram pod borer with respect to morphology and life cycle.

   iii) Give the marks of identification and life cycle of pulse bettle.

_____

B.Sc. – II (Sem. – IV) Examination, 2014
STATISTICS (Paper – VII)
Continuous Probability Distributions – II

Day and Date : Wednesday, 30-4-2014   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* indicates *full* marks.

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

    1) The sum of independent gamma variates is
       a) Gamma variate   b) Beta variate of first kind
       c) Beta variate of second kind   d) None of these

    2) The p.d.f. of uniform distribution over (0, 1) is similar to the p.d.f. of
       a) $\beta_2(1, 1)$ b) $\beta_1(1, 1)$
       c) $N(0, 1)$ d) none of these

    3) If $X \sim \beta_1(m, n)$ variate, where m > 1, n > 1, the mode is

       a) $\dfrac{m}{m+n-2}$ b) $\dfrac{m-1}{m+n-1}$

       c) $\dfrac{m-1}{m+n-2}$ d) none of these

    4) If $X \sim \beta_2(m, n)$, then $\dfrac{1}{X}$ has _____ distribution.

       a) $\beta_1(m, n)$ b) $\beta_2(n, m)$
       c) $\beta_1(n, m)$ d) none of these

5) If X~N(16, 25), then the standard normal variate Z will be

   a) $Z = \dfrac{X - 16}{25}$

   b) $Z = \dfrac{X - 4}{5}$

   c) $Z = \dfrac{X - 16}{5}$

   d) none of these

6) If $Z_1, Z_2, \ldots Z_n$ are iidN(0,1) variates then the distribution of $\sum\limits_1^n Z_i^2$ is a

   a) t-dist^n with n d.f.

   b) χ^2 – dist^n with n d.f.

   c) t-dist^n with (n – 1) d.f.

   d) none of these

7) Relation between mean and variance of $\chi^2_{(n)}$ distribution is

   a) mean = 2. variance

   b) 2. mean = variance

   c) mean = variance

   d) none of these

8) Student's t-distribution was given by

   a) G. W. Snedecor

   b) R.A. Fisher

   c) W. S. Gosset

   d) None of these

9) Mean of F-distribution with n_1 and n_2 degrees of freedom is ($n_2 > 2$)

   a) $\dfrac{n_2}{n_2 - 2}$

   b) $\dfrac{n_1}{n_2 - 2}$

   c) $\dfrac{n_2}{n_1 - 2}$

   d) none of these

10) Let Z ~ N (0, 1). Then P(–1.96 < Z < 1.96) is equal to

   a) 0.95

   b) 0.05

   c) 0.01

   d) 0.99

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

   i) Define p.d.f. of gamma distribution with parameters (α, λ). If $\lambda = 1$, then identify its distribution.

   ii) State the additive property of chi-square distribution.

iii) Let X, Y and Z be three independent G (6, 3), G (6, 4) and G (6, 5) respectively. Identify the distribution of W = X + Y + Z. Find E (W).

iv) Show that the odd order central moments of t-distribution are vanish.

v) State the additive property of normal distribution.

vi) What is the relation between F and chi-square distributions ?

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

    i) Find mean and variance of beta distribution of first kind.

    ii) State and prove additive property of gamma distribution.

    iii) If X and Y are independent normal variates with means μ_1, μ_2 and variances σ_1^2, σ_2^2 respectively. Find the probability distribution of Z = aX + bY, where a and b are constants.

  B) If X ~ χ_n^2 variate, then show that 2 mean = variance. **4**

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

    i) Find m.g.f. of gamma variate with α and λ parameters.

    ii) If X ~ β_2 (m, n) variate, obtain the distribution of $\dfrac{1}{X}$.

    iii) Obtain mode of F-distribution with (n_1, n_2) d.f.

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

    i) If X and Y are independent gamma variates with parameters m and n respectively. Obtain the distribution of u = X + Y and $v = \dfrac{X}{X+Y}$.

    ii) Obtain the median of $N(\mu, \sigma^2)$.

    iii) Find the mean and variance of t-distribution with n d.f.

_____

Seat No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
ZOOLOGY (Paper – VII)
Animal Diversity – IV

Day and Date : Wednesday, 30-4-2014   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) **Neat** diagrams must be drawn **whenever** necessary.

1. Rewrite the following sentences using correct alternatives :   **10**

    1) The exoskeleton of _____ consists of scales, scutes or bony plates.

      a) Sirenia   b) Birds   c) Amphibians   d) Reptiles

    2) Rat belongs to the order _____

      a) Squamata   b) Rodentia   c) Cetacea   d) Urodela

    3) Pulmonary artery carry _____ blood to the lungs.

      a) Deoxygenated   b) Oxygenated

      c) Mixed   d) Clotted

    4) The _____ era is known as golden era of reptiles.

      a) Paleozoic   b) Mesozoic   c) Coenozoic   d) Azoic

    5) In rat digestion is stomach is called _____ digestion.

      a) Gastric   b) Complete   c) Incomplete   d) Partial

    6) The liver secretes _____

      a) Pancreatic juice   b) Enzymes

      c) Bile   d) Insulin

    7) In poisonous snakes the poison gland is _____ shaped.

      a) Diamond   b) Pear   c) Rod   d) Almond

    8) In rat the RBCs are _____

      a) Single nucleated   b) Non nucleated

      c) Binucleated   d) Nucleated

9) Fruit eating beak is found in _____

a) Sparrow   b) Parrot   c) Vulture   d) Kite

10) Archaeopteryx is connecting link between

a) Amphibian and reptiles   b) Pisces and amphibians

c) Birds and reptiles   d) Mammals and amphibians

2. Write short notes on following (**any five**) :   **10**

1) Seed eating beak

2) Characters of poisonous snakes

3) Salient features of mammals

4) Stegosaurus

5) Marsupials

6) Dentition in rat.

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

1) Longitudinal migration in birds.

2) Describe digestion in stomach of rat.

3) Describe climbing feet in parrot.

B) Dentition in human.   **4**

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

1) Poisonous apparatus in snakes.

2) Describe internal ear of rat.

3) Malpighian tubule of rat.

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

1) Describe in detail nervous system of rat.

2) Give an account of salient features and affinities of monotremes.

_____

Seat No.

B.Sc. – II (Semester – IV) Examination, 2014
STATISTICS (Paper – VIII)
Applied Statistics

Day and Date : Friday, 2-5-2014   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) Probability of any one sample of size 'n' being drawn out of N units is

   a) $\dfrac{1}{N}$ b) $\dfrac{n}{N}$ c) $\dfrac{1}{n!}$ d) $\dfrac{1}{N_{c_n}}$

   ii) Simple random sample can be drawn with the help of
       a) Random number tables   b) Chit method
       c) Lottery method   d) All the above

   iii) Control charts consist of
       a) Three control lines
       b) Upper and lower control limits
       c) The level of the process
       d) All the above

   iv) Total population will remain same if per women
       a) NRR > 1   b) NRR < 1
       c) NRR = 1   d) None of these

   v) Variation due to assignable causes in the product occurs due to
       a) Faulty process
       b) Carelessness of operators
       c) Poor quality of raw material
       d) All the above

vi) Which of the following is a composite hypothesis ?

a) $H_1 : \theta > 10$ b) $H_1 : \theta < 10$

c) $\theta \neq 10$ d) All the above

vii) 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

viii) An estimate of process sd σ is

a) $\dfrac{d_2}{\overline{R}}$ b) $d_2\overline{R}$ c) $\dfrac{\overline{R}}{d_2}$ d) $\overline{R} + d_2$

ix) Always, the hypothesis under test is

a) null hypothesis
b) alternative hypothesis
c) simple hypothesis
d) composite hypothesis

x) In simple random sampling with replacement the same sampling unit may be included in the sample

a) only once
b) only twice
c) more than once
d) none of the above

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

i) Define a statistic giving two examples.

ii) Explain the term defect.

iii) Explain with illustration 'population'.

iv) Explain with illustration 'census survey'.

v) Explain what is a simple hypothesis. Give an example.

vi) Define Type I error and Type II error.

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

    i) Write the standard errors of the following :

      a) Sample mean

      b) Sample proportion

      c) Difference of two sample means

    ii) Define the terms :

      a) Defect

      b) Defective

      c) Fraction defective

    iii) Show that in case of simple random sampling without replacement (SRSWOR) expected value of the sample mean is population mean.

  B) Answer the following : **4**

    Explain the construction of control chart for number of defects when standards are not given.

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

  i) Distinguish between process control and product control.

  ii) Prove that in a simple random sampling without replacement sample mean square is an unbiased estimate of population mean square.

  iii) Describe the procedure for testing the equality of two population means $\mu_1 = \mu_2$ based on t distribution.

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

  i) For the 2×2 contingency table, prove that the chi-square test for independence gives.

$$\chi^2 = \frac{N(ad - bc)^2}{(a + c)\,(a + b)\,(c + d)\,(b + d)}$$

    Where $N = a + b + c + d$.

  ii) Explain the construction of R chart when standards are given.

  iii) Discuss the criteria for detecting lack of control.

Seat
No.

B.Sc. (Part – II) (Semester – IV) Examination, 2014
GEOCHEMISTRY (Paper – IV)
Chemistry of the Earth

Day and Date : Friday, 2-5-2014   Total Marks : 50
Time : 3.00 a.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 options.   **10**

    1) The pH of environment is significant for the transportation of _____
       a) Alumina and Silica   b) Alumina and iron
       c) Silica and iron   d) Iron and Magnesia

    2) _____ soil order is rich in hydrated oxides of Al and Fe.

       a) Mollisol   b) Oxisol

       c) Affisol   d) None of the above

    3) Unpolluted dry air constitute _____ % of CO_2.

       a) 0.320   b) 0.130   c) 0.032   d) 0.013

    4) Chlorofluorocarbon is responsible for depletion of _____

       a) Ozone   b) O_2

       c) Nitrogen   d) Argon

    5) The most common mineral in soil is _____

       a) Quartz   b) Clay

       c) Mica   d) Calcite

6) _____ mineral is least susceptible to chemical weathering.

   a) Olivine   b) Calcite

   c) Quartz   d) Augite

7) _____ element is of low ionic potential.

   a) Al   b) Si   c) Mn   d) Na

8) CO_2 in soil phase is about _____ % by volume.

   a) 0.50   b) 0.03   c) 1.30   d) 0.75

9) Biological Oxygen Demand (BOD) for pure water is _____ ppm.

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

10) The upper crust is equivalent of _____ composition.

   a) Basalt   b) Granite   c) Duenite   d) Pumice

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

   i) Oxidation.

   ii) Secondary air pollutants.

   iii) Organic chemicals.

   iv) Diagram showing the solubility of amorphous silica.

   v) Effects of soil pollution.

   vi) Mollisol soil.

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

   i) Hydrocarbon as primary pollutant.

   ii) Oxygen demanding wastes.

   iii) Control of water pollution.

   B) Explain soil formation.   **4**

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

   i) pH environment.

   ii) Earth as a physico-chemical system.

   iii) susceptibility of minerals to chemical weathering.

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

   i) Ionic potential.

   ii) Soil properties.

   iii) Iron sediments.

———————————

B.Sc. – I (Semester – I) Examination, 2014
COMPUTER SCIENCE (Paper – I) (New)
Computer Fundamentals – I

Day and Date : Wednesday, 4-6-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

1. Multiple choice questions :   **10**

    1) _____ is an interface between Hardware and Software.

      a) Operating system   b) ALU

      c) ROM   d) Control Unit

    2) Batch file contains _____ commands.

      a) Format   b) System   c) File   d) DOS

    3) _____ is a portable magnetic disks.

      a) CD   b) DVD   c) Hard disks   d) Floppy disks

    4) The speed of Dot matrix is measured in _____

      a) alpi   b) cps   c) ppm   d) rpm

    5) Digitizer is an _____ device.

      a) output   b) input   c) printing   d) display

    6) Data stored in computer called as _____

      a) Files   b) Directories   c) Floppy   d) Disks

    7) Memory is made up of _____

      a) Set of silicons   b) Set of circuits

      c) Large no. of cells   d) Set of ICS

    8) _____ command displays content of file on screen.

      a) DIR   b) Type   c) Del.   d) Copy con.

    9) _____ is volatile memory.

      a) RAM   b) ROM   c) EPROM   d) EROM

   10) _____ is output device.

      a) Keyboard   b) Joysticks   c) Lightpens   d) Plotters.

2. Answer **any five** : **10**

   a) Plotters

   b) DVD

   c) ALU

   d) LCD

   e) Bar Code Reader

   f) DOS.

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

   a) Explain operating system with different types.

   b) Dot matrix printers.

   c) Binary Arithmetic.

   B) Convert following : **4**

   a) $(110110)_2 \rightarrow (?)_8$

   b) $(ABgD)_{16} \rightarrow (?)_2$.

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

   a) Explain keyboards.

   b) Explain expansion slots on mother board.

   c) Files and Directories in DOS.

5. Answer **any two** : **10**

   a) Booting process.

   b) Binary Arithmetic.

   c) Applications of Computers.

_____

Seat No.

B.Sc. I (Semester – I) (New) Examination, 2014
COMPUTER SCIENCE (Paper – II)
Programming Using C – I

Day and Date : Thursday, 5-6-2014　　　　　　　　　　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) C language was developed by _____
　　　　a) Ken Thompson　　　　　　b) Dennis Ritchie
　　　　c) Y.C. Kanetkar　　　　　　 d) Balgurusami

　　2) The _____ function is used to display output on the scree.
　　　　a) printf ( )　　　　　　　　b) scanf ( )
　　　　c) getch ( )　　　　　　　　d) getchar ( )

　　3) Character variable can store at a time _____
　　　　a) 4 characters　　　　　　 b) 2 characters
　　　　c) 1 character　　　　　　　d) 8 characters

　　4) _____ datatype is built in data type.
　　　　a) structure　　　b) int　　　c) array　　　d) pointer

　　5) _____ is not operator in C language.
　　　　a) +　　　　　　b) *　　　　c) /　　　　d) #

　　6) _____ is built-in function used to calculate the length of string in C.
　　　　a) strlen ( )　　　　　　　　b) strlength ( )
　　　　c) length ( )　　　　　　　　d) strsize ( )

P.T.O.

7) An escape sequence character _____ causes the cursor to move to the next line.
   a) \t   b) \n   c) \r   d) \a

8) The type of all elements in an array must be same
   a) true   b) false

9) A program stop its execution when break statement encountered.
   a) true   b) false

10) _____ format code is used for integer type value.
   a) % d   b) % c   c) % f   d) % s

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

   1) Variable and constant.

   2) Explain logical operator's.

   3) Strcat ( ) and strrev ( ).

   4) Define algorithm and flowchart.

   5) Debugging.

   6) Explain any two header file's.

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

   1) List the features of C language.

   2) Explain syntax and use of do_while.

   3) What is array ? List different types of array.

   B) Write a program to find maximum number among three numbers.   **4**

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

   1) What is operator ? Explain types of operator's ?

   2) Explain switch statement with its syntax and example.

   3) Write a program to sort given array.

5. Answer **any two :**   **10**

   1) Write a program to compute sum of digits of given number.

   2) Explain forword and backword jump.

   3) Write a program to print.
      ```
      *
      * *
      * * *
      * * * *
      ```

Seat No.

B.Sc. – I (Sem. – I) (New) Examination, 2014
PHYSICS (Paper – I)
Mechanics and Properties of Matter

Day and Date : Friday, 6-6-2014
Time : 11.00 a.m. to 1.00 p.m.

Max. Marks : 50

N.B : 1) **All** questions are **compulsory**.
2) Figures to right indicate **full** marks.
3) Draw neat diagrams **wherever** necessary.
4) **Use** of logarithmic table and calculator is **allowed**.

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

   i) Moment of inertia in rotational motion is analogous to the _____ in translation motion.

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

   ii) M.I. of circular disc about an axis passing through its centre and perpendicular to its plane having mass 400 gm and radius 4 cm is _____ gm.cm^2.

   a) 3200   b) 1600   c) 6400   d) 8000

   iii) The modulus of rigidity of the material of wire can be determined by using _____ pendulum.

   a) Simple   b) Bifilar   c) Torsion   d) Kater's

   iv) Minimum period of compound pendulum is _____

   a) $T = 2\pi\sqrt{\dfrac{k}{g}}$ b) $T = 2\pi\sqrt{\dfrac{2k}{g}}$ c) $T = 4\pi\sqrt{\dfrac{k}{g}}$ d) $T = 2\pi\sqrt{\dfrac{k}{2g}}$

   v) Calculate the Poisson's ratio for iron γ and η for iron are 20×10^{10} N/m^2 and 8×10^{10} N/m^2.

   a) 0.5   b) 0.25   c) 1   d) -0.5

   vi) The ratio of shearing stress to shearing strain is called _____

   a) Young's modulus   b) Bulk modulus

   c) Modulus of rigidity   d) Poisson's ratio

P.T.O.

vii) The angle of contact of mercury and glass is about _____

    a) 140°   b) 0°   c) 80°   d) 120°

viii) The C.G.S. unit of surface tension is _____

    a) dyne.cm   b) dyne/cm^2 c) dyne/cm   d) dyne.cm^2

ix) The CGS unit of coefficient of viscosity is _____

    a) gm.sec/cm   b) gm/cm.sec   c) gm.cm/sec   d) N/cm

x) Energy is dissipated more in _____ flow.

    a) Turbulent   b) Stream line   c) Constricted   d) Free

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

   1) State relation between elastic constants of a material.

   2) Define coefficient of viscosity.

   3) Define surafce tension.

   4) State any two factors of affecting surface tension.

   5) State the Bernoulli's theorem.

   6) Water flows through a pipe of varying cross-section. Its speed is 50 cm/sec, where the cross-section is 100 cm^2. What will be the speed where the cross-section is 25 cm^2 ?

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

   1) From the expression $P = T\left(\dfrac{1}{r_1} + \dfrac{1}{r_2}\right)$ show that excess of pressure in the soap bubble of radius r is $\dfrac{4T}{r}$.

   2) Starting from the relation between γ, κ and η : show that for a homogenous isotropic material, theoretically, σ must lie between -1 to $+0.5$.

   3) A spherical shell of mass 0.5 kg has diameter 20 cm. Calculate its moment of inertia about i) the diameter   ii) the tangent.

B) A thin rod of mass 100 gm and length 10 cm is suspended by a wire which passes through its centre and perpendicular to its length. The wire is twisted and set oscillating. The period is 2 sec. When another body is suspended period is 6 sec. Find M.I. of other body using theory of torsion pendulum.   **4**

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

   1) Explain the effect of temperature and pressure on viscosity of liquid.

   2) Explain the experimental determination of surface tension by Jaeger's method.

   3) Calculate the Young's modulus and Poisson's ratio of a material for which $k = 14 \times 10^{10}$ N/m^2 and $\eta = 4.2 \times 10^{10}$ N/m^2.

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

   1) Derive an expression for M.I. of a spherical shell about one of its diameter.

   2) Define compound pendulum. Show that the oscillation of compound pendulum are simple harmonic and obtain expression for its time period.

—————————

SLR-CN – 205

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
GEOGRAPHY (Paper – II) (New)
Physical Geography – Climatology

Day and Date : Saturday, 7-6-2014   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) _____ is the study of weather conditions over a longer period.

      a) Geomorphology   b) Meteorology

      c) Climatology   d) Weather and climate

   2) _____ is the lowest layer of the Atmosphere.

      a) Ionosphere   b) Troposphere

      c) Stratosphere   d) Exosphere

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

      a) Atmosphere   b) Lithosphere

      c) Hydrosphere   d) Biosphere

   4) The lines joining the places of equal atmospheric temperature are called as
      _____

      a) isohyets   b) isotherms

      c) isobars   d) isolines

P.T.O.

5) In troposphere temperature decreases with increasing height at the rate of 1°C per _____ meters.

   a) 460   b) 360

   c) 260   d) 160

6) The _____ zones lie between $23^1/_2°$ N/S and $66^1/_2$ N/S.

   a) Tropical   b) Temperate

   c) Frizid   d) Ozone

7) _____ winds blow almost in the same direction throughout the year.

   a) Monsoon   b) Cyclone

   c) Local   d) Planetary

8) In North America tropical cyclones are called as _____

   a) Hurricanes   b) Typhoons

   c) Tornadoes   d) EL Nino

9) At 40°S latitudes westerlies blow with very high velocity, which are known as _____

   a) Monsoons   b) Cyclones

   c) Roaring Fourties   d) Furious Fifties

10) The ice capped ground reflects _____ % solar radiation back to space.

   a) 1   b) 2

   c) 3   d) 4

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

   1) What is meant by Insolation ?

   2) Name of the different gases in the atmosphere.

   3) State various types of planetary winds.

   4) Define weather.

   5) Define Isobars.

   6) State three branches of climatology.

3. A) Write brief answer (**any two**) :   **6**

    1) Describe troposphere.

    2) Describe High pressure belts on the earth.

    3) State various elements of weather.

  B) Draw a figure of pressure belts on the earth.   **4**

4. Write short answer (**any two**) :   **10**

    1) Describe in detail the composition of atmosphere.

    2) Explain the horizontal distribution of temperature.

    3) Describe Hurricanes and Typhoons in details.

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

    1) State various layers in the atmosphere and describe Ionosphere in detail.

    2) Define climatology and state its importance.

    3) Write a note on heat budget of the earth.

———————————

**Seat
No.**

B.Sc. (Part – I) (Sem. – I) Examination, 2014
ZOOLOGY (Paper – I) (New)
Animal Diversity – I

Day and Date : Monday, 9-6-2014   Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

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

1) Amoeba belongs to the Kingdom
   a) Protista   b) Plantae   c) Fungi   d) Monera

2) _____ are the locomotory organs in paramecium.
   a) Pseudopodia   b) Flagellae   c) Cilia   d) Tentacles

3) Spicules of sycon are secreted by _____ cells.
   a) Choanocytes   b) Scleroblasts   c) Porocytes   d) Pinacocytes

4) In Hydra the function of nematocysts is
   a) Digestion   b) Respiration   c) Protection   d) Excretion

5) In scolex of Tapeworm _____ suckers are present.
   a) Two   b) Three   c) Four   d) Five

6) Earthworm belongs to the class
   a) Polychaeta   b) Hirudinarea   c) Ciliata   d) Oligochaeta

7) The male genital pores of earthworm found in _____ segment.
   a) 14th b) 18th c) 16th d) 17th and 19th

8) Setae of earthworm performs the function of
   a) Locomotion   b) Respiration   c) Reproduction   d) Excretion

P.T.O.

9) In earthworm _____ pairs of spermathecae are present.
   a) Two   b) Three   c) Four   d) Five

10) Septal nephridia are _____ in function
   a) digestive   b) excretary   c) respiratory   d) circulatory

2. Answers **any five** of the following :   **10**
   i) Habit and Habitat of sycon.
   ii) Explain food of Paramecium.
   iii) Give the classes of phylum-poriferra with suitable examples.
   iv) Give the functions of tentacles of Hydra.
   v) Ovary of Earthworm.
   vi) Economic importance of Earthworm.

3. A) Answer **any two** of the following :   **6**
   i) Scolex of Tapeworm.
   ii) Budding in Hydra.
   iii) Setae of Earthworm.

   B) Give significance of conjugation in paramecium.   **4**

4. Answer **any two** of the following :   **10**
   i) Explain cyclosis in paramecium.
   ii) Parasitic adaptations of Tapeworm.
   iii) Septal nephridium of Earthworm.

5. Answer **any one** of the following :   **10**
   i) Describe the nervous system of Earthworm with suitable diagram.
   ii) Explain the canal system of Sycon with suitable diagram.

_____

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
ZOOLOGY (Paper – II) (New)
Cell Biology and Genetics

Day and Date : Tuesday, 10-6-2014　　　　　　　　　　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 **wherever** necessary.

1. Rewrite the following sentences using correct alternative:　　　　**10**

   1) In animals the sex of an individual is controlled by _____ chromosomes.
      a) Autosome　　b) Vegetative　　c) Giant　　　　d) Sex

   2) The outer protein coat of prokaryotic cell is called as _____ coat.
      a) Cosmid　　　b) Capsid　　　c) Lipid　　　　d) Protein

   3) The nuclear envelope is also called as ____
      a) Karyotheca　　　　　　b) Atheca
      c) Karyokinesis　　　　　d) Monotheca

   4) The Balbiani rings are found in _____ chromosomes.
      a) Polytene　　b) Lampbrush　　c) Sex　　　　d) Autosome

   5) The genotype of the blood group 'AB' is _
      a) $I^A I^B$　　　b) ii　　　　c) $I^A i$　　　d) $I^A I^A$

   6) When the cell organells are digested by lysosomes in a cell, then it is called as
      a) Pinnocytosis　　　　　b) Phagocytosis
      c) Endocytosis　　　　　d) Autolysis

   7) The model of Mendel's experiments was _____
      a) Rose plant　　　　　b) Pea plant
      c) Mice　　　　　　　　d) Drosophila

8) _____ contrasting characters of pea plant were studied by Mendel.

   a) Ten   b) Seven   c) Five   d) Nine

9) The unit of heredity is called as _____

   a) Gene   b) Cell   c) Tissue   d) Factor

10) The human RBCs are _____

   a) Mononucleated   b) Polynucleated

   c) Anucleated   d) Binucleated

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

   i) Characteristics of multiple alleles

   ii) Partial dominance

   iii) ZW-method of sex determination

   iv) F1 particles in mitochondria

   v) Rh-factor

   vi) Ribosomes.

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

   i) Sickle cell anemia

   ii) Hormonal method of sex determination

   iii) Incomplete dominance.

  B) Give any account of nucleus.   **4**

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

   i) Structure of mitochondria

   ii) Types of lysosomes

   iii) Structure of eukaryotic cell.

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

   i) Explain fluid mosaic model of plasma membrane and add note on its functions.

   ii) With suitable example explain law of segregation.

_____

Seat No.

B.Sc. – I (Semester – I) Examination, 2014
BOTANY (Paper – I) (New)
Microbiology and Cryptogams

Day and Date : Wednesday, 11-6-2014 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 diagrams **whereve**r necessary.
4) Figures to the **right** indicate **full** marks.

1. Select and rewrite following sentences choosing correct option : **10**

   1) The shape of coccus bacterium is _____

   a) Spherical b) Spiral c) Rod-like d) Filamentous

   2) Agar-agar is obtained from _____ algae.

   a) Volvox b) Gelidium c) Nostoc d) Spirogyra

   3) G .M. Smith has divided cryptogams _____ divisions.

   a) 7 b) 13 c) 14 d) 12

   4) Mode of nutrition in Mucor is _____

   a) Autotrophic b) Saprophytic c) Symbiotic d) Both a) and c)

   5) _____ is used in surgical dressings.

   a) Anthoceros b) Riccia c) Lichen d) Sphagnum

   6) Selaginella is a _____ tern.

   a) Monosporous b) Heterosporous

   c) Tetrasporous d) Both a) and c)

   7) _____ is a non-vascular cryptogams.

   a) Bryophyte b) Pteridophyte c) Gymnosperm d) Angiosperm

   8) In bacteria the ribosomes are of _____ types.

   a) 70 S b) 80 S c) 55 S d) None of these

P.T.O.

9) Chemically the capsid is made up of _____

    a) Proteins   b) Lipids   c) Carbohydrates   d) All of these

10) The typical prokaryotic cell is found in _____

    a) Spirogyra   b) Sargassum   c) Ulothrix   d) Nostoc

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

  i) What is mycoplasma ?

  ii) What is viruses ?

  iii) What is phycology ?

  iv) Sketch and label the cell structure of Spirogyra.

  v) Which algae are used as biofertilizers ?

  vi) Give systematic position of Riccia.

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

    i) Describe the types of lichens.

    ii) Give classification of virus.

    iii) Describe the thallus structure of Nostoc.

  B) Describe the general characters of bacteria.   **4**

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

  i) Describe in brief asexual reproduction in Albugo.

  ii) Give economic importance of Lichens.

  iii) Describe the general characters of mycoplasma.

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

  i) Describe the thallus structure and sex organs in Riccia.

  ii) Describe the t.s. of stem and L.S. of strobilus of Selaginella.

_____

SLR-CN – 212

Seat No.	

B.Sc. – I (Semester – I) Examination, 2014
MATHEMATICS (New)
Calculus (Paper – II)

Day and Date : Thursday, 12-6-2014   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) $x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \dfrac{x^7}{7!} + ---$ is infinite series expansion of _____

    a) e^x b) $\sin x$ c) $\cos x$ d) $\tan x$

2) The degree of homogeneous $f(x, y) = ax^2 + 2hxy + by^2$ is _____

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

3) If $y = (2x + 1)^5$ then $y_6 = $ _____

    a) $5! (2x + 1) \cdot 2^4$ b) 0

    c) $5! \, 2^4$ d) $2^5 \cdot 5!$

4) $\displaystyle\int_0^{\pi/2} \cos^6 x \, dx = $ _____

    a) $\dfrac{5\pi}{32}$ b) $\dfrac{16}{35}$ c) $\dfrac{5\pi}{36}$ d) $\dfrac{16}{15}$

5) $\displaystyle\int_0^{\pi/2} \sin^4 x \cos^3 x \, dx = $ _____

    a) $\dfrac{2}{35}$ b) $\dfrac{3}{35}$ c) $\dfrac{1}{35}$ d) $\dfrac{2\pi}{35}$

6) If $\phi(x, y, z) = x^2yz + 4xz^2$ then $\nabla \phi = $ _____

    a) $8\,\bar{i} + \bar{j} + 10\,\bar{k}$ b) $8\,\bar{i} + \bar{j} - 10\,\bar{k}$

    c) $8\,\bar{i} - \bar{j} - 10\,\bar{k}$ d) $8\,\bar{i} - \bar{j} + 10\,\bar{k}$

7) If $u = \log x + \log y$ then $x\,\dfrac{\partial u}{\partial x} + y\,\dfrac{\partial u}{\partial y} = $ _____

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

8) If $y = \log(3x + 2)$ then n^{th} derivative $y_n = $ _____

    a) $\dfrac{(-1)^{n-1}\,(n-1)!\,3^n}{(3x+2)^n}$ b) $\dfrac{(-1)^{n-1}\,n!\,3^n}{(3x+2)^n}$

    c) $\dfrac{(-1)^{n-1}\,(n-1)!\,3^n}{(3x+2)^{n-1}}$ d) $\dfrac{(-1)^{n-1}\,(n-1)!\,3^{n-1}}{(3x+2)^{n-1}}$

9) A vector $\bar{F}$ is said to be irrational if curl $\bar{F} = $ _____

    a) $\sqrt{5}$ b) 3   c) 0   d) 1

10) $\lim\limits_{x \to 0} \dfrac{3^x - 2^x}{x} = $ _____

    a) $\log\left(\dfrac{2}{3}\right)$ b) $\log\left(\dfrac{3}{2}\right)$ c) $\log\left(\dfrac{1}{2}\right)$ d) $\log 3 + \log 2$

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

    1) Find n^{th} derivative of $y = \log(2x + 1)$.

    2) If $\bar{f}(x, y, z) = x^2z\,\bar{i} + 2y^3z^2\,\bar{j} + xy^2z\,\bar{k}$.

    3) Evaluate $\lim\limits_{x \to 0} \dfrac{\text{Cosh}\,x - \cos x}{x \sin x}$.

    4) If $u = x^3 - 3xy^2$, $V = 3x^2y - y^3$. Prove that $\dfrac{\partial u}{\partial y} + \dfrac{\partial v}{\partial x} = 0$.

5) If $z = \log (x^2 + y^2)$, find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$.

6) State Taylor's theorem and Maclaurin's theorem.

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

1) If $\phi (x, y, z) = x^2 y z^3$ find $\nabla^2 \phi$.

2) Discuss the continuity of the following function at (0,0)

$$f (x, y) = \dfrac{x^3 y^3}{x^6 + y^4} \quad (x, y) \neq (0, 0)$$
$$= 0 \qquad (x, y) = (0, 0)$$

3) Evaluate $\displaystyle\int_0^\infty \dfrac{dx}{\left(1 + x^2\right)^5}$.

B) If $\displaystyle\lim_{x \to a} f (x) = \infty$, $\displaystyle\lim_{x \to a} g (x) = \infty$ and $\displaystyle\lim_{x \to a} \dfrac{f (x)}{g (x)} = 1$ then prove that

$$\lim_{x \to a} \dfrac{f' (x)}{g' (x)} = 1.$$ **4**

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

1) If $y = e^{\tan^{-1} x}$, prove that
   $(1 + x^2) y_{n+2} + [2 (n + 1) x - 1] y_{n+1} + n (n + 1) y_n = 0$.

2) Evaluate $\displaystyle\int_0^{\pi/2} \sin^7 x\, dx$.

3) Prove that $\nabla \dfrac{f}{g} = \dfrac{g \nabla f - f \nabla g}{g^2}$ where f and g are scalar point functions.

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

1) State and prove Leibnitz's theorem and hence find n^{th} derivative of $x^3 e^x$.

2) If f (x, y, z) is a homogeneous function of degree n then prove that
   $$x \dfrac{\partial f}{\partial x} + y \dfrac{\partial f}{\partial y} + z \dfrac{\partial f}{\partial z} = nf (x, y, z).$$

_____

B.Sc. – I (Semester – I) Examination, 2014
BOTANY (Paper – II) (New)
Plant Physiology and Horticulture

Day and Date : Thursday, 12-6-2014
Time : 3.00 p.m. to 5.00 p.m.

Max. Marks : 50

Instructions : 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 measured with

      a) Auxanometer   b) Potometer

      c) Thermometer   d) Colorimeter

   ii) Acquisition of the ability to flower earlier by chilling treatment is called

      a) Photoperiodism   b) Vernalization

      c) Devernalization   d) None of these

   iii) _____ was isolated from Gibberella Fujikuroi.

      a) Gibberllin   b) IAA

      c) IBA   d) CCC

   iv) _____ is Micro-element.

      a) Ca   b) Mg   c) P   d) Cu

   v) Enzymes having difference in molecular structure, but having similar function are called

      a) Iso enzymes   b) Co-factor

      c) Multi enzymes   d) Co-enzymes

   vi) The branch of horticulture which deals with cultivation, processing and marketing of vegetable crops is called

      a) Olericulture   b) Pomoculture

      c) Floriculture   d) Landscape gardening   **P.T.O.**

vii) The reproduction which occurs by the formation and fusion of gamets is called

   a) Sexual reproduction

   b) Asexual reproduction

   c) Vegetative propagation

   d) Budding

viii) _____ is the underground modification of stem.

   a) Runner   b) Bulb

   c) Stolon   d) Sucker

ix) _____ means the branch or bud of the desired variety which is grafted on the stock.

   a) Stock   b) Scion

   c) Root   d) All of these

x) Air layering is also known as

   a) Gootee   b) Whip grafting

   c) Approach grafting   d) Shield budding

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

  i) What is grand period of growth ?

  ii) Write any two application of GA in agriculture.

  iii) Write any two functions of phosphorus.

  iv) Write in brief about catalytic activity of enzyme.

  v) Define pomoculture.

  vi) Define asexual propagation.

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

  i) Define enzymes, Iso enzymes and co-enzymes.

  ii) What are macro nutrients ? Write in brief about the role of any one macro element in plant metabolism.

  iii) What are phytochromes ? Comment upon their role flowering.

  B) Describe the method of 'T' budding.   **4**

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

    i) Explain in brief the requirements of 'Rose' regarding its cultivation.

    ii) What is horticulture ? Comment upon the scope of horticulture.

    iii) What is vernalization ? Explain in brief mechanism of vernalization.

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

    i) What is vegetative propagation ? Explain any four natural methods of vegetative propagation.

    ii) What is photoperiodism ? Define and classify the plants on the basis of photoperiod giving one example of each class.

_____

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
PSYCHOLOGY (Paper – I) (New)
General Psychology – I

Day and Date : Friday, 13-6-2014   Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : i) **All** questions are **compulsory.**
            ii) Figures to the **right** side indicate **full** marks.

1. Multiple choice.   **10**

   i) The first step in understanding anything is to it a name is _____

     A) Description   B) Prediction

     C) Psychology   D) Mind

   ii) Determining what will happen in the future is a _____

     A) Prediction   B) Explanation

     C) Goal   D) Control

   iii) The_____ is to change a behaviour from an undesirable one to a desirable one.

     A) Goal   B) Aim   C) Mind   D) Soul

   iv) _____ is the scientific study of behaviour and mental processes.

     A) Psychology   B) Sociology

     C) Economics   D) Politics

   v) The goal of _____ helps to build the theory.

     A) Explanation   B) Prediction

     C) Psychology   D) Mind

vi) _____ performed ground breaking experiments in the visual and auditory perception.

A) Helmholtz   B) Washburn

C) Wundt   D) Freud

vii) Anna Freud began what became known as the ego movement in _____

A) Psychology   B) Sociology

C) Maths   D) Physics

viii) The parts of the neuron that receive messages from other cells are called the _____

A) Dendrites   B) Axon

C) Nervous system   D) Mind

ix) The sleep-wake cycle is a _____

A) Circadian rhythm   B) Altered state

C) Perception   D) Concept

x) The _____ of phobias is a very good example of a certain type of classical conditioning.

A) Learning   B) Sleep

C) Memory   D) Concept

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

i) What is meant by learning ?

ii) Who developed the first psychological laboratory ?

iii) Who wrote a book of 'De-Anima' ?

iv) Who stressed the importance of early childhood experience ?

v) Meaning of 'Gestalt'.

vi) Give only names of psychological goods.

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

     i) Explain the concept of description.

     ii) Explain the reticular formation.

     iii) Explain stimulus generalization and discrimination.

   B) Discuss the goals of psychology.   **4**

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

    i) Explain the Pavlov's experiment.

    ii) What is consciousness ?

    iii) Explain the experimental method.

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

    i) Describe the history of psychology.

    ii) Explain the structures under the cortex.

    iii) Explain the concept of reinforcement.

———————————

Seat No.

B.Sc. I (Semester – I) (New) Examination, 2014
MICROBIOLOGY
Fundamentals of Microbiology (Paper – I)

Day and Date : Friday, 13-6-2014　　　　　　　　　　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 following sentences by selecting correct answers from the given alternatives. **10**

   i) Teichaic acid is absent in _____ bacteria.
   　a) Gram positive　　　　　　　b) Gram negative
   　c) Acid fast　　　　　　　　　d) Both Gram positive and negative

   ii) A process of vaccination was introduced by _____
   　a) Louis Pasteur　　　　　　　b) Edward Jenner
   　c) John Tyndall　　　　　　　　d) Joseph Lister

   iii) Number of chromosomes in procaryotic cell is _____
   　a) 1　　　　　b) 2　　　　　c) 3　　　　　d) 4

   iv) The major component of cell wall of gram positive bacteria is _____
   　a) Lipopolysaccharide　　　　b) Peptidoglycan
   　c) Teichaic acid　　　　　　　d) Phospholipid

   v) Mesosome is the invagination of _____
   　a) Cell wall　　　　　　　　　b) Ribosome
   　c) Capsule　　　　　　　　　d) Cell membrane

   vi) _____ is a site for protein synthesis in bacteria.
   　a) Mesosome　　　　　　　　b) Cytochrome
   　c) Ribosome　　　　　　　　　d) Capsule

   vii) The type of ribosome found in procaryotic cell is _____
   　a) 50 S　　　　b) 80 S　　　　c) 70 S　　　　d) 40 S

P.T.O.

viii) _____ discovered filterable nature of viruses.
    a) Pasteur   b) Stanley
    c) Ivanowsky   d) Watson

 ix) Size of bacterial cell is measured in _____
    a) Micron   b) Nanometer
    c) Millimeter   d) Centimeter

  x) The study of fungi is called as _____
    a) Phycology   b) Mycology
    c) Cytology   d) Limnology

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

   i) Define Taxonomy

   ii) Functions of cell membrane

   iii) Pili

   iv) Define Biotechnology

   v) Soil Microbiology

   vi) Contribution of Robert Hook.

3. A) Answer in brief **(any two)** :   **6**

    i) Ribosome

    ii) Characteristics of Actinomycetes

    iii) Joseph Lister.

  B) Describe functions of cell wall.   **4**

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

   i) Differentiate between Procaryotic and Eucaryotic cell.

   ii) Explain Fluid Mosaic model.

   iii) Contribution of Louis Pasteur.

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

   i) General principles of bacterial nomenclature.

   ii) General characteristics of viruses.

   iii) Arrangement of bacteria.

_____

Seat
No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS (New)
Digital Fundamentals (Paper – II)

Day and Date : Saturday, 14-6-2014　　　　　　　　　　　　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.

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

　　1) The base of octal number system is

　　　　a) 2　　　　　b) 8　　　　　c) 10　　　　　d) 16

　　2) The hexadecimal equivalent of decimal number $(13)_{10}$ is

　　　　a) A　　　　　b) B　　　　　c) D　　　　　d) E

　　3) Gray code of binary number $(11011)_2$ is

　　　　a) 11001　　　b) 10101　　　c) 10110　　　d) 11101

　　4) The IC 7432 is

　　　　a) OR gate　　　　　　　　　b) AND gate

　　　　c) NOR gate　　　　　　　　d) NAND gate

　　5) In NAND gate

　　　　a) AND follows NOT gate　　b) OR follows NOT gate

　　　　c) AND follows OR gate　　　d) OR follows AND gate

　　6) In Boolean algebra $A + \overline{A}$ is

　　　　a) A　　　　　b) 1　　　　　c) 0　　　　　d) $\overline{A}$

　　7) The output of XOR gate is 1

　　　　a) When inputs are 0 and 0　　b) When inputs are 0 and 1

　　　　c) When inputs are 1 and 1　　d) None of these

　　8) Full adder adds how much bits at a time ?

　　　　a) 2　　　　　b) 1　　　　　c) 4　　　　　d) 3

9) The 8421 code is also known as

   a) ASC II code

   b) Excess-3 code

   c) Gray code

   d) BCD code

10) The 2's compliment of 1011 is

   a) 0011

   b) 0100

   c) 0101

   d) 1000

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

   i) What is hexadecimal number system ?

   ii) State DeMorgans theorems.

   iii) Draw pin out diagram of IC 7400.

   iv) Draw the logic diagram of half substractor.

   v) Draw the logic diagram for logic equation $Y = A + B.\overline{C}$.

   vi) Draw the symbol of NAND gate. Write its truth table for 2 inputs.

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

   i) Explain excess-3 code. Write the excess-3 for $(19)_{10}$.

   ii) Explain OR using NAND gate.

   iii) State the rules of AND and OR laws.

   B) Explain the working of parallel binary adder.   **4**

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

   i) What is binary number system ? Convert $(67)_{10}$ to equivalent binary number.

   ii) Draw IC pin out diagrams of 7402, 7404 and 7432.

   iii) Prove that $A + \overline{A}B + \overline{A}C = A + B + C$.

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 ? Explain k-map for 2 and 3 variables. Simplify the equation using k-map.

   $Y = \overline{A}\,\overline{B}C + \overline{A}\,\overline{B}\,\overline{C} + AB\overline{C} + A\overline{B}\,\overline{C}$.

Seat No.

B.Sc. (Part – I) (Semester – I) Examination, 2014
PSYCHOLOGY (New) (Paper – II)
Human Development – I (Adolescence to Early Adulthood)

Day and Date : Saturday, 14-6-2014   Max. Marks : 50

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

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

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

1. Multiple Choice :   **10**

    i) _____ is the developmental stage between childhood and adulthood.

      A) Adolescence   B) Middle age   C) Old age   D) None of all

    ii) The hormone _____ appears to play a role in the start of puberty for males and females.

      A) Pituitary   B) Estrogen   C) Leptin   D) Serotonin

    iii) Boy's and girl's growth spurts begin at _____ ages.

      A) Different   B) Same   C) Equal   D) None

    iv) Puberty , the period when the _____ organs mature.

      A) Sexual   B) Psychological

      C) Social   D) Physical

    v) _____ consequences are very important to adolescents.

      A) Social   B) Physical   C) Economical   D) Emotional

    vi) The most common nutritional concern in adolescence is

      A) Obesity   B) Bulimia   C) Sleep   D) Dream

    vii) _____ learn to depend on alcohol and are unable to stop drinking.

      A) Alcoholics   B) Friends   C) Paranoids   D) Puberty

    viii) Poverty largely determines whether a students completes

      A) High school   B) School   C) College   D) Family

ix) Several factors determine an adolescent's _____ among them gender.
A) Self-esteem   B) Self   C) Mind   D) Society

x) _____ used the concept of the identity versus-identity-confusion stage.
A) Erikson   B) Freud   C) Skinner   D) Watson

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

   i) What is the physical maturation ?

   ii) Define the self concept.

   iii) Which is the two faces of love ?

   iv) Definition of the Eli Ginzberg theory.

   v) What is the identity formation ?

   vi) Define the obesity.

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

   i) Explain puberty in girls.

   ii) Describe the consequences of early and late maturation.

   iii) Discuss on cyberspace.

3. B) Discuss on friendship.   **4**

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

   i) Discuss on sexually transmitted infections.

   ii) Describe the depression and suicide in adolescence.

   iii) Discuss on identity formation of change or crisis.

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

   i) Describe the eating disorder of adolescence.

   ii) Discuss the perry approach.

   iii) Explain the sexual behavior and sexual relationships in adolescence.

_____

SLR-CN – 220

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) Extrusive forms of igneous rocks are
      a) Plutonic   b) Volcanic   c) Intermediate   d) All of these

   2) Slow cooling of magma results in formation of ———— grained rock.
      a) Fine   b) Coarse   c) Very fine   d) None of these

   3) ———— is a small scale circular exposure of Batholith.
      a) Roof pendent   b) Stocks
      c) Boss   d) None of these

   4) Dehydration and contraction are the processes involved in formation of ——— structure.
      a) Mud cracks b) Pillow   c) Columnar   d) Rain prints

   5) ———— is a residual sedimentary rock.
      a) Bauxite   b) Conglomerate
      c) Breccia   d) Sandstone

   6) The ———— can be recognized by the difference in composition, texture and colour of sediments.
      a) Ripple marks   b) Mud cracks
      c) Stratification   d) Pisolites

   7) Slate rock formed due to metamorphism of ————
      a) Shale   b) Sandstone   c) Limestone   d) Granite

P.T.O.

8) Cataclastic metamorphic rock is due to the action of —————
   a) Directed pressure   b) High temperature
   c) Uniform pressure   d) Hydrothermal solution

9) Porphyroclasts which have been flattened and crushed into lenticular eye-like forms are called ————— structure.
   a) Augen   b) Flaser   c) Maculose   d) Slaty

10) ————— is discordant igneous intrusion.
   a) Sill   b) Phacolith   c) Lopolith   d) Dyke

2. Answer **any five** of the following :   **10**
   i) Ripple marks.
   ii) Oolitic structure.
   iii) Essential minerals.
   iv) Sills.
   v) Quartzite.
   vi) Marble.

3. A) Answer **any two** of the following :   **6**
   i) Depth zones of metamorphism.
   ii) Deposition of clastic sediments.
   iii) Formation of vesicular structure.

   B) Write note on :   **4**
   Rock, Petrology and their major divisions.

4. Answer **any two** of the following :   **10**
   i) Forms of discordant intrusive igneous rocks.
   ii) Chemical deposit in detail.
   iii) Agents of metamorphism.

5. Answer **any two** of the following :   **10**
   i) Composition and origin of magma.
   ii) Describe sedimentary processes.
   iii) Describe dynamothermal metamorphism.

————————————

Seat No. _____

B.Sc. – I (Semester – I) (New) Examination, 2014
MICROBIOLOGY (Paper – II)
Microbial Techniques

Day and Date : Saturday, 14-6-2014　　　　　　Max. Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
　　　　　　2) Draw a ***neat*** *labelled diagram* ***wherever*** *necessary.*
　　　　　　3) Figures to the ***right*** *hand side indicate* ***marks*** *allotted to the question.*

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

　i) Refractive index of oil immersion lense used in microscopy is _____
　　a) 0.5　　　　　b) 1　　　　　c) 1.5　　　　　d) 1.3

　ii) The limit of resolution of the most human eye is _____
　　a) 0.2 mm　　b) 2 mm　　　c) 20 mm　　　d) 200 mm

　iii) _____ acts as a mordent in Gram's staining procedure.
　　a) Safranin　　b) 95% alcohol　c) Gram's iodine d) Crystal violet

　iv) _____ is an example of nonionizing radiations.
　　a) X-rays　　　b) U. V. rays　　c) Gamma rays　d) Cathode rays

　v) In desiccation growth of microorganism in controlled by _____
　　a) Drying　　　　　　　　b) Radiation
　　c) Osmotic pressure　　　d) Filtration

　vi) _____ makes MacConkey's agar selective for intestinal bacteria.
　　a) Neutral red　　　　　　b) Sodium taurocholate
　　c) Peptone　　　　　　　d) Agar-agar

　vii) Cultures are best maintained by _____
　　a) Lyophilization　　　　　b) Pasteurization
　　c) a) and b)　　　　　　　d) None of these

　viii) _____ is a selective decolourizing agent in cell wall staining by chance's method.
　　a) 0.5% congo red　　　　b) 95% alcohol
　　c) 0.5% new fuchsin　　　d) 0.1% congo red

P.T.O.

ix) _____ has developed the oil immersion lense.

    a) Robert Hooke   b) Antony Van Leeuwenhock

    c) Ernst Abbe   d) Joseph Lister

x) _____ is not an example of heavy metals used to obtain sterilization.

    a) Iodine   b) Mercury   c) Silver   d) Copper

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

  i) Define– working distance.

  ii) What is neutral stain ?

  iii) Define sterilization.

  iv) What is a pure culture ?

  v) Define sanitisation.

  vi) Give the role of NaCl in a medium.

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

    i) Write short note on cell wall staining by chance's method.

    ii) In short explain spread plate technique.

    iii) What is numerical aperture, give an account on it.

  B) Write an essay on cultivation of micro-organism using 'Living media'.   **4**

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

  i) What is differential staining ? Explain with any one example.

  ii) Write in brief on 'osmotic pressure' a physical agent used to obtain sterilization and give its application.

  iii) Explain in detail Lyophilization.

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

  i) Give a brief account on electron microscope.

  ii) What is the difference between dye and stain ? Write in detail classification of stains.

  iii) Explain, how heavy metals are used to obtain sterilization.

_____

SLR-CN – 222

B.Sc. – I (Sem. – II) Examination, 2014
ENGLISH COMPULSORY (New)
On track : English Skills for Success

Day and Date : Thursday, 8-5-2014   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 choosing the correct alternative.   **10**

   i) Dr. Kalam had successfully tested _____ while he was in France.

       a) PSLV   b) SLV-3   c) V-2   d) Jupiter

   ii) Maharaja of Khetri had given _____ to Vivekananda for his journey to America.

       a) money

       b) gold coins

       c) a beautiful robe

       d) copy of the Bhagwad Gita.

   iii) The Parliament of Religions was to be held in _____

       a) America   b) Singapore   c) Canada   d) Japan

   iv) After our incredible scientific progress _____ is the greatest threat to humanity.

       a) natural calamities   b) diseases

       c) nuclear weapons   d) the human being himself/herself

   v) The odd word on the following set of words is _____ in the meaning.

       a) slay   b) murder   c) help   d) kill

   vi) 'The bubble house' in the poem 'Full Moon' refers to the _____

       a) moon   b) earth   c) planet   d) nature

P.T.O.

vii) The lioness is feeding _____ cub.

    a) her   b) its   c) it   d) herself

viii) Maharastra is one of the _____ states in the country.

    a) large   b) larger   c) more larger   d) largest

ix) Mohan found the _____ in his soup yesterday.

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

x) The antonym for the word 'barren' is _____

    a) infertile   b) heath   c) fertile   d) dull

2. Answer **any five** of the following questions in **two** and **three** sentences **each**.   **10**

  i) Who was Wernher Von Braun and what was his contribution to science and to the world ?

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

  iii) What were the points about the new culture that struck Vivekananda on his arrival in America ?

  iv) Who were the other Indians present at the parliament of Religions ?

  v) What do you understand by human rights ?

  vi) Why does the author declare that human rights cannot function in a vacuum ?

3. A) Answer **any two** of the following questions in about **50** words **each**.   **6**

    i) What is the origin or background of the poem 'Brahma' ?

    ii) How was the Moon's light made holy in Gethsemane ?

    iii) Examine the theme of innocence versus experience in the poem 'Full Moon'.

  B) Answer briefly **any two** of the following questions.   **4**

    i) What is meant by BCC in e-mail ? Explain.

    ii) What precautions should be taken while sending the e-mails ?

    iii) Write out any two e-mail ID's of your friends.

4. You are Veena Raut the secretary of the 'Student's Union' in 'Doon College, Mumbai. The college is conducting 'Blood Donation Camp' on the occasion of Swami Vivekananda's birth anniversary. Draft notice and agenda informing the members about the data, time and venue of the meeting. **10**

<div align="center">OR</div>

Write out the minutes of the 'meeting of Marathi Cultural Association' Mumbai.

Date : 15 July 2013   Time : 10 a.m.

Venue : Kala Bhavan, Mumbai

<div align="center">**Agenda**</div>

10.00 a.m.	–	Call to order
10.15 a.m	–	Presentation of the minutes of the previous meeting for approval by the board.
10.30 a.m.	–	Report of the secretory to the directors of board.
11.00 a.m.	–	Report of the treasurer
12.00 p.m.	–	Planning the annual 'Navaratri Festival'.
1.30 p.m.	–	Adjournment.

5. You wish to apply for the post of Assistant Professor in the subject of Chemistry. Prepare the C.V. for the post with suitable biographical details. **10**

<div align="center">_____</div>

Seat No.

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

Day and Date : Sunday, 18-5-2014　　　　　　　　　　　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) Dr. A.P.J. Abdul Kalam was entrusted the responsibility of _____ Von Braun.
　　a) Dropping　　　b) Ticking up　　c) Inviting　　　d) Introducing

　ii) Wernher Von Braun is known for his _____ missiles.
　　a) V – 2　　　b) V – 1　　　c) V – 3　　　d) V – 4

　iii) _____ had taken Swami Vivekananda's ticket to his great journey to the West.
　　a) Maharaja of Khetri　　　b) Maharaja of Delhi
　　c) J. H. Wright　　　　　　d) His friends

　iv) _____ was sitting at the centre of the first session of the parliament.
　　a) Swami Vivekanand　　　b) Nagarkar
　　c) Dharmpala　　　　　　　d) Cardinal Gibbons

　v) The death of the people at the hands of their own governments is an example of _____
　　a) Violations of human rights　　b) Violation of the laws
　　c) Violation of values　　　　　 d) Violation of customs

　vi) Nani A. Palkhivala sums up human rights as _____
　　a) Equality　　b) Liberty　　c) Justice　　　d) Fraternity

　vii) The red slayer in the poem 'Brahma' is referred to _____
　　a) Soldier　　　b) The slain　　c) Heaven　　d) Brahmin

　viii) Who challenges the sacred identity of the Moon ?
　　a) Astronomers　b) Rocket expert　c) Mothers　　d) The children

P.T.O.

ix) My friend is fond _____ playing cricket.

   a) off   b) of   c) in   d) by

x) Mother is a _____ singer than me.

   a) good   b) better   c) best   d) worst

2. Answer **any five** of the following questions in **two** or **three** sentences **each** :   **10**

  i) Multifaceted career of Wernher Von Braun.

  ii) What did Von Braun advise Dr. A.P.J. Abdul Kalam ?

  iii) What did attract Swami Vivekananda's attention in China and Japan ?

  iv) Describe Vivekananda's appearance in the passage.

  v) What is the speciality of the mirror in the zoo of Lusaka ?

  vi) Why is the oldest human rights organization still in business ?

3. A) i) What is the message in the poem 'Brahma' ?   **6**

    ii) Present the innocence of man about the Moon.

    iii) Explain the line, 'It shines tonight upon their graves'.

  B) Answer briefly **any two** of the following questions :   **4**

    i) As a program officer of a college N.S.S. Unit. Write a notice about the camp at the village and the schedule of activities.

    ii) Write the agenda for the third meeting of Utkarsh Cricket Club, Solapur.

    iii) Write a notice about the book exhibition to be held by the library of a college. Imagine yourself as the librarian.

4. A) Write an e-mail application letter in response to an advertisement for the part of Sales Executive by Gyan Book Publishers, New Delhi refer only briefly to your qualifications, work experience and say that you are attaching your CV for the reference.   **10**

            OR

  B) Imagine that you have received an e-mail of appointment of a sales executive by Atlantic Book Publishers, New Delhi. Write an e-mail accepting the appointment.

5. Prepare a CV of your friend who is employed as a primary teacher.   **10**

_____

Seat
No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
CHEMISTRY (Paper – IV) (New)
ANALYTICAL CHEMISTRY

Day and Date : Saturday, 10-5-2014   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, 0 = 16, N = 14, Na = 23, Cl = 35.5)

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

   1) η represents the symbol for _____

     a) surface tension   b) viscosity

     c) density   d) none of these

   2) A homogeneous mixture of two or more chemical components is known as
     _____

     a) solution   b) solute   c) solvent   d) partition

   3) The distribution of solute between two immiscible solvents is known as
     _____

     a) solvation   b) dissolution   c) partition   d) none of these

   4) The reciprocal of coefficient of viscosity is called _____

     a) parachor   b) surface tension

     c) viscosity   d) fluidity

   5) Haematite ore on calcination gives _____ of metal.

     a) sulphate   b) chloride   c) carbonate   d) oxide

P.T.O.

6) For any living organism the environment always remains _____

   a) non-static   b) constant   c) specific   d) static

7) Catalyst used is estimation of nitrogen by Kjeldahl's method is
   _____

   a) $CuSO_4$ b) K_2SO_4 c) H_2SO_4 d) $CaSO_4$

8) Halogen in organic compound is estimated by _____ method.

   a) Carius   b) Combustion   c) Liebig's   d) Kjeldahl's

9) Milk is a colloidal solution containing _____

   a) carbohydrates b) fats   c) proteins   d) all of these

10) The milk sugar is called _____

   a) glucose   b) lactose

   c) sucrose   d) maltose

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

   i) Define the term

      i) Threshold Limit Value (TLV)

      ii) Biological Oxygen Demand (BOD).

   ii) State and explain the term 'surface tension'.

   iii) Draw a neat labelled diagram of blast furnace.

   iv) Define

      a) Empirical formula

      b) Molecular formula.

   v) How does aluminium hydroxide act as antacid ? Give reactions.

   vi) Give the principle underlying in the detection of nitrogen in an organic
   compound.

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

   i) Define the following terms

      a) Gangue

      b) Flux

      c) Slag.

    ii) Draw neat labelled diagram of experimental setup of Liebig's method for the estimation of carbon and hydrogen elements.

    iii) Write a short note on 'Air pollution'.

B) When phenol is shaken with water and chloroform, concentrations of the two layers were found as follows :

$C_{H_2O \, (moles/dm^3)}$	0.047	0.081	0.123
$C_{CHCl_3 \, (moles/dm^3)}$	0.127	0.38	0.925

    Find out the molecular condition of phenol in chloroform. **4**

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

    i) State and explain 'partition law'. How is it modified when the solute undergoes association and disassociation in one of the solvents ?

    ii) 2.4×10^{-4} kg of organic compound gave 2.2×10^{-4} kg of AgCl in carius method. Find the percentage of chlorine in given organic compound.

    iii) Define milk. Explain the various composition of milk.

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

    i) Discuss the construction and working of Ostwald's viscometer.

    ii) Write a short note on plant nutrients.

    iii) Discuss the experimental determination of surface tension by drop-weight method.

_____

Seat No.

B.Sc.– I (Semester – II) Examination, 2014
COMPUTER SCIENCE (New)
Programming Using 'C' – II (Paper – IV)

Day and Date : Saturday, 10-5-2014   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) Variable declared inside function body can easily accessed by another function.
      a) True   b) False

   2) All elements of structure are stored from common memory location.
      a) True   b) False

   3) 'C' compiler assigns _____ value for local variable.
      a) zero   b) two   c) three   d) garbage

   4) Performing operation on pointer causes change in value of variable that the pointer points.
      a) True   b) False

   5) _____ is used to read single integer value from file.
      a) getchar ( )   b) getc ( )   c) getw ( )   d) putw ( )

   6) _____ is return type of function when no value is returned.
      a) char   b) void   c) float   d) double

   7) The tag name of structure is optional.
      a) True   b) False

   8) The _____ memory allocation causes memory wastage.
      a) dynamic   b) static
      c) both a) and b)   d) none of these

   9) The parameters which are used at function call are _____ parameters.
      a) actual   b) formal   c) dummy   d) general

   10) By default complier assign zero value for _____ variable.
      a) static   b) local   c) auto   d) register

P.T.O.

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

   1) Define "static memory allocation".

   2) Define "pointer" and list out its application.

   3) Define "file" and list out file opening modes.

   4) Write steps to add user defined function in program.

   5) Write an syntax of realloc( ) function.

   6) What is storage class ? List out different storage classes in 'C' language.

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

   1) Differentiate between structure and union.

   2) Write a program to check number is prime or not by using pointer.

   3) Write a program to check number is even or odd by using function returning value.

   B) Explain pointer to structure with example. **4**

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

   1) Write a program to copy the contents of one file into another.

   2) Explain the concept "call by value" and "call by address".

   3) Write any program that demonstrate the concept of array of structure.

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

   1) Write a program for traversing array elements by using pointer.

   2) Explain "fprintf( )" and "fscanf( )" file handling function in details.

   3) What is recursion ? Explain it with example.

Seat No.

B.Sc. (Part – I) (Semester – II) Examination, 2014
PHYSICAL GEOGRAPHY (Paper – III) (New)
Geomorphology

Day and Date : Monday, 12-5-2014   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 :   **10**

   1) According to _____ landscape is a function of structure, process and stage.
   (Davis, Darwin, Thomas, Penck)

   2) Plants and animals are involved in _____ weathering.
   (Biotic, Chemical, Physical, Mechanical)

   3) _____ are formed due to wind erosion.
   (Gorges, Loess, Spurs, Yardang)

   4) Davis has identified _____ stages of evolution of landforms.
   (two, three, four, five)

   5) The loose materials of the mantle rock is known as _____
   (soil, texture, structure, components)

   6) A soil is made up of _____ elements.
   (two, three, four, six)

   7) Soil is one of the most significant _____ components.
   (Geological, Geomorphological, Geographical, Ecological)

   8) Water present in the soil is called soil _____
   (fertility, structure, solution, texture)

   9) The soil fertility depends upon mainly _____ properties.
   (Biological, Chemical, Physical, None of these)

   10) Application of chemical fertilizers enhances soil _____
   (colour, fertility, structure, texture)

2. Answer in short (**any five**) :   **10**

   1) Define the term denudation.

   2) What is cycle of erosion ?

   3) Nutrient in soil.

   4) Significance of weathering.

   5) Texture of soil.

   6) What is mean by leaching ?

3. A) Answer in short (**any two**) :   **6**

   1) Draw a diagram of cycle of erosion.

   2) Classify the soil in to their major types.

   3) Describe the causes of physical weathering.

   B) Describe the various landforms produced by the erosional work of wind.   **4**

4. Answer the question (**any two**) :   **10**

   1) Explain the process of chemical weathering.

   2) Explain the processes involved in soil formation.

   3) Describe the various landforms produced by depositional work of river.

5. Answer the question (**any two**) :   **10**

   1) Describe the process of delta formation.

   2) Explain the depositional work by wind.

   3) Discuss nutritive elements and their significance in the soil.

_____

SLR-CN – 229

B.Sc. – I (Semester – II) Examination, 2014
PHYSICS (Paper – IV) (New)
Electricity, Magnetism and Basic Electronics

Day and Date : Tuesday, 13-5-2014   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 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 expression for charging of the condensor through resistance is given by the equation

     a) $q = q_0 (1 - e^{t/RC})$ b) $q = q_0 (1 - e^{-t/RC})$

     c) $q = q_0 (1 + e^{-t/RC})$ d) $q = q_0 e^{-t/RC}$

   ii) Current through LR circuit when it grows is given by the equation

     a) $I = I_0 \left(1 - e^{-\frac{R}{L}t} \right)$ b) $I = I_0 \left(1 + e^{-\frac{R}{C}t} \right)$

     c) $I = I_0 \left(1 + e^{\frac{R}{L}t} \right)$ d) $I = I_0 e^{\frac{-R}{L}t}$

   iii) In purely resistive circuit, the current with the applied alternating e.m.f. is

     a) out of phase   b) lagging by $\dfrac{\pi}{2}$

     c) in phase   d) leads by $\dfrac{\pi}{2}$

iv) In series L-C-R circuit, at resonance, the current drawn is

    a) maximum   b) minimum

    c) zero   d) less than zero

v) The equation for charge through ballistic galvanometer is

    a) $q = \dfrac{C}{nAB} \cdot \dfrac{T}{2\pi} \cdot \theta_0$ b) $q = \dfrac{1}{nAB} \cdot \dfrac{T}{2\pi} \theta_0$

    c) $q = \dfrac{T}{2\pi} \theta_0$ d) $q = \dfrac{C}{nAB} \cdot \dfrac{T}{2\pi}$

vi) Magnetic induction at a point on the axis of finite solenoid is given by

    a) $B = \dfrac{\mu_o nl}{2} (\cos\theta_1 + \cos\theta_2)$ b) $B = \dfrac{\mu_o nl}{2} (\sin\theta_1 - \sin\theta_2)$

    c) $B = \dfrac{\mu_o nl}{2} (\cos\theta_1 - \cos\theta_2)$ d) $B = \dfrac{\mu_o nl}{2} (\sin\theta_1 + \sin\theta_2)$

vii) The junction barrier potential difference for a germanium diode is of the order of

    a) 0.3 V   b) 0.7 V

    c) 1.5 V   d) 2 V

viii) An ideal forward biased diode offers

    a) infinite resistance   b) zero resistance

    c) minimum resistance   d) moderate resistance

ix) The alpha (α) of a bipolar junction transistor is always

    a) less than minus one   b) equal to minus one

    c) less than one   d) equal to one

x) Transistor as an amplifier is always operated in

    a) cut off region   b) active region

    c) saturation region   d) reverse biased region

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

   i) What is j operator ? Find the magnitude of complex conjugate (4+3j).

   ii) What is acceptor circuit ?

   iii) State advantage of bridge rectifier.

   iv) What is clamper and clipper circuit ?

   v) What is transistor ? Draw the circuit symbol of N-P-N transistor.

   vi) Draw the circuit diagram of common emitter amplifier.

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

   i) Explain zener diode as a voltage regulator.

   ii) Write a note on Owen's bridge.

   iii) A transistor connected in common mode configuration having current gain α =0.99. If change in base current is 0.30 mA. Calculate the value of collector current.

   B) Write a note on π-filter circuit. **4**

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

   i) What is zener diode ? Discuss its IV characteristics.

   ii) Define the current amplification factors in common base and common emitter configuration. Obtain the relation between them.

   iii) Discuss series resonance circuit. Show that at resonance, circuit is purely resistive and current in circuit is maximum.

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

   i) Obtain the expression for growth and decay of current in L-R circuit.

   ii) Obtain the expression for magnetic induction at a point on the axis of current carrying coil of single turn.

_____

SLR-CN – 232

Seat No.	

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

Day and Date : Thursday, 15-5-2014 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) Agnatha are vertebrates without _____
      a) tail b) trunk c) jaws d) head

   2) Body of urochordates enclosed in a test called as _____
      a) tunic b) meninge c) coat d) jelly

   3) Age of fish can be calculated by studying lines of growth in _____ scales.
      a) Cycloid b) Rhomboid c) Ganoid d) Placoid

   4) In blood of frog _____ are phagocytic in function.
      a) leucocytes b) thrombocytes c) erythrocytes d) blood platelets

   5) The larva of petromyzon is called _____
      a) tadpole b) fusiform larva
      c) ammocoetus larva d) axolotal larva

   6) The brain of frog is hollow and its cavities are called as _____
      a) Ventricles b) Lumen
      c) Coelom d) Pericardial cavity

   7) Acetabulum is the cavity of _____
      a) pelvic girdle b) pectoral girdle
      c) sternum d) rib

   8) All the gills are holobranch found in _____
      a) Scoliodon b) Labeo
      c) Dog fish d) Cartilagenous fishes

P.T.O.

9) RBCs of frog are _____ carrier.

    a) Oxygen   b) Nitrogen

    c) Carbondioxide   d) Hydrogen

10) In frog the bunch of eggs is called as _____

    a) spawn   b) tadpole   c) amplexus   d) blastula

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

    1) Salient features of cephalochordata

    2) Paired fins of fishes

    3) Components of buccal cavity of frog

    4) Functions of scales in fishes

    5) Classification of frog

    6) Egg of frog.

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

    1) Cleavage in frog

    2) Tadpole with external gill stage of frog

    3) Functions of brain of frog.

   B) Functions of liver of frog.   **4**

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

    1) Skin respiration in frog

    2) Ammocoetus larva

    3) Renal portal system of frog.

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

    1) What is excretion ? Describe the excretory system of frog.

    2) Give general characters of Cyclostomata.

_____

Seat
No.

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

Day and Date : Friday, 16-5-2014　　　　　　　　　　　　Max. Marks : 50
Time : 11.00 a.m. to 1.00 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 :　　　　　　　　　　　　　　　　　　**10**

　i) The mathematical expectation of a r.v. is its
　　a) Median　　　　　　　　　　b) Mode
　　c) Geometric Mean　　　　　　d) Arithmatic Mean

　ii) If E(Y) = 3 where $Y = \dfrac{X-2}{5}$ then E(X) is

　　a) $\dfrac{1}{5}$　　　　b) $\dfrac{17}{15}$　　　　c) $\dfrac{5}{17}$　　　　d) 17

　iii) If X and Y are any two random variables with covariance between them is equal to 50 then covariance between U and V where U = 10X + 10 and V = 5Y + 5 is given by
　　a) 2500　　　　b) 500　　　　c) 650　　　　d) 1000

　iv) The probability generating function of a discrete r.v. is affected by change of
　　a) Origin　　　　　　　　　　b) Origin and scale
　　c) Scale　　　　　　　　　　d) Cannot be determined

　v) The second order central moment of a r.v. is
　　a) Mode　　　　　　　　　　b) Variance
　　c) Arithmetic Mean　　　　　d) Harmonic Mean

P.T.O.

vi) The sum of independent and identically Bernoulli r.vs has _____ distribution.

   a) Hypergeometric   b) Bernoulli

   c) Binomial   d) Uniform

vii) The variance of following distribution is zero

   a) One point   b) Two point

   c) Bernoulli   d) Uniform

viii) For hypergeometric distribution number of parameters are

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

ix) The mean of discrete uniform r.v. taking values 1, 2, ... n is

   a) 1   b) n   c) $\dfrac{n}{n+1}$ d) $\dfrac{n+1}{2}$

x) pgf of one point distribution taking value C is

   a) C   b) 1   c) 0   d) S^C

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

  i) Define marginal distribution of X.

  ii) Prove that first central moment is always zero.

  iii) Obtain mean of Bernoulli distribution.

  iv) Obtain effect of change of origin on pgf.

  v) Let X be a r.v. with following probability distribution

X	0	1	2	3
P(x)	$\dfrac{1}{8}$	$\dfrac{3}{8}$	$\dfrac{3}{8}$	$\dfrac{1}{8}$

   Obtain E(X).

  vi) State two real life situations where Binomial distribution can be used.

3. A) Attempt **any two** of the following :   **6**

  i) The pgf of discrete r.v. X is $0.5 + 0.3S + 0.2S^2$ then find E(X) and V(X).

  ii) Obtain mean of two point distribution.

  iii) State a) Addition theorem of expectation b) multiplication theorem of Expectation.

B) Prove that **4**

    a) $E(aX + b) = aE(X) + b$

    b) $V(aX + b) = a^2V(X)$

4. Attempt **any two** from the following : **10**

   i) The joint pmf of (X, Y) is

X\Y	0	1
−1	0	$\frac{1}{3}$
0	$\frac{1}{3}$	0
1	0	$\frac{1}{3}$

    Prove that (X, Y) are uncorrelated but not independent.

   ii) Obtain Expectation and variance of linear combination of (X, Y).

   iii) Two fruits are to be selected at random from 4 mangoes, 2 oranges and 3 apples. Let X and Y denote number of mangoes and number of oranges selected respectively. Obtain the probability distribution of (X, Y) and obtain E(X) and V(X).

5. Attempt **any one** from the following : **10**

   i) The joint pmf of (X, Y) is

X\Y	0	1	2	3
0	C	2C	3C	4C
1	2C	4C	6C	8C
2	3C	6C	9C	12C

    Find :   i) C

          ii) $P(X = Y)$

          iii) $P(X + Y \leq 1)$

          iv) Conditional distribution of X given Y = 2

          v) $E(X/Y = 2)$

   ii) Define binomial distribution. Obtain its pgf and hence or otherwise find its mean and variance.

SLR-CN – 234

B.Sc. (Part – I) (Semester – II) Examination, 2014
ZOOLOGY (Paper – IV) (New)
Ecology, Ethology, Evolution and Applied Zoology

Day and Date : Friday, 16-5-2014   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** and labelled diagrams **wherever** necessary.

1. Rewrite the sentence by selecting appropriate answer :   **10**

　 1) All the living organisms along with abiotic factors on the earth constitute
　　 _____

　　 a) Biosphere　　 b) Biome　　　 c) Ecosystem　 d) Community

　 2) Paedology is the study of _____

　　 a) Soil　　　　 b) Fire　　　　 c) Light　　　 d) Moisture

　 3) All close relationship between organism are called _____

　　 a) Symbiosis　　 b) Mutualism　 c) Parasitism　 d) Commensalism

　 4) The phenomenon of cyclomorphosis in Daphnia is in response to variations
　　 in

　　 a) Temperature　 b) Water　　　 c) Soil　　　　 d) Light

　 5) Which of the following food chain is correct.

　　 a) Grass → Mouse → Snake → Hawk

　　 b) Mouse → Grass → Snake → Hawk

　　 c) Snake → Mouse → Hawk → Grass

　　 d) Hawk → Grass → Snake → Mouse

　 6) When one organism is benefitted without affecting the other is called
　　 _____

　　 a) Parasitism　　　　　　　　 b) Commensalism

　　 c) Mutualism　　　　　　　　 d) Predator

P.T.O.

7) In a colony of beehive a worker bee is _____

   a) Fertile female   b) Fertile male

   c) Sterile female   d) Sterile male

8) Vermiculture is related to _____

   a) Breeding and maintenance of earthworms

   b) Rearing of silkworms

   c) Rearing of honeybee

   d) Rearing of goats

9) Leaf insect (Phyllium) exhibit _____

   a) Variation   b) Mimicry   c) Camouflage   d) Model

10) Rearing of silkworm is _____

   a) Apiculture   b) Sericulture   c) Pisciculture   d) Aquaculture

2. Answer **any five** of the following :   **10**

   i) Food web

   ii) Pearl culture

   iii) Vermiculture

   iv) Ecology

   v) List of abiotic factors of ecosystem

   vi) Primary succession.

3. A) Answer **any two** of the following :   **6**

   i) Describe the grass land ecosystem.

   ii) Explain the castes of honey bees.

   iii) What is mimicry ? Answer with example you have studied.

  B) Give an account of vermicomposting.   **4**

4. Answer **any two** of the following :   **10**

   i) What is food chain ? Explain it with reference to pond ecosystem.

   ii) Give an account of camouflage with suitable examples.

   iii) Give the palaeontological evidences of evolution.

5. Answer **any one** of the following :   **10**

   1) Describe the swarming behaviour of honey bee.

   2) What is courtship ? Comment on its features.

_____

Seat No.

B.Sc. – I (Semester – II) (New) Examination, 2014
MATHEMATICS (Paper – III)
Geometry

Day and Date : Saturday, 17-5-2014   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) $(\sqrt{3}, 1)$ is the Cartesian coordinates of a point then its polar coordinate
      is _____
      a) (2, 30°)   b) (3, 30°)   c) (–2, 30°)   d) (–3, 45°)

   2) $x^2 + y^2 = 2ax$ is the equation of curve in Cartesian system then its polar
      equation is _____
      a) $r = a$ b) $r = \cos\theta$ c) $r = 2a\cos\theta$ d) $r = 2a$

   3) $r^2 \sin 2\theta = 2a^2$ is the polar equation of the curve then its Cartesian equation
      is _____
      a) $x = a^2$ b) $y = a^2$ c) $x^2 + y^2 = a^2$ d) $xy = a^2$

   4) If OP is the diagonal of a unit cube with edges ox, oy, oz then the direction
      cosines of OP are _____
      a) (1, 1, 1)   b) $\left(\sqrt{3}, \sqrt{3}, \sqrt{3}\right)$

      c) $\left(\dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}, \dfrac{1}{\sqrt{3}}\right)$ d) $\left(\dfrac{1}{3}, \dfrac{1}{3}, \dfrac{1}{3}\right)$

   5) The distance of a plane $Ax + By + Cz = D$ from the origin is _____
      a) D   b) – D

      c) $\dfrac{1}{\sqrt{A^2 + B^2 + C^2}}$ d) $\dfrac{D}{\sqrt{A^2 + B^2 + C^2}}$

6) The direction ratios of the normal to the plane $\dfrac{x}{2} + \dfrac{y}{3} + \dfrac{z}{4} = 1$ are _____

a) $\left(\dfrac{1}{2}, 0, 0 \right)$

b) $\left(\dfrac{1}{2}, -\dfrac{1}{3}, \dfrac{1}{4} \right)$

c) $\left(\dfrac{1}{2}, \dfrac{1}{3}, -\dfrac{1}{4} \right)$

d) $\left(\dfrac{1}{2}, \dfrac{1}{3}, \dfrac{1}{4} \right)$

7) The radius of the sphere $x^2 + y^2 + z^2 - 4x - 6y + 8z + 4 = 0$ is _____

a) 5   b) -5 c) 4   d) 6

8) The locus of $x = 0$ is _____

a) zx – plane   b) xy – plane   c) yz – plane   d) none of these

9) The centre of the sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ is _____

a) (u, v, w) b) $(-u, -v, -w)$

c) $(-u, v, -w)$ d) $(-u, -v, w)$

10) The equation of tangent plane at $p(x_1, y_1, z_1)$ to the sphere $x^2 + y^2 + z^2 = a^2$ is _____

a) $xx_1 - yy_1 - zz_1 = a^2$ b) $xx_1 + yy_1 - zz_1 = a^2$

c) $xx_1 + yy_1 + zz_1 = a^2$ d) $xx_1 + yy_1 - zz_1 = a$

2. Attempt **any five** from the following :   **10**

1) Find the Cartesian coordinates of the point whose polar coordinates are $\left(5, \frac{\pi}{6} \right)$.

2) Transform the equation
$3x^2 + 2xy + 4y^2 + 14x - 10y + 31 = 0$ to parallel axes through the point $(-3, 2)$.

3) Identify the conic $4x^2 - 12xy + 9y^2 - 4x + y - 5 = 0$.

4) Show that the following points are collinear.
$A(2, 5, -4), B(1, 4, -3), C(4, 7, -6)$

5) Find the equation of the sphere whose centre is at $C(2, 3, -4)$ and radius 5.

6) Obtain the equation of sphere described on the join of $A(2, -3, 4)$ and $B(-5, 6, -7)$ as diameter.

3. A) Attempt **any two** from the following : **6**

a) By rotating the axes about the origin through the angle θ if $ax + by$ becomes $a'x' + b'y'$, show that $a^2 + b^2 = a'^2 + b'^2$.

b) Find the equation of a plane passing through three points, P(3, 4, 2), Q(4, 6, 5), R (8, 2, 9).

c) Find the equation of the radical plane of the spheres
$x^2 + y^2 + z^2 - 2x + 3y + 4z - 5 = 0$ and
$x^2 + y^2 + z^2 - 3x - 4y + 5z - 6 = 0$.

B) Show that the equation of a sphere described on the line segment joining the points $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ as a diameter is
$(x - x_1)(x - x_2) + (y - y_1)(y - y_2) + (z - z_1)(z - z_2) = 0$. **4**

4. Attempt **any two** from the following : **10**

1) Show that the equation of the plane whose normal from the origin has the direction cosines l, m, n and the length P is $lx + my + nz = p$.

2) Show that the equation of the plane tangent to the sphere
$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ at a point $p(x_1, y_1, z_1)$ is
$xx_1 + yy_1 + zz_1 + u(x + x_1) + v(y + y_1) + w(z + z_1) + d = 0$.

3) By change of origin to a suitable point remove the first degree terms in the equation $3x^2 + 2xy + 3y^2 - 18x - 22y + 5 = 0$.

5. Attempt **any one** from the following : **10**

1) Show that the plane $Ax + By + Cz = D$ touches the sphere
$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$
if and only if
$(Au + Bv + Cw + D)^2 = (A^2 + B^2 + C^2)(u^2 + v^2 + w^2 - d)$ and show that the plane $2x - 2y + z + 12 = 0$ touches the sphere $x^2 + y^2 + z^2 - 2x - 4y + 2z = 3$.

2) If by transformation of rectangular axes the expression $ax^2 + 2hxy + by^2$ becomes $a'x'^2 + 2h'x'y' + b'y'^2$ then prove that $a + b = a' + b'$ and
$ab - h^2 = a'b' - h'^2$.

_____

Seat No.

B.Sc. I (Semester – II) (New) Examination, 2014
MATHEMATICS (Paper – IV)
Differential Equation

Day and Date : Monday, 19-5-2014   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 of the following :   **10**

   1) An expression in x & y is said to be homogeneous if the sum of the degrees of x & y in every term is

       a) distinct   b) finite

       c) same   d) infinite

   2) The equation Mdx + Ndy = 0 is said to be exact if

       a) $\dfrac{\partial M}{\partial y} = \dfrac{\partial N}{\partial x}$ b) $\dfrac{\partial M}{\partial y} = -\dfrac{\partial N}{\partial x}$

       c) $\dfrac{\partial^2 M}{\partial x \partial y} = \dfrac{\partial^2 N}{\partial y \partial x}$ d) $\dfrac{\partial M}{\partial y} + \dfrac{\partial N}{\partial x} = 0$

   3) A differential equation is said to be linear if the dependent variable and its derivative appear only in the _____ degree.

       a) first   b) second   c) third   d) fourth

   4) The equation of the form (ax + by + c) dx − (a′x + b′y + c′) dy = 0 is _____ linear equation in x and y.

       a) homogeneous   b) non-homogeneous

       c) exact   d) Bernoulli's

5) $\dfrac{1}{(D-a)^2}e^{ax} =$

    a) $x^2 e^{ax}$ b) $\dfrac{x^2}{2}e^{ax}$ c) $x^2 e^{-ax}$ d) xe^{-x}

6) The C.F. of the differential equation $\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} + 4y = 0$ is y =

    a) $(C_1 + C_2 x)e^{2x}$ b) $(C_1 + C_2 x)e^{-2x}$

    c) $C_1 e^{-2x}$ d) $C_1 e^{2x}$

7) $\dfrac{1}{D-a}X =$

    a) $e^x \int e^{-x}X dx$ b) $e^{-x}\int e^x X dx$

    c) $e^{ax}\int e^{-x}X dx$ d) $e^{ax}\int e^{-ax}X dx$

8) The particular integral of the differential equation $\dfrac{d^2y}{dx^2} - 7\dfrac{dy}{dx} + 12y = e^{2x}$ is

    a) e^{2x} b) e^{-2x} c) $\dfrac{1}{2}e^{2x}$ d) $\dfrac{1}{2}e^x$

9) The particular integral of $\dfrac{1}{D^2 + 4}\cos 2x =$

    a) $\dfrac{-x}{4}\sin 2x$ b) $\dfrac{x}{4}\sin 2x$

    c) $x\sin 2x$ d) $\sin 2x$

10) The complementary function of $(D^2 + 3D + 2)y = xe^{3x}$ is y =

    a) $C_1 e^{-x} + C_2 e^{-2x}$ b) $C_1 e^x + C_2 e^{-2x}$

    c) $C_1 e^{-x} + C_2 e^{2x}$ d) $C_1 e^x + C_2 e^{2x}$

2. Attempt **any five** from the following : **10**

    1) Solve

       $Sec^2x \; tany \; dx + sec^2y \; tanx \; dy = 0$

    2) Solve

$$(x + y)^2\left(x\frac{dy}{dx} + y\right) = xy\left(1 + \frac{dy}{dx}\right)$$

    3) Solve

       $(x + y) \, (dx - dy) = dx + dy$

    4) Evaluate $\dfrac{1}{(D - 1)(D - 5)} e^{2x}$.

    5) Find the particular integral of the differential equation $(D^3 - 4D^2 + 5D - 2) \, y = e^x$.

    6) Solve

$$\frac{d^2y}{dx^2} - 4y = 2 \, \sin\frac{x}{2}$$

3. A) Attempt **any two** from the following : **6**

    1) Solve $(x^3 + y^3)\dfrac{dy}{dx} = x^2y$.

    2) Solve $\dfrac{dy}{dx} + \dfrac{2x}{x^2 + 1}. \, y = \dfrac{4x^2}{x^2 + 1}$.

    3) In the usual notation, prove that $\dfrac{1}{f(D)} e^{ax} = \dfrac{1}{f(a)} e^{ax}$ if $f(a) \neq 0$.

  B) Explain how to solve $\dfrac{dy}{dx} + py = Qy^n$. **4**

4. Attempt **any two** from the following : **10**

   1) Show that $(D - \alpha)(D - \beta)y = (D - \beta)(D - \alpha)y$.

   2) Solve $\dfrac{d^2y}{dx^2} - 5\dfrac{dy}{dx} + 6y = \sin 3x$.

   3) State and prove the necessary and sufficient condition for the equation Mdx + Ndy = 0 to be exact.

5. Attempt **any one** from the following : **10**

   1) Explain how to solve the equation $(ax + by + c)\,dx - (a'x + b'y + c')dy = 0$ is non-homogeneous linear differential equation.

   2) Prove that $\dfrac{1}{\phi(D^2)}\sin ax = \dfrac{1}{\phi(-a^2)}\sin ax$, solve $D^2(D^2 + 1)y = \cos x + e^{3x}$.

———————

Seat No.

B.Sc. (Part – I) (Semester – II) (New) Examination, 2014
BOTANY (Paper – IV)
Cell Biology, Genetics and Plant Biotechnology

Day and Date : Monday, 19-5-2014   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 by choosing correct alternative :   **10**

   1) In prokaryotic cells _____ is the site of respiratory electron transport.

     a) Nucleus   b) Polysome

     c) Plasma-membrane   d) Mitochondrium

   2) Increase in refractivity and viscosity of cytoplasm occurs during _____

     a) Interphase   b) Prophase

     c) Metaphase   d) Telophase

   3) _____ plays an important role in the assembly of interphase nucleus.

     a) Nuclear pore   b) Chromosome

     c) Nucleolus   d) Nuclear matrix

   4) In eukaryotic cells the respiratory enzymes are present in _____

     a) Mitochondria   b) Nucleus

     c) Chloroplast   d) Cell membrane

5) Enzymes for the metabolism of hydrogen peroxide are present in
   _____

   a) Chloroplasts   b) Mitochondria

   c) Peroxisomes   d) Glyoxysomes

6) The term "Genetics" was first used by _____

   a) Mendel   b) Bateson

   c) Punnet   d) Sutton and Boveri

7) The external appearance of an individual is termed _____

   a) Recessive   b) Dominant

   c) Genotype   d) Phenotype

8) Recombinant DNA technique was first proposed by _____

   a) Hebert Boyer   b) Stanley Cohen

   c) Peter Lobban   d) Bolivar

9) _____ is the free living bacteria used as biofertilizer.

   a) Azotobacter   b) Rhizobium

   c) Nostoc   d) <u>Bacillus</u> <u>thuringinesis</u>

10) The gene that stops the expression of another gene is called
    _____ gene.

    a) Inhibitory   b) Complimentary

    c) Supplimentary   d) Dominant

2. Answer **any five** of the following :   **10**

   i) Define eukaryotic cell.

   ii) Write in brief about middle lamella.

   iii) What is test cross ?

   iv) What is self-breeding ?

   v) What is the ratio of complementary and supplimentary genes ?

   vi) What is the 'law of segregation' ?

3. A) Answer **any two** of the following : **6**

   i) Give the significance of Mitosis.

   ii) Draw neat labelled diagram of the ultra structure of the nucleus.

   iii) Give the importance of Biofertilizers.

   B) Explain the "Law of Independent Assortment" with suitable example. **4**

4. Write **any two** of the following : **10**

   i) Structure of chloroplast.

   ii) Describe "dihybrid cross" with suitable example.

   iii) Explain the "multidisciplinary nature of Biotechnology".

5. Answer **any one** of the following : **10**

   i) Describe in brief the chemical composition and functions of cell membrane.

   ii) What is interaction of genes ? Explain inhibitory genes with suitable example.

_____

Seat No.

B.Sc. I (Semester – II) (New) Examination, 2014
PSYCHOLOGY (Paper – III)
General Psychology – II

Day and Date : Tuesday, 20-5-2014
Time : 3.00 p.m. to 5.00 p.m.

Max. Marks : 50

N.B. : **All** questions are **compulsory**.

1. Multiple choice. **10**

   1) _____ is the first stage of memory.

      a) Sensory memory   b) Iconic memory

      c) Echoic memory   d) Selective memory

   2) The word _____ refers to meaning, so this kinds of knowledge is the awareness.

      a) Semantic   b) Implicit   c) Declarative   d) Explicit

   3) _____ was one of the first researchers to study forgetting.

      a) Ebbinghaus   b) Pope   c) Miller   d) Paul

   4) Mental retardation is defined in _____ ways.

      a) 2   b) 6   c) 8   d) 10

   5) The ability to reason and solve problems was labeled _____ for general intelligence.

      a) g factor   b) h factor   c) d factor   d) e factor

   6) When the _____ is external, it is called extrinsic motivation.

      a) Motivation   b) Emotion   c) Intelligence   d) Need

   7) _____ theory still includes the concept of instincts that reside in the id.

      a) Psychoanalytic   b) Arousal

      c) Humanistic   d) Incentive

P.T.O.

8) _____ are things that attract or lure people into action.

   a) Incentives   b) Expectancy   c) Need   d) Drive

9) Freud believed that the mind was divided into _____ parts.

   a) 3   b) 4   c) 6   d) 8

10) _____ introduced the psychosexual stages.

   a) Freud   b) Skinner   c) Dove   d) Fantz

2. Answer the following **(any five)**.   **10**

   1) Define personality.

   2) Define emotion.

   3) Define motivation.

   4) Define Intelligence.

   5) What is amnesia ?

   6) Define memory.

3. A) Answer the following **(any two)** :   **6**
     1) Explain short term memory/working memory.
     2) Explain Ebbinghaus forgetting curve.
     3) Explain Sternberg's theory of IQ.

   B) Explain Maslow's Hierachy of Need theory.   **4**

4. Answer the following **(any two)** :   **10**

   1) Discuss on physiological components of hunger.

   2) Explain psychosexual stages.

   3) Explain projective tests.

5. Answer the following **(any two)** :   **10**

   1) Discuss on trait theories of personality.

   2) Explain Cannon-Bard theory of emotion.

   3) Explain emotional intelligence.

_____

Seat No.

B.Sc. – I (Semester – II) Examination, 2014
MICROBIOLOGY (Paper – III) (New)
Microbial Physiology

Day and Date : Tuesday, 20-5-2014
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 following sentences by selecting correct answers from the given alternatives. **10**

   i) _____ is used for detection of sugar fermentation.

     a) Bromocresol purple   b) Methyl red

     c) Andrade's indicator   d) Phenol red

   ii) _____ proposed cloverleaf model of t-RNA.

     a) Holley   b) Watson   c) Rich   d) Nicolson

   iii) _____ maintains osmotic pressure.

     a) Agar   b) Peptone   c) Milk   d) NaCl

   iv) Starch is an example of

     a) Monosaccharide   b) Disaccharide

     c) Polysaccharide   d) Trisaccharide

   v) _____ Spp. are free living nitrogen fixer.

     a) Rhizobium   b) Azotobacter

     c) Bacillus   d) Pseudomonas

   vi) _____ is normal flora of human intestine.

     a) Streptococcus pyogens   b) Escherichia Coli

     c) Staphylococcus aureus   d) Bacillus subtilis

   vii) _____ is an example of induced enzyme.

     a) β-galactosidase   b) Ligase

     c) Synthatase   d) DNA polymerase

viii) During catabolism of glucose by EMP, _____ net number ATPs are generated.

a) 10   b) 8   c) 2   d) 12

ix) _____ species play role in root nodulation.

a) Clostridium   b) Rhizobium   c) Bacillus   d) Staphylococcus

x) _____ is present in Mac Conkey's agar.

a) Sodium Chloride   b) Sodium citrate

c) Sodium taurocholate   d) Sodium benzoate

2. Answer **any five** of the following :   **10**

i) Active site   ii) Stationary phase

iii) Define catabolism   iv) Heterotrophs

v) Coenzyme   vi) Commensalism

3. A) Answer **any two** of the following :   **6**

i) Ruminant symbiosis

ii) Induced enzymes

iii) Extracellular enzymes.

B) Describe nutritional types of micro-organisms based an carbon and energy source.   **4**

4. Answer **any two** of the following :   **10**

i) Root nodulation

ii) Structure and functions of proteins

iii) Growth phases of bacteria.

5. Write short notes on (**any two**) :   **10**

i) Normal flora of human body and their significance in human health.

ii) TCA cycle.

iii) List common components of media and their functions.

_____

Seat No.

B.Sc. – I (Semester – II) Examination, 2014
PSYCHOLOGY (Paper – IV)
Human Development – II (New)

Day and Date : Wednesday, 21-5-2014   Max Marks : 50
Time : 3.00 p.m. to 5.00 p.m

N.B. : All *questions are* **compulsory**.

1. Multiple choice :   **10**

     1) One of the most frequent _____ problem is glaucoma.

         a) Eye   b) Body   c) Brain   d) Psychological

     2) The _____ marks the transition that ends the child bearing years.

         a) Female climacteric   b) Male climacteric

         c) Menopause   d) Sexual

     3) Menopause is important because it marks the end of a _____ natural fertility.

         a) Woman's   b) Man's   c) Human's   d) Animal's

     4) Most of people are healthy in _____

         a) Middle adulthood   b) Old age

         c) Early adulthood   d) Middle childhood

     5) Psychologist suggests there are _____ reasons why this discrepancy exists ?

         a) 4   b) 6   c) 8   d) 10

     6) To recall information, people often use schemas organized bodies of information stored in _____

         a) Memory   b) Brain   c) Body   d) Sensation

     7) _____ focus on life-events models.

         a) Ravenna Helson   b) Skinner   c) Munn   d) Smit

8) _____ model is the concept of mid-life crisis.

   a) Levinson's   b) Nelson's   c) Miller's   d) Cooper's

9) Many experience the peak of marital satisfaction during _____ age.

   a) Middle   b) Young   c) Old   d) Early childhood

10) Dissatisfaction with working conditions or with the nature of the job increases their _____

   a) Stress   b) Depression   c) Tension   d) Problems

2. Answer the following **(any five)** :   **10**

   1) Define Crystallized Intelligence.

   2) What is selective optimization ?

   3) Give the term of sandwich generation.

   4) What is Ageism ?

   5) What is Alzheimer's disease ?

   6) Explain unlocking longevity genes.

3. A) Answer the following **(any two)** :   **6**

     1) Explain the memory changes in old age.

     2) Explain the development of expertise

     3) Discuss on the threat of cancer.

   B) Discuss on Erikson's stage of generativity versus stagnation.   **4**

4. Answer the following **(any two)** :   **10**

   1) Explain the stability versus change in personality.

   2) Explain transitions in older people.

   3) Discuss on the on going sexuality of middle age.

5. Answer the following **(any two)** :   **10**

   1) Explain crystallized and fluid intelligence.

   2) Explain the health problems in older people.

   3) Discuss on continuity and change in personality during late adulthood.

_____

Seat No.

B.Sc. – I (Semester – II) Examination, 2014
GEOLOGY (Paper – IV) (New)
Introduction to Physical Geology

Day and Date : Wednesday, 21-5-2014　　　　　　　　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) In high altitudes and high latitudes _____ is the chief agent of mechanical weathering.
      a) Oxidation　　b) Frost　　　　c) Salt action　　d) Solution

   2) Chemical weathering takes place through
      a) Solution　　　b) Hydration　　c) Oxidation　　d) All of these

   3) River flows in loop like channels are called as
      a) Meanders　　b) Pot holes　　c) River terrace　d) Ox-bow lake

   4) Deltas are _____ shaped features of stream deposition.
      a) Square　　　b) Triangular　　c) Circle　　　d) Pentagonal

   5) The processes of sea erosion accomplished by wave action through
      a) Impact　　　　　　　　　　b) Hydraulic action
      c) Solution　　　　　　　　　 d) All of these

   6) A _____ is developed at an angle to the shore or at the mouth of an embayment.
      a) bar　　　　　b) spit　　　　　c) hook　　　　d) tombolo

   7) The separated ice blocks may be buried in out wash plain after the retreat of glacier, this block of ice may melt leaving a depression which is known as
      a) Kames　　　b) Eskers　　　c) Kettle hole　　d) Drumlin

P.T.O.

8) _____ are rounded mounts or hills of till with elliptical bases.

   a) Drumlins   b) Moraines   c) Kames   d) Eskers

9) _____ are formed by coalescing alluvial fans.

   a) Bajadas   b) Pediment   c) Playas   d) None of these

10) _____ is an erosional features of regions of arid climate.

   a) Bolson   b) Pediment   c) Bajadas   d) Playas

2. Answer **any five** of the following :   **10**

   1) Wave built terrace

   2) Out wash plains

   3) Pediments

   4) Talus

   5) Define weathering

   6) What is Erosion ?

3. A) Answer **any two** of the following :   **6**

   1) Soil formation

   2) Tsunamis

   3) Describe watershed in brief.

  B) Write note on :   **4**

   Agents of weathering.

4. Answer **any two** of the following :   **10**

   1) Describe depositional features, point bar and Natural levees by stream.

   2) Describe erosional features, striations and grooves of glaciers.

   3) Explain kinds of deserts.

5. Answer **any two** of the following :   **10**

   1) Explain polished surfaces and U-shaped valley.

   2) Describe river piracy and waterfalls.

   3) Describe wind deflation.

_____