

## CSIR 27th Dec 2019 S1

|                 |                         |
|-----------------|-------------------------|
| Application No. | 191620063849            |
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| Roll No.        | AM0216203463            |
| Test Date       | 27/12/2019              |
| Test Time       | 9:30 AM - 12:30 PM      |
| Subject         | Life Sciences           |

### Section : Part-A General Aptitude

**Q.1** A commodity is sold  $n$  times, each time at a profit of  $p\%$ . If the value of the object finally becomes 10 times its original value, then  $p$  is

1.  $\left(10^{\frac{1}{n}} - 1\right)100$
2.  $(10^n - 1)100$
3.  $(1 - 10^{-n})100$
4.  $\left(1 - 10^{-\left(\frac{1}{n}\right)}\right)100$

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931617**

Option 1 ID : **3398936237**

Option 2 ID : **3398936238**

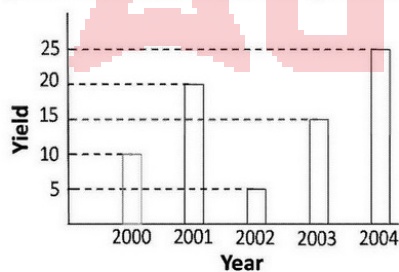
Option 3 ID : **3398936239**

Option 4 ID : **3398936240**

Status : **Not Answered**

Chosen Option : --

**Q.2** Year-wise yield in tonnes of a product is given in the graph below. Which year had the largest percent variation in the yield compared to the previous year ?



1. 2004

2. 2003

3. 2002

4. 2001

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931610**

Option 1 ID : **3398936209**

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Option 2 ID : **3398936210**  
 Option 3 ID : **3398936211**  
 Option 4 ID : **3398936212**  
 Status : **Answered**  
 Chosen Option : **3**

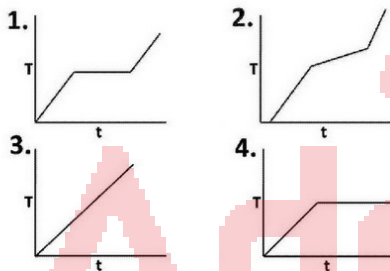
**Q.3** The decay rate of a certain radioisotope is measured to be 6000 decays/second after 2 seconds and 750 decays/second after 5 seconds. What is the half life of the radioisotope?

1. 1 second
2. 0.5 second
3.  $e$  seconds
4. 1.5 seconds

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931607**  
 Option 1 ID : **3398936197**  
 Option 2 ID : **3398936198**  
 Option 3 ID : **3398936199**  
 Option 4 ID : **3398936200**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.4** A piece of iron is heated at a uniform rate. Heating is continued even after it melts. Which one of the following is the correct Temperature-time (T-t) diagram for this process?

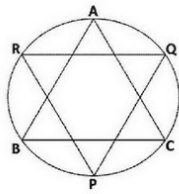


**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931612**  
 Option 1 ID : **3398936217**  
 Option 2 ID : **3398936218**  
 Option 3 ID : **3398936219**  
 Option 4 ID : **3398936220**  
 Status : **Answered**  
 Chosen Option : **2**

**Q.5**

$\triangle ABC$  and  $\triangle PQR$  are equilateral triangles inscribed in the same circle as shown. If  $AB$  is parallel to  $PQ$ ,  $BC$  is parallel to  $RQ$  and  $CA$  is parallel to  $PR$ , then which of the following is true for the hexagon  $ARBPCQ$ ?



1. No two sides are equal.
2. Adjacent sides are unequal.
3. Only opposite sides are equal.
4. All sides are equal.

Options 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931616**

Option 1 ID : **3398936233**

Option 2 ID : **3398936234**

Option 3 ID : **3398936235**

Option 4 ID : **3398936236**

Status : **Answered**

Chosen Option : **4**

**Q.6** A certain radioactive material produces  $H$  units of heat per unit volume per unit time. A uniform solid sphere is made of this material. The sphere radiates  $S$  units of heat per unit area per unit time. For the sphere to reach a steady temperature, its radius should necessarily be

1. less than or equal to  $\frac{3S}{H}$
2. more than  $\frac{3S}{H}$
3. less than  $\frac{S}{H}$
4. more than  $\frac{S}{H}$

Options 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931601**

Option 1 ID : **3398936173**

Option 2 ID : **3398936174**

Option 3 ID : **3398936175**

Option 4 ID : **3398936176**

Status : **Not Answered**

Chosen Option : **--**

**Q.7**

Pick the correct statement:

1. The sum of any two sides of a plane triangle is always less than the third side.
2. The sum of squares of two sides of a plane triangle is always equal to the square of the third side.
3. Two internal angles of a scalene plane triangle can be equal.
4. The sum of the internal angles (in radians) of a plane triangle is the same as the ratio of the circumference of a circle to its diameter.

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931602**  
 Option 1 ID : **3398936177**  
 Option 2 ID : **3398936178**  
 Option 3 ID : **3398936179**  
 Option 4 ID : **3398936180**  
 Status : **Answered**  
 Chosen Option : **3**

**Q.8** Which of the following is true for the internal angles A, B and C of a plane scalene triangle ?

1.  $\tan A + \tan B + \tan C = 0$
2.  $\tan A + \tan B + \tan C = 1$
3.  $\tan (A + B) = \tan C$
4.  $\tan A + \tan B + \tan C = \tan A \tan B \tan C$ .

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931611**  
 Option 1 ID : **3398936213**  
 Option 2 ID : **3398936214**  
 Option 3 ID : **3398936215**  
 Option 4 ID : **3398936216**  
 Status : **Answered**  
 Chosen Option : **3**

**Q.9** If 'DELHI' is coded as 'BCJFG' and 'MADRAS' is coded as 'KYBPYQ', then 'MUMBAI' is coded as:

1. LTLAZH
2. KWNCBG
3. KSKZYG
4. KTKAYH

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931604**  
 Option 1 ID : **3398936185**

Option 2 ID : 3398936186

Option 3 ID : 3398936187

Option 4 ID : 3398936188

Status : Answered

Chosen Option : 3

**Q.10** In a cricket match, team A needed to score 20 runs to win in the last 12 balls, with players  $A_1$  and  $A_2$  batting.  $A_1$  faced 8 out of 12 balls with a strike rate (*defined as number of runs scored per hundred balls faced*) of 75. What is the least strike rate  $A_2$  needed to score at, for team A to win (assuming team A did not lose any more wickets or get any extra runs)?

1. 250
2. 300
3. 350
4. 375

Options 1. 1

2. 2

3. 3

4. 4

Question Type : MCQ

Question ID : 3398931609

Option 1 ID : 3398936205

Option 2 ID : 3398936206

Option 3 ID : 3398936207

Option 4 ID : 3398936208

Status : Answered

Chosen Option : 3

**Q.11** What is the maximum number of cubes of side 2 cm each that can be fitted into a cylinder without rising above the brim of a cylinder whose diameter and height are 6 cm and 15 cm, respectively?

1. 14
2. 21
3. 28
4. 35

Options 1. 1

2. 2

3. 3

4. 4

Question Type : MCQ

Question ID : 3398931603

Option 1 ID : 3398936181

Option 2 ID : 3398936182

Option 3 ID : 3398936183

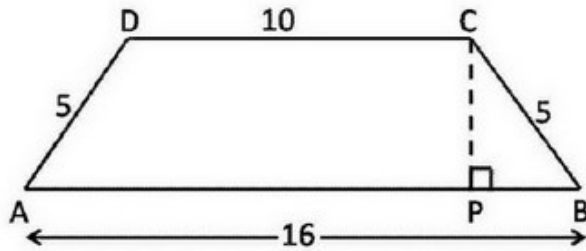
Option 4 ID : 3398936184

Status : Not Answered

Chosen Option : --

**Q.12**

In the trapezium ABCD, what is the length of CP?



1. 4
2.  $4\sqrt{3}$
3. 3
4.  $3\sqrt{3}$

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931605**

Option 1 ID : **3398936189**

Option 2 ID : **3398936190**

Option 3 ID : **3398936191**

Option 4 ID : **3398936192**

Status : **Not Answered**

Chosen Option : --

**Q.13** 10 g of a compound is dissolved in 1 L of water. 50 mL of this solution is replaced by water and the solution is homogenised. The process is repeated once more. Then the concentration (in g/mL) of the final solution is

1. 0.010000
2. 0.009500
3. 0.009025
4. 0.005000

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931600**

Option 1 ID : **3398936169**

Option 2 ID : **3398936170**

Option 3 ID : **3398936171**

Option 4 ID : **3398936172**

Status : **Not Answered**

Chosen Option : --

**Q.14**

If a square is inscribed in the ellipse  $\frac{x^2}{25} + \frac{y^2}{16} = 1$  with its sides parallel to the axes of the ellipse and its vertices lying on the ellipse, then the area of the square is approximately

1. 40.
2. 16.
3. 25.
4. 20.

Options 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931614**

Option 1 ID : **3398936225**

Option 2 ID : **3398936226**

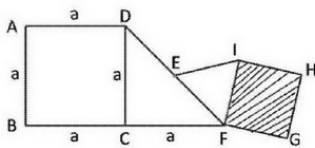
Option 3 ID : **3398936227**

Option 4 ID : **3398936228**

Status : **Answered**

Chosen Option : **4**

**Q.15** In the following figure, E is the mid-point of DF, FGHI is a square and EIF is an equilateral triangle. What is the area of the square FGHI ?



1.  $\frac{\sqrt{3}a^2}{2}$
2.  $\sqrt{2}a^2$
3.  $\frac{a^2}{2}$
4.  $\frac{a^2}{\sqrt{2}}$

Options 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931608**

Option 1 ID : **3398936201**

Option 2 ID : **3398936202**

Option 3 ID : **3398936203**

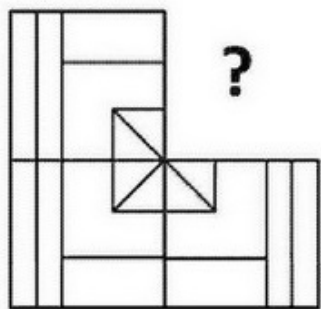
Option 4 ID : **3398936204**

Status : **Not Answered**

Chosen Option : **--**

**Q.16**

Complete the figure below with the correct block.



- 1.
- 2.
- 3.
- 4.

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931598**  
Option 1 ID : **3398936161**  
Option 2 ID : **3398936162**  
Option 3 ID : **3398936163**  
Option 4 ID : **3398936164**  
Status : **Answered**  
Chosen Option : 4

Fact 1: Seeta said "Geeta and I both have cars".

Fact 2: Geeta said "I don't have a car".

Fact 3: Seeta always tells the truth, but Geeta sometimes lies.

Which of the following statement(s) must be true?

- A. Geeta has a car.
- B. Seeta has a car.
- C. Geeta is lying.

- 1. A only
- 2. A and B only
- 3. A, B and C
- 4. Only C

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931599**

Option 1 ID : **3398936165**

Option 2 ID : **3398936166**

Option 3 ID : **3398936167**

Option 4 ID : **3398936168**

Status : **Not Answered**

Chosen Option : --

**Q.18** To enter a building a password is needed. When A enters, the sentry says "Five", A replies "4" and is let in. When B enters, the sentry says "Six" and B replies "3" and is let in. When C enters, the sentry says "One" and C replies "3" and is let in. When you try to enter, the sentry says "Three". What should your reply be to gain entry?

- 1. 1
- 2. 2
- 3. 4
- 4. 5

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931606**

Option 1 ID : **3398936193**

Option 2 ID : **3398936194**

Option 3 ID : **3398936195**

Option 4 ID : **3398936196**

Status : **Answered**

Chosen Option : **4**

**Q.19**

In order to estimate the number of fish of species B in a pond, 100 fish of a foreign species A were released into the pond. Later, in a catch of 100 fish, the numbers of fish of species A and B were found to be 10 and 90 respectively. Assuming homogeneous distribution of the fish, and no changes in the numbers for either species, the estimated number of fish of species B in the pond is

1. 900.
2. 100.
3. 810.
4. 1000.

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931615**

Option 1 ID : **3398936229**

Option 2 ID : **3398936230**

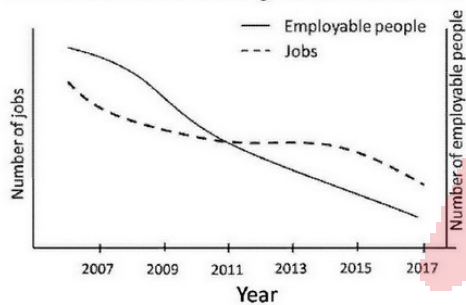
Option 3 ID : **3398936231**

Option 4 ID : **3398936232**

Status : **Not Answered**

Chosen Option : --

**Q.20** Which one of the following inferences can definitely be drawn based on the plot shown ?



1. Number of jobs and number of employable people decreased at the same rate from 2007 to 2017.
2. There were surplus jobs from 2012 onwards.
3. Unemployment increased from 2012 onwards.
4. Minimum unemployment was during 2007 and 2011.

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931613**

Option 1 ID : **3398936221**

Option 2 ID : **3398936222**

Option 3 ID : **3398936223**

Option 4 ID : **3398936224**

Status : **Answered**

Chosen Option : 1

Section : **Part-B Life Sciences**

**Q.1**

In *Drosophila* males, where no recombination occurs, segregation of the two alleles of a gene occurs at which stage of cell division?

1. Diplotene
2. Anaphase I
3. Anaphase II
4. mitotic telophase

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931647**

Option 1 ID : **3398936357**

Option 2 ID : **3398936358**

Option 3 ID : **3398936359**

Option 4 ID : **3398936360**

Status : **Not Answered**

Chosen Option : --

**Q.2** A 30-residue peptide containing Phe, Tyr and Trp is dissolved in D<sub>2</sub>O and the high field proton NMR is recorded after 24 hours. The resonances that are unlikely to be present are

1. aromatic protons
2. C<sup>α</sup> protons
3. aliphatic protons
4. amide protons

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931667**

Option 1 ID : **3398936437**

Option 2 ID : **3398936438**

Option 3 ID : **3398936439**

Option 4 ID : **3398936440**

Status : **Answered**

Chosen Option : 1

**Q.3**

Following table shows the number of individuals of different species in two communities, X and Y.

| Species | Community |     |
|---------|-----------|-----|
|         | X         | Y   |
| 1       | 250       | 490 |
| 2       | 200       | 125 |
| 3       | 180       | 80  |
| 4       | 100       | 65  |
| 5       | 65        | 50  |
| 6       | 30        | 10  |
| 7       | 5         | 10  |
| Total   | 830       | 830 |

Based on the above data and the Simpson's Diversity Index which one of the following statements is true?

1. X has greater alpha diversity than Y
2. Y has greater alpha diversity than X
3. X and Y have equal alpha diversities
4. X has greater species richness than Y

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931653**  
Option 1 ID : **3398936381**  
Option 2 ID : **3398936382**  
Option 3 ID : **3398936383**  
Option 4 ID : **3398936384**  
Status : **Answered**  
Chosen Option : **4**

Q.4 Pulmonary surfactant is synthesized primarily by

1. type I alveolar epithelial cells
2. alveolar macrophages
3. type II alveolar epithelial cells
4. alveolar mast cells

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931641**  
Option 1 ID : **3398936333**  
Option 2 ID : **3398936334**  
Option 3 ID : **3398936335**  
Option 4 ID : **3398936336**  
Status : **Not Answered**  
Chosen Option : **--**

Q.5

Which one of the following immunoglobulin isotypes plays a primary role in protecting against pathogens that invade through the gut or respiratory mucosa?

1. IgE
2. IgM
3. IgD
4. IgA

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931633**

Option 1 ID : **3398936301**

Option 2 ID : **3398936302**

Option 3 ID : **3398936303**

Option 4 ID : **3398936304**

Status : **Answered**

Chosen Option : **4**

**Q.6** Which one of the following combinations of *nodulation* (*nod*) genes are found in all rhizobial strains?

1. *nodA*, *nodB* and *nodC*
2. *nodP*, *nodQ* and *nodH*
3. *nodF*, *nodE* and *nodL*
4. *nodA*, *nodE* and *nodP*

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931638**

Option 1 ID : **3398936321**

Option 2 ID : **3398936322**

Option 3 ID : **3398936323**

Option 4 ID : **3398936324**

Status : **Answered**

Chosen Option : **1**

**Q.7** Three bird species with similar habitat and diet preferences co-exist in a habitat. For these species, which one of the following statements is most likely to be correct?

1. The fundamental and realised niches of these species are same.
2. Their fundamental niches are greater than their realised niches.
3. Their realised niches are greater than their fundamental niches.
4. The fundamental and realised niches both will expand.

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931655**

Option 1 ID : **3398936389**

Option 2 ID : **3398936390**

Option 3 ID : **3398936391**

Option 4 ID : **3398936392**  
Status : **Answered**  
Chosen Option : **3**

**Q.8** Reproductive success of individuals in a population is likely to be skewed under all the following conditions, **EXCEPT** when

1. females are choosy.
2. male-male competition is intense.
3. pair-bonding occurs in the species.
4. females prefer males with larger territories

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931658**  
Option 1 ID : **3398936401**  
Option 2 ID : **3398936402**  
Option 3 ID : **3398936403**  
Option 4 ID : **3398936404**  
Status : **Answered**  
Chosen Option : **4**

**Q.9** "In *Agrobacterium*-mediated transformation of a plant using a binary vector construct, \_\_\_\_\_." Complete the above statement with the correct option.

1. all transgenic plants generated would show similar levels of transgenic expression".
2. the *Agrobacterium* cells lose the binary vector after the transfer of T-DNA".
3. some transgenic plants generated may contain partial or truncated versions of the T-DNA".
4. proteins of the host plant do not play any role".

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931660**  
Option 1 ID : **3398936409**  
Option 2 ID : **3398936410**  
Option 3 ID : **3398936411**  
Option 4 ID : **3398936412**  
Status : **Not Answered**  
Chosen Option : **--**

**Q.10** Given below are a few factors that influence the sensitivity of immunoassays:

- A. Affinity of the antibody used
- B. Epitope density on the antigen
- C. Epitope distribution on the antigen

Which one of the following options represents the correct factor(s)?

1. A only
2. B only
3. B and C only
4. A, B and C

**Options** 1. 1

- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**  
 Question ID : **3398931659**  
 Option 1 ID : **3398936405**  
 Option 2 ID : **3398936406**  
 Option 3 ID : **3398936407**  
 Option 4 ID : **3398936408**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.11** Distyly is

- A. presence of two styles in a flower
- B. presence of two lengths of styles in a species
- C. a form of dichogamy.
- D. a form of herkogamy.

Which one of the following options represents all correct statements?

- 1. B only
- 2. A and C
- 3. B and C
- 4. B and D

- Options**
- 1. 1
  - 2. 2
  - 3. 3
  - 4. 4

Question Type : **MCQ**  
 Question ID : **3398931650**  
 Option 1 ID : **3398936369**  
 Option 2 ID : **3398936370**  
 Option 3 ID : **3398936371**  
 Option 4 ID : **3398936372**  
 Status : **Marked For Review**  
 Chosen Option : 3

**Q.12** Bacterial ribosomes consist of 30S and 50S ribosomal subunits. The translating monosome has a sedimentation value of

- 1. 70S because a fixed set of the ribosomal proteins (totalling to a value of ~10S) are removed when 30S and 50S subunits interact with each other
- 2. 70S because the interaction between the two subunits (30S and 50S) excludes some surface area decreasing the overall resistance of movement through the medium
- 3. 80S because the monosome consists of one subunit of 30S and one subunit of 50S
- 4. 50S because the sedimentation of the combined monosome is determined by the sedimentation of the large subunit

- Options**
- 1. 1
  - 2. 2
  - 3. 3
  - 4. 4

Question Type : **MCQ**  
 Question ID : **3398931628**  
 Option 1 ID : **3398936281**

Option 2 ID : **3398936282**

Option 3 ID : **3398936283**

Option 4 ID : **3398936284**

Status : **Answered**

Chosen Option : 4

**Q.13** How many kinetochores are present in a human cell at mitosis?

1. 46
2. 23
3. 92
4. 84

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931624**

Option 1 ID : **3398936265**

Option 2 ID : **3398936266**

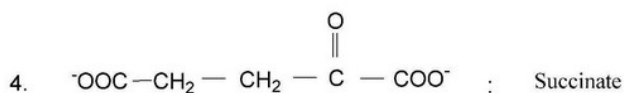
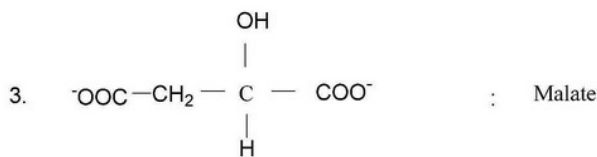
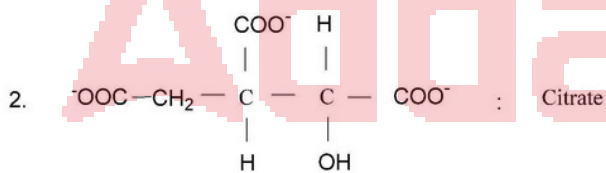
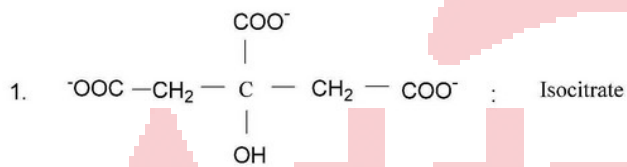
Option 3 ID : **3398936267**

Option 4 ID : **3398936268**

Status : **Answered**

Chosen Option : 3

**Q.14** The molecules citrate, isocitrate, malate and succinate take part in the citric acid cycle. Identify the structure with the correct name.



Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931620**

Option 1 ID : **3398936249**

Option 2 ID : 3398936250  
 Option 3 ID : 3398936251  
 Option 4 ID : 3398936252  
 Status : Not Answered  
 Chosen Option : --

**Q.15** Which one of the following statements is correct?

1. Epigenetic memory depends on DNA acetylation by trithorax group of proteins
2. An epigenetic change could be inherited from a cell to a daughter cell
3. Parental origin does not influence the expression level of imprinted loci
4. Epigenetic changes do not alter the chromatin landscape

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : MCQ  
 Question ID : 3398931623  
 Option 1 ID : 3398936261  
 Option 2 ID : 3398936262  
 Option 3 ID : 3398936263  
 Option 4 ID : 3398936264  
 Status : Answered  
 Chosen Option : 4

**Q.16** Which one of the following microorganisms is used for the fermentation of coffee beans?

1. *Candida krusei*
2. *Erwinia dissolvens*
3. *Lactobacillus delbrueckii*
4. *Lactobacillus plantarum*

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : MCQ  
 Question ID : 3398931663  
 Option 1 ID : 3398936421  
 Option 2 ID : 3398936422  
 Option 3 ID : 3398936423  
 Option 4 ID : 3398936424  
 Status : Not Answered  
 Chosen Option : --

**Q.17** Which one of the following proteins catalyzes branch migration activity in Holliday junction?

1. Spo11
2. RuvB
3. Zip1
4. RuvC

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931626**  
 Option 1 ID : **3398936273**  
 Option 2 ID : **3398936274**  
 Option 3 ID : **3398936275**  
 Option 4 ID : **3398936276**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.18** The table given below provides categories and names of genes involved in *Drosophila* development.

| Category |                       | Gene Name |                     |
|----------|-----------------------|-----------|---------------------|
| I        | Pair rule gene        | (A)       | <i>abdominal A</i>  |
| II       | Homeotic gene         | (B)       | <i>gooseberry</i>   |
| III      | Gap gene              | (C)       | <i>fushi tarazu</i> |
| IV       | Segment polarity gene | (D)       | <i>giant</i>        |

Which one of the following options is a correct match between the categories and gene names?

1. I – A, II – B, III – C, IV - D
2. I – D, II – C, III – B, IV - A
3. I – B, II – D, III – A, IV - C
4. I – C, II – A, III –D, IV - B

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931634**  
 Option 1 ID : **3398936305**  
 Option 2 ID : **3398936306**  
 Option 3 ID : **3398936307**  
 Option 4 ID : **3398936308**  
 Status : **Marked For Review**  
 Chosen Option : 2

**Q.19** Which one of the following pathogens cannot survive and replicate within phagocytic cells?

1. *Listeria monocytogenes*
2. *Mycobacterium tuberculosis*
3. *Leishmania donovani*
4. *Streptococcus pneumoniae*

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

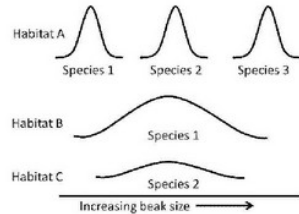
Question Type : **MCQ**  
 Question ID : **3398931630**  
 Option 1 ID : **3398936289**  
 Option 2 ID : **3398936290**  
 Option 3 ID : **3398936291**

Option 4 ID : **3398936292**

Status : **Answered**

Chosen Option : **3**

**Q.20** The diagram below shows the frequency distribution of three closely related bird species based on their beak sizes, across three different habitat patches A, B and C. All the three species co-exist in habitat A, whereas only species 1 occurs in habitat B and species 2 occurs in habitat C.



Which one of the following phenomena most appropriately explains the change in frequency distributions of species 1 and 2 in the figure given above?

1. Migration
2. Character displacement
3. Colonization
4. Succession

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931654**

Option 1 ID : **3398936385**

Option 2 ID : **3398936386**

Option 3 ID : **3398936387**

Option 4 ID : **3398936388**

Status : **Answered**

Chosen Option : **2**

**Q.21** A reciprocal translocation heterozygote at the end of meiosis I generates

1. an acentric and a dicentric chromosome
2. viable gametes with deletions and duplications
3. viable gametes with only parental type chromosomes
4. all non-viable gametes

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931646**

Option 1 ID : **3398936353**

Option 2 ID : **3398936354**

Option 3 ID : **3398936355**

Option 4 ID : **3398936356**

Status : **Not Answered**

Chosen Option : **--**

**Q.22**

Which one of the following options is an **INCORRECT** match?

|   |                                 |                                                                      |
|---|---------------------------------|----------------------------------------------------------------------|
| 1 | F <sub>2</sub> population       | selfing or sib-mating F <sub>1</sub> hybrids                         |
| 2 | F <sub>2:3</sub> population     | immortal population                                                  |
| 3 | Backcross population            | Difference in segregation patterns of dominant and recessive markers |
| 4 | F <sub>1</sub> doubled haploids | immortal population                                                  |

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931661**  
 Option 1 ID : **3398936413**  
 Option 2 ID : **3398936414**  
 Option 3 ID : **3398936415**  
 Option 4 ID : **3398936416**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.23** Which one of the following statements about M-phase cyclin is correct?

1. Cyclin synthesis and destruction is essential for cell cycle progression
2. Synthesis of new cyclin, but not destruction is essential for cell cycle progression
3. Cyclin and the corresponding kinase(s), both exhibit cyclic expression pattern during cell cycle
4. Cyclic pattern of cyclin protein is regulated by the controlled translation of stored cyclin transcripts, and not dependent on fresh transcription.

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931622**  
 Option 1 ID : **3398936257**  
 Option 2 ID : **3398936258**  
 Option 3 ID : **3398936259**  
 Option 4 ID : **3398936260**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.24** Presence of sigma factor ( $\sigma^{70}$ ) in *Escherichia coli* facilitates

1. sequence specific localization of RNA polymerase on the promoter regions of genes
2. phosphorylation of C-terminal tail of RNA polymerase
3. interaction of  $\beta$ -subunit of RNA polymerase with  $\alpha$ -subunit
4. interaction of  $\omega$ -subunit with  $\beta\beta'\alpha_2$  complex of RNA polymerase

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**

Question ID : 3398931627  
 Option 1 ID : 3398936277  
 Option 2 ID : 3398936278  
 Option 3 ID : 3398936279  
 Option 4 ID : 3398936280  
 Status : Not Answered  
 Chosen Option : --

**Q.25** In a metastudy, percentage of species affected by different ecological threats in different habitats was found to be as follows:

| Habitat | Ecological threats |                  |           |
|---------|--------------------|------------------|-----------|
|         | Over-exploitation  | Invasive species | Pollution |
| A       | 20                 | 22               | 7         |
| B       | 19                 | 20               | 44        |
| C       | 86                 | 5                | 38        |

Based on the above information, habitats A, B and C will be respectively:

1. Terrestrial, Fresh water, Marine
2. Marine, Fresh water, Terrestrial
3. Fresh water, Terrestrial, Marine
4. Marine, Terrestrial, Fresh water

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : MCQ  
 Question ID : 3398931652  
 Option 1 ID : 3398936377  
 Option 2 ID : 3398936378  
 Option 3 ID : 3398936379  
 Option 4 ID : 3398936380  
 Status : Answered  
 Chosen Option : 4

**Q.26** Which one of the following sets contains at least one primate species **NOT** found in India?

1. Lion Tailed Macaque, Slender Loris, Common Langur
2. Golden Langur, Hoolock Gibbon, Howler Monkey
3. Bonnet Macaque, Stump Tailed Macaque, Slow Loris
4. Capped Langur, Rhesus Macaque, Phayre's Leaf Monkey

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : MCQ  
 Question ID : 3398931651  
 Option 1 ID : 3398936373  
 Option 2 ID : 3398936374  
 Option 3 ID : 3398936375  
 Option 4 ID : 3398936376  
 Status : Answered  
 Chosen Option : 2

**Q.27**

A circular plasmid of 4 kb produces fragments on digestion with different enzymes as given below:

BamHI - 4 kb  
BamHI + HindIII - 1 kb + 3 kb  
BamHI + EcoRI - 2.5 kb + 1.5 kb

Based on the above information, the enzymes that are present as unique cutters in the plasmid are:

1. BamHI and HindIII only
2. BamHI only
3. HindIII and EcoRI only
4. BamHI, HindIII and EcoRI

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931665**

Option 1 ID : **3398936429**

Option 2 ID : **3398936430**

Option 3 ID : **3398936431**

Option 4 ID : **3398936432**

Status : **Not Answered**

Chosen Option : --

**Q.28** A test cross was made with phenotypically wild type *Drosophila* flies having genes for sepia eye and curled wing in heterozygous condition. The following results were obtained:

|                          |                 |
|--------------------------|-----------------|
| Wild type                | 400 individuals |
| Sepia eyed               | 150 individuals |
| Curled winged            | 100 individuals |
| Sepia eyed curled winged | 350 individuals |

The result indicates

1. independent assortment, as wild and the double mutant types are in almost equal proportion
2. unequal segregation, as it is showing departure from 1:1:1:1 ratio
3. complete linkage, as the two genes are very closely placed
4. linkage, the two genes are separated by 25 cM distance

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931645**

Option 1 ID : **3398936349**

Option 2 ID : **3398936350**

Option 3 ID : **3398936351**

Option 4 ID : **3398936352**

Status : **Answered**

Chosen Option : 1

**Q.29** Following are statements on enzyme kinetics. Choose the correct statement.

1. Sufficiently high concentrations of substrate cannot completely relieve competitive inhibition.
2. Sufficiently high concentrations of substrate can relieve non-competitive inhibition.
3. Allosteric nature of an enzyme cannot be inferred from a plot of reaction velocity and substrate concentration.
4. For an enzyme following Michaelis-Menten kinetics, the initial velocity is determined at the beginning when enzyme-substrate dissociation is insignificant.

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931621**

Option 1 ID : **3398936253**

Option 2 ID : **3398936254**

Option 3 ID : **3398936255**

Option 4 ID : **3398936256**

Status : **Not Answered**

Chosen Option : --

**Q.30** A small-bodied hominid whose fossil was discovered very recently, ventured into the islands of South-East Asia from mainland Asia about 67,000 years ago. This species is believed to be closely related to another *Homo* species discovered previously from an island in Indonesia. The given scientific name of the newly discovered species is:

1. *Homo floresiensis*
2. *Homo luzonensis*
3. *Homo naledi*
4. *Homo habilis*

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931657**

Option 1 ID : **3398936397**

Option 2 ID : **3398936398**

Option 3 ID : **3398936399**

Option 4 ID : **3398936400**

Status : **Answered**

Chosen Option : **3**

**Q.31** First committed precursor in the biosynthesis of chlorophyll is:

1.  $\delta$ -aminolevulinic acid
2. Porphobilinogen
3. Protoporphyrin IX
4. Coproporphyrinogen III

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : 3398931639

Option 1 ID : 3398936325

Option 2 ID : 3398936326

Option 3 ID : 3398936327

Option 4 ID : 3398936328

Status : **Marked For Review**

Chosen Option : 3

**Q.32** Which one of the statements given below is correct?

1. The Ramachandran plots of Acetyl-L-Ala-CONHMe and Acetyl-D-Ala-CONHMe will be identical.
2. Fe is a transition metal but Ca is not.
3. Side chain pKa of L-Glu and D-Glu will not be identical.
4. Hydrogen bonds are fundamentally van der Waals interaction.

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : 3398931618

Option 1 ID : 3398936241

Option 2 ID : 3398936242

Option 3 ID : 3398936243

Option 4 ID : 3398936244

Status : **Not Answered**

Chosen Option : --

**Q.33** Which one of the following functions is correct for the microglia cells in the brain?

1. Myelin formation
2. Making blood-brain barrier
3. Scavenging injured cell debris
4. Enveloping synapses

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : 3398931644

Option 1 ID : 3398936345

Option 2 ID : 3398936346

Option 3 ID : 3398936347

Option 4 ID : 3398936348

Status : **Answered**

Chosen Option : 2

**Q.34** Bacterial actin homologs contribute to the cell shape by serving as a scaffold to direct the synthesis of the peptidoglycan cell wall. Which of the following is/are actin homolog/s in bacteria?

1. MreB and Mbl
2. FtsZ
3. DnaK
4. DnaJ

**Options**

1. 1
2. 2

3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931625**  
Option 1 ID : **3398936269**  
Option 2 ID : **3398936270**  
Option 3 ID : **3398936271**  
Option 4 ID : **3398936272**  
Status : **Not Answered**  
Chosen Option : --

**Q.35** Which one of the following is **NOT** a typical movement pattern observed during gastrulation?

1. Involution
2. Epiboly
3. Furrowing
4. Delamination

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931635**  
Option 1 ID : **3398936309**  
Option 2 ID : **3398936310**  
Option 3 ID : **3398936311**  
Option 4 ID : **3398936312**  
Status : **Answered**  
Chosen Option : 3

**Q.36** The most common cause of blindness induced by microbial infection in humans is:

1. *Chlamydia psittaci*
2. *Chlamydia pneumoniae*
3. *Chlamydia muridarum*
4. *Chlamydia trachomatis*

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931649**  
Option 1 ID : **3398936365**  
Option 2 ID : **3398936366**  
Option 3 ID : **3398936367**  
Option 4 ID : **3398936368**  
Status : **Answered**  
Chosen Option : 1

**Q.37**

Hypophysiotropic hormones are secreted into blood at

1. posterior lobe of pituitary
2. median eminence
3. mamillary bodies
4. anterior lobe of pituitary

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931642**  
Option 1 ID : **3398936337**  
Option 2 ID : **3398936338**  
Option 3 ID : **3398936339**  
Option 4 ID : **3398936340**  
Status : **Answered**  
Chosen Option : **4**

**Q.38** A new trait was found to be highly variable in a population. It showed a bell-shaped distribution and is shown to be influenced by environmental factors. The trait can be

1. a monogenic trait
2. a polygenic trait
3. a non-quantitative trait
4. due to a point mutation in the regulatory region of a gene

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931648**  
Option 1 ID : **3398936361**  
Option 2 ID : **3398936362**  
Option 3 ID : **3398936363**  
Option 4 ID : **3398936364**  
Status : **Answered**  
Chosen Option : **2**

**Q.39** Column A lists a set of nutrients and Column B lists some sources for these nutrients that are used in industrial fermentation.

|   | Column A      |       | Column B      |
|---|---------------|-------|---------------|
| A | Nitrogen      | (i)   | soya meal     |
| B | Carbon        | (ii)  | yeast extract |
| C | Micronutrient | (iii) | corn liquor   |
|   |               | (iv)  | molasses      |
|   |               | (v)   | tryptone      |

Choose the option that matches the nutrient with its most common source.

1. A: (i), (ii); B: (iii), (iv); C: (v)
2. A: (i), (v); B: (iii), (iv); C: (ii)
3. A: (ii), (v); B: (iii), (iv); C: (i)
4. A: (v); B: (i), (iii); C: (ii), (iv)

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931662**  
 Option 1 ID : **3398936417**  
 Option 2 ID : **3398936418**  
 Option 3 ID : **3398936419**  
 Option 4 ID : **3398936420**  
 Status : **Answered**  
 Chosen Option : **4**

**Q.40** Which one of the following techniques/approaches **CANNOT** be used to analyze expression pattern of a gene?

1. Western blotting
2. qRT-PCR
3. Northern blotting
4. Southern blotting

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931664**  
 Option 1 ID : **3398936425**  
 Option 2 ID : **3398936426**  
 Option 3 ID : **3398936427**  
 Option 4 ID : **3398936428**  
 Status : **Answered**  
 Chosen Option : **3**

**Q.41** The mechanism by which ants find their way back to the nests after searching and finding food is:

1. migration
2. topographical mapping
3. piloting
4. path integration

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931656**  
 Option 1 ID : **3398936393**  
 Option 2 ID : **3398936394**  
 Option 3 ID : **3398936395**  
 Option 4 ID : **3398936396**  
 Status : **Marked For Review**  
 Chosen Option : **4**

**Q.42**

Which one of the following options related to plant growth and development is matched correctly?

1. LEAFY: regulator of genomic imprinting
2. Xylogenesis: wood formation
3. MET1: Inflorescence architecture
4. caspases: inhibition of apoptosis

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931636**

Option 1 ID : **3398936313**

Option 2 ID : **3398936314**

Option 3 ID : **3398936315**

Option 4 ID : **3398936316**

Status : **Answered**

Chosen Option : **1**

**Q.43** Some of the radioisotopes commonly used in biology are listed in column A and their properties are listed in Column B.

| Column A |                  | Column B |                     |
|----------|------------------|----------|---------------------|
| I        | $^{35}\text{S}$  | i        | High energy $\beta$ |
| II       | $^{32}\text{P}$  | ii       | $\alpha$ particle   |
| III      | $^{238}\text{U}$ | iii      | $\gamma$ emission   |
| IV       | $^{125}\text{I}$ | iv       | Low energy $\beta$  |

Choose the option that correctly matches the isotope with the property listed.

1. I : iv; II : iii; III : ii; IV : i
2. I : iii; II : ii; III : iv; IV : i
3. I : ii; II : i; III : iv; IV : iii
4. I : iv; II : i; III : ii; IV : iii

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931666**

Option 1 ID : **3398936433**

Option 2 ID : **3398936434**

Option 3 ID : **3398936435**

Option 4 ID : **3398936436**

Status : **Not Answered**

Chosen Option : **--**

**Q.44** Which one of the following statements about mRNA export from the nucleus is **INCORRECT**?

1. Cellular pre-mRNAs with introns are generally not exported out of nucleus
2. Dbp5 is an RNA helicase that releases mRNA from the transport complex
3. ATP hydrolysis is required for mRNA transport across the nuclear pore complex
4. Phe-Gly proteins of the nuclear pore complex are not involved in mRNA export

Options

1. 1
2. 2
3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931629**

Option 1 ID : **3398936285**

Option 2 ID : **3398936286**

Option 3 ID : **3398936287**

Option 4 ID : **3398936288**

Status : **Not Answered**

Chosen Option : --

**Q.45** Which one of the following amino acids is induced drastically in dark adapted plants?

1. Glutamine
2. Glycine
3. Asparagine
4. Serine

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931640**

Option 1 ID : **3398936329**

Option 2 ID : **3398936330**

Option 3 ID : **3398936331**

Option 4 ID : **3398936332**

Status : **Not Answered**

Chosen Option : --

**Q.46** Heat shock protein binding region is located in which one of the following domains of glucocorticoid receptor protein?

1. DNA-binding
2. Ligand-binding
3. N-terminal
4. Hinge region

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931643**

Option 1 ID : **3398936341**

Option 2 ID : **3398936342**

Option 3 ID : **3398936343**

Option 4 ID : **3398936344**

Status : **Not Answered**

Chosen Option : --

**Q.47** Which one of the following glycosaminoglycans is generally **NOT** covalently attached to protein as proteoglycans?

1. Chondroitin sulfate
2. Dermatan sulfate
3. Heparan sulfate
4. Hyaluronan

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931632**  
 Option 1 ID : **3398936297**  
 Option 2 ID : **3398936298**  
 Option 3 ID : **3398936299**  
 Option 4 ID : **3398936300**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.48** The initiator caspase responsible for promoting cell death after specific activation of TRADD is

1. Caspase 1
2. Caspase 8
3. Caspase 7
4. Caspase 5

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931631**  
 Option 1 ID : **3398936293**  
 Option 2 ID : **3398936294**  
 Option 3 ID : **3398936295**  
 Option 4 ID : **3398936296**  
 Status : **Answered**  
 Chosen Option : **2**

**Q.49** Choose the correct statement from the following:

1. Iodoacetamide inactivates an enzyme by reaction with a critical serine residue at neutral pH.
2. Proline racemase causes isomerisation of L-proline to D-proline. Ribose will be an appropriate transition state analog.
3. Tosyl-1-phenylalanine chloromethyl ketone binds at the active site of chymotrypsin and modifies an essential arginine residue.
4.  $^2\text{O}_3\text{PO}-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_2-\text{C}-\text{CH}_2-\text{Br}$  binds to triose phosphate isomerase at the active site and covalently modifies a glutamic acid residue required for enzyme activity.

- Options
1. 1
  2. 2
  3. 3
  4. 4

Question Type : **MCQ**  
 Question ID : **3398931619**  
 Option 1 ID : **3398936245**  
 Option 2 ID : **3398936246**  
 Option 3 ID : **3398936247**

Option 4 ID : **3398936248**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.50** Which one of the following proteins regulate photomorphogenesis in plants by adding ubiquitin tags to a subset of nuclear proteins?

1. PhyA
2. Hy5
3. LAF1
4. COP1

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931637**  
 Option 1 ID : **3398936317**  
 Option 2 ID : **3398936318**  
 Option 3 ID : **3398936319**  
 Option 4 ID : **3398936320**  
 Status : **Answered**  
 Chosen Option : 4

Section : **Part-C Life Sciences**

**Q.1** In a large, healthy, polygynous population of an ungulate species with distinct, short seasonal mating, the operational sex ratio (Male : Female) is likely to resemble which one of the following conditions:

1. Male > Female
2. Female  $\geq$  Male
3. Male = Female
4. Female > Male

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931730**  
 Option 1 ID : **3398936689**  
 Option 2 ID : **3398936690**  
 Option 3 ID : **3398936691**  
 Option 4 ID : **3398936692**  
 Status : **Answered**  
 Chosen Option : 2

**Q.2**

DNA from a bacterial strain with genotype  $a^+ b^+ c^+ d^+ e^+ f^+$  was isolated and used to transform a strain of bacteria with genotype  $a^- b^- c^- d^- e^- f^-$ . The transformed cells were tested for the presence of cotransformed genes and the following types of cotransformants were observed:

- $a^+$  and  $c^+$
- $e^+$  and  $d^+$
- $d^+$  and  $b^+$
- $b^+$  and  $f^+$
- $c^+$  and  $e^+$

The correct order of genes will be:

1. a b c d e f
2. a c e b f d
3. a c e d b f
4. a b f e d c

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931710**

Option 1 ID : **3398936609**

Option 2 ID : **3398936610**

Option 3 ID : **3398936611**

Option 4 ID : **3398936612**

Status : **Answered**

Chosen Option : **3**

**Q.3** The following statements are made regarding a plant cell:

- A. Polysaccharides of various sugars with methyl esters of galacturonic acid are generically referred as chitin.
- B. Suberin and cutin are polymers and are mixtures of polyesters of hydroxy fatty acids and glycerol
- C. Cellulose is a polymer of glucose and fructose which can be stained by light green and haematoxylin
- D. Plasmodesmata maintain continuity between the cytoplasm of adjacent cells and allow large molecules to pass between them without crossing membrane.

Which one of the following options represents a combination of correct statements?

1. A and C
2. B and C
3. B and D
4. A and B

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931698**

Option 1 ID : **3398936561**

Option 2 ID : **3398936562**

Option 3 ID : **3398936563**

Option 4 ID : **3398936564**

Status : **Answered**

Chosen Option : 3

- Q.4** Certain statements made on the mechanisms of action of a neurohormone, vasopressin (VP) are given below:
- VP acts on collecting ducts of kidney to concentrate urine by binding to  $V_1$  receptors and activating cAMP cascade
  - VP acts on collecting ducts of kidney to concentrate urine by binding to  $V_2$  receptors and activating cAMP cascade
  - VP acts on blood vessels to produce constriction by binding to  $V_1$  receptors and activating cAMP cascade
  - VP acts on blood vessels to produce constriction by binding to  $V_1$  receptors and activating phosphatidylinositol cascade

Which one of the following options represents a combination of correct statements?

- A and B
- C and D
- B and D
- A and D

**Options**

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931706**

Option 1 ID : **3398936593**

Option 2 ID : **3398936594**

Option 3 ID : **3398936595**

Option 4 ID : **3398936596**

Status : **Not Answered**

Chosen Option : --

- Q.5** In human cells, centrioles assemble centrosomes, and centrosomes are essential for microtubular nucleation. Centriole duplication is tightly coupled to the cell cycle progression. To discover which genes are crucial for centriole duplication, an investigator will conduct:

- RNAi-based functional genomics screen in human cells to uncover novel genes involved in centriole duplication.
- experiments to generate constitutive knockout human cell lines.
- chemical based screen in human cell lines.
- RNA sequencing followed by generating constitutive knockout human cell lines.

Choose the combination with correct statements:

- A and B
- A and C
- B and C
- B and D

**Options**

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931678**

Option 1 ID : **3398936481**

Option 2 ID : **3398936482**

Option 3 ID : **3398936483**

Option 4 ID : **3398936484**

Status : **Not Answered**

Chosen Option : --

**Q.6** Following are statements related to statistical methods:

- A. An outlier can be defined as a value in a data set that lies more than three standard deviations from the mean.
- B. Measures of central tendency and dispersion are independent of the presence of outliers in a data set.
- C. Standard deviation is a measure of dispersion.
- D. Mean, median and mode are not measure of central tendency.

Which one of the following options is a combination with both **INCORRECT** statements?

- 1. A and B
- 2. B and C
- 3. A and C
- 4. B and D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931741**

Option 1 ID : **3398936733**

Option 2 ID : **3398936734**

Option 3 ID : **3398936735**

Option 4 ID : **3398936736**

Status : **Not Answered**

Chosen Option : --

**Q.7** Given below are cytoskeleton filaments (**Column X**) and their component/associated proteins (**Column Y**)

| Column X |                        | Column Y |                 |
|----------|------------------------|----------|-----------------|
| A        | Actin                  | i        | Formin          |
| B        | Microtubule            | ii       | Arp 2/3 complex |
| C        | Intermediate filaments | iii      | EB 1            |
|          |                        | iv       | Lamin A         |
|          |                        | v        | Xmap 215        |

Choose the option that matches cytoskeleton filament (**Column X**) with the most appropriate protein (**Column Y**)

- 1. A – i, A – ii; B – iii, B – v; C – iv
- 2. A – iii, A – v; B – ii, B – i; C – iv
- 3. A – iv, A – v; B – i, B – ii; C – iii
- 4. A – ii, A – v; B – i, B – iv; C – v

**Options**

- 1. 1
- 2. 2
- 3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931677**

Option 1 ID : **3398936477**

Option 2 ID : **3398936478**

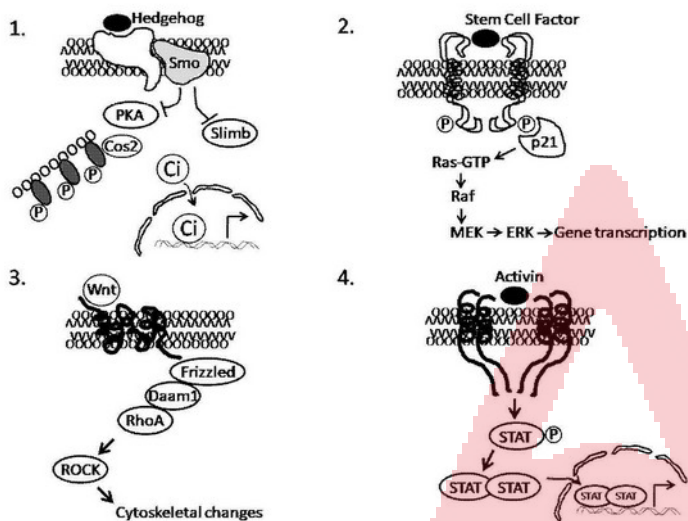
Option 3 ID : **3398936479**

Option 4 ID : **3398936480**

Status : **Not Answered**

Chosen Option : --

**Q.8** Which one of the following signaling pathways will best support the formation of the zone of polarizing activity (ZPA) during limb development in mice?



- Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**

Question ID : **3398931691**

Option 1 ID : **3398936533**

Option 2 ID : **3398936534**

Option 3 ID : **3398936535**

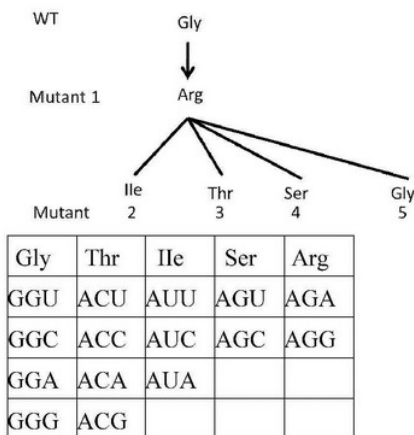
Option 4 ID : **3398936536**

Status : **Not Answered**

Chosen Option : --

**Q.9**

A protein has Gly at position 28 (wild type). On mutagenesis, a point mutation leads to conversion of Gly to Arg at position 28 (mutant 1). When mutant 1 is further mutagenized, four different point mutants (mutants 2 to 5) were isolated where the Arg at position 28 was mutated to Ile, Thr, Ser or Gly as represented below:



Based on the codons given in the table above, which one of the following codons codes for Gly at position 28 of the wild type protein?

1. GGU
2. GGC
3. GGA
4. GGG

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : MCQ

Question ID : 3398931712

Option 1 ID : 3398936617

Option 2 ID : 3398936618

Option 3 ID : 3398936619

Option 4 ID : 3398936620

Status : Not Answered

Chosen Option : --

**Q.10** An allosteric enzyme has two heterotropic effectors, X and Y. The allosteric constant, L, for the enzyme in the absence of effector molecules is 180. For the X-saturated form, the value of L increases from 180 to 1200, while for Y-saturated form it decreases to 60. What kind of effector molecules are X and Y?

1. X and Y both are positive regulators.
2. X is a negative regulator while Y is a positive regulator.
3. X is a positive regulator while Y is a negative regulator.
4. X and Y are not allosteric regulators.

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : MCQ

Question ID : 3398931671

Option 1 ID : 3398936453

Option 2 ID : 3398936454

Option 3 ID : 3398936455

Option 4 ID : 3398936456

Status : Not Answered

Chosen Option : --

**Q.11** In a gene stacking experiment, a transgenic plant generated using *bar* as a selection marker was crossed with another transgenic line containing *hpt* as the selection marker. Analysis of the F<sub>1</sub> progeny of this cross showed that 50% of the progeny was resistant to both selection agents (Basta and hygromycin) while the remaining 50% of the progeny was resistant to only hygromycin. Which one of the following statements is a possible explanation of the above results?

1. Both the transgenic lines used as parents for the cross are single-copy events that are homozygous for the transgenes.
2. The Basta-resistant transgenic plant is a single-copy, homozygous event and the hygromycin-resistant plant is a double-copy event that is homozygous for two unlinked copies of the transgene.
3. The *bar* containing transgenic plant is a hemizygous single-copy event and the *hpt* containing transgenic plant is a homozygous, single-copy event
4. Both the transgenic plants used as parents for the cross are hemizygous, single-copy events.

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : MCQ

Question ID : 3398931733

Option 1 ID : 3398936701

Option 2 ID : 3398936702

Option 3 ID : 3398936703

Option 4 ID : 3398936704

Status : Not Answered

Chosen Option : --

**Q.12** Following are some statements given for vertebrate eye lens induction:

- A. Paired box6 (Pax6) is a transcription factor synthesized in specific region of head surface ectoderm.
- B. Pax6 is secreted by optic vesicle.
- C. Optic vesicle serves as an inducer for competent head surface ectoderm.
- D. Studies on amphibians suggest that the first inducers of lens may be the foregut endoderm and heart forming mesoderm.
- E. The genes for lens proteins get induced in the surface ectoderm of optic vesicle.

Which combination of the above statements is correct towards vertebrate eye lens induction?

1. A, C, D
2. A, C, E
3. B, E
4. B, C, D

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : MCQ

Question ID : 3398931694

Option 1 ID : **3398936545**

Option 2 ID : **3398936546**

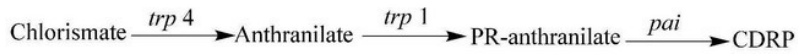
Option 3 ID : **3398936547**

Option 4 ID : **3398936548**

Status : **Not Answered**

Chosen Option : --

**Q.13** The first few steps of the tryptophan biosynthetic pathway in plants along with the available mutants is provided below



Column X represents genotypes and Column Y summarizes the anthranilate fluorescence phenotype in UV light.

| Column X              | Column Y               |
|-----------------------|------------------------|
| Genotype              | Phenotype in UV Light  |
| A – wild type         | i. Strong fluorescence |
| B – <i>trp1</i>       | ii. No fluorescence    |
| C – <i>trp1; trp4</i> | iii. Weak fluorescence |
| D – <i>pai</i>        |                        |

Which of the following combinations represent the correct match between column X and column Y?

1. A – i, B – ii, C – i, D – iii
2. A – ii, B – i, C – ii, D – iii
3. A – ii, B – ii, C – iii, D – i
4. A – iii, B – i, C – iii, D – ii

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931701**

Option 1 ID : **3398936573**

Option 2 ID : **3398936574**

Option 3 ID : **3398936575**

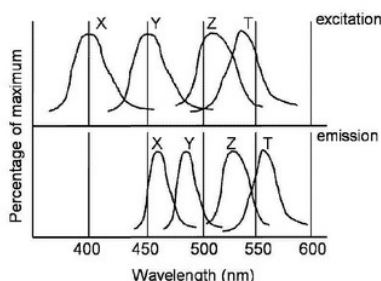
Option 4 ID : **3398936576**

Status : **Not Answered**

Chosen Option : --

**Q.14**

To spatiotemporally detect the localization of two proteins A and B using a confocal microscope, an investigator plans to utilize a few fluorescent proteins (X, Y, Z and T). The excitation and emission spectra of these fluorescent proteins are shown below.



Which one of the following options comprises of a fluorescent pair that is best suited to conduct such an experiment?

1. X and Y
2. Y and Z
3. X and T
4. Z and T

Options

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931739

Option 1 ID : 3398936725

Option 2 ID : 3398936726

Option 3 ID : 3398936727

Option 4 ID : 3398936728

Status : Not Answered

Chosen Option : --

**Q.15** Two cell surface receptors, A and B with a single binding site specifically bind with their respective ligands, X and Y. In the table below are the values for the association constant,  $K_a$  of the respective ligand-receptor interactions.  $K_a$  is also called the affinity constant.

| Receptor | Ligand | $K_a$              |
|----------|--------|--------------------|
| A        | X      | $1 \times 10^8$    |
| B        | Y      | $1 \times 10^{11}$ |

Based on these values, which one of the following statements is **INCORRECT**?

1.  $K_d$  for B-Y binding is smaller than that for A-X binding
2.  $K_1$  for A-X binding is lesser than that for B-Y binding
3.  $K_{-1}$  for B-Y binding is smaller than that for A-X binding
4.  $K_{-1}/K_1$  for B-Y binding is higher than that for A-X binding

( $K_1$  is the forward rate constant,  $K_{-1}$  is the reverse rate constant and  $K_d$  is the dissociation constant)

Options

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931687

Option 1 ID : 3398936517

Option 2 ID : 3398936518  
Option 3 ID : 3398936519  
Option 4 ID : 3398936520  
Status : Not Answered  
Chosen Option : --

**Q.16** For ELISPOT measurements of interferon  $\gamma$  [IFN- $\gamma$ ] secretion by mouse NKT cells, the following steps were performed in an ELISA plate:

- Addition of purified spleenocytes
- Stimulation of spleenocytes by peptide pulsed antigen presenting cells (APCs)
- Addition of biotin-conjugated anti IFN- $\gamma$  antibody
- Addition of capture antibody specific to IFN- $\gamma$
- Addition of avidin-conjugated colour changing substrate.

Which one of the following options lists the correct sequence of steps performed?

- A  $\rightarrow$  D  $\rightarrow$  B  $\rightarrow$  C  $\rightarrow$  E
- D  $\rightarrow$  B  $\rightarrow$  A  $\rightarrow$  C  $\rightarrow$  E
- D  $\rightarrow$  A  $\rightarrow$  B  $\rightarrow$  C  $\rightarrow$  E
- B  $\rightarrow$  A  $\rightarrow$  D  $\rightarrow$  C  $\rightarrow$  E

**Options**

- 1
- 2
- 3
- 4

Question Type : MCQ  
Question ID : 3398931736  
Option 1 ID : 3398936713  
Option 2 ID : 3398936714  
Option 3 ID : 3398936715  
Option 4 ID : 3398936716  
Status : Not Answered  
Chosen Option : --

**Q.17** In sea urchins, successful fertilization can be ensured only after specific interaction between sperm proteins and their receptors on the egg vitelline envelope. Which one of the following will ensure proper fertilization of sea urchin eggs?

- Expression of EBR1, a putative bindin receptor, on the surface of the acrosomal membrane
- Expression of bindin just below the egg jelly
- Expression of EBR1 on the egg vitelline envelope
- Expression of bindin molecules on the egg vitelline envelope

**Options**

- 1
- 2
- 3
- 4

Question Type : MCQ  
Question ID : 3398931692  
Option 1 ID : 3398936537  
Option 2 ID : 3398936538  
Option 3 ID : 3398936539  
Option 4 ID : 3398936540  
Status : Answered  
Chosen Option : 4

**Q.18** Given below are some examples of biological rhythms in humans:

- (a) REM and non-REM sleep cycle
- (b) Menstrual cycle
- (c) Sleep-wake cycle

Which one of the following is a correct representation of the type of biological rhythms given above?

- 1. (a) Ultradian cycle; (b) Infradian cycle; (c) Circadian cycle
- 2. (a) Circadian cycle; (b) Ultradian cycle; (c) Infradian cycle
- 3. (a) Infradian cycle; (b) Ultradian cycle; (c) Circadian cycle
- 4. (a) Infradian cycle; (b) Circadian cycle; (c) Ultradian cycle

**Options** 1. 1

- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931725**

Option 1 ID : **3398936669**

Option 2 ID : **3398936670**

Option 3 ID : **3398936671**

Option 4 ID : **3398936672**

Status : **Answered**

Chosen Option : **3**

**Q.19** Male fiddler crabs with larger claws are preferred by females over males with smaller claws. If the selection pressure exerted on claw size is strong, which one of the following options is true with respect to male claw size over generations?

- 1. Mean > Median > Mode
- 2. Mean < Median < Mode
- 3. Mean = Mode < Median
- 4. Mean = Median = Mode

**Options** 1. 1

- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931727**

Option 1 ID : **3398936677**

Option 2 ID : **3398936678**

Option 3 ID : **3398936679**

Option 4 ID : **3398936680**

Status : **Not Answered**

Chosen Option : **--**

**Q.20**

Given below are some statements made on the buffering capacity of hemoglobin (Hb) in contributing to acid-base balance in the body.

- A. Hb buffering capacity is due to large number of histidine residues
- B. Imidazole groups of Hb dissociate less than those of oxyhemoglobin (HbO<sub>2</sub>)
- C. Hb buffering capacity is due to large number of threonine residues
- D. Hb is a strong acid

Which one of the following options represents a combination of correct statements?

- 1. A and B
- 2. B and C
- 3. C and D
- 4. A and D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931707**

Option 1 ID : **3398936597**

Option 2 ID : **3398936598**

Option 3 ID : **3398936599**

Option 4 ID : **3398936600**

Status : **Answered**

Chosen Option : **1**

**Q.21** Which among the following sets of conditions are best suited for a mimic species to coexist with its model?

| Condition | Abundance     | Predators learn | Resource overlap |
|-----------|---------------|-----------------|------------------|
| A         | Mimic > Model | Yes             | Yes              |
| B         | Model > Mimic | Yes             | No               |
| C         | Mimic = Model | No              | Yes              |
| D         | Model ≥ Mimic | No              | No               |

- 1. Condition A
- 2. Condition B
- 3. Condition C
- 4. Condition D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931721**

Option 1 ID : **3398936653**

Option 2 ID : **3398936654**

Option 3 ID : **3398936655**

Option 4 ID : **3398936656**

Status : **Answered**

Chosen Option : **2**

**Q.22**

Following are statements related to spectroscopic investigation of proteins.

- A. Tryptophan fluorescence in a protein is not sensitive to its environment.
- B. Observation of a large number of  $N_i - N_{i+1}$  connectivities in the NOESY spectrum of a protein suggests the presence of helical conformation.
- C. Only proteins with masses less than 5000 daltons can be identified by MALDI mass spectrometry.
- D. Protein conformation can be investigated by ESI mass spectrometry.

Which one of the following options consists of both correct statements?

- 1. A and C
- 2. B and D
- 3. A and B
- 4. B and C

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931740**

Option 1 ID : **3398936729**

Option 2 ID : **3398936730**

Option 3 ID : **3398936731**

Option 4 ID : **3398936732**

Status : **Not Answered**

Chosen Option : --

**Q.23** Humans exposed to cold climate are able to maintain their body temperature. The physiological mechanisms operating in the condition were suggested in the following statements:

- A. The increased thermogenesis in brown adipose tissue occurred in cold
- B. Uncoupling protein 1 in brown adipose tissue participated in the increased heat production
- C. The decreased secretion of catecholamine in cold elevated heat production
- D. The reflex responses activated by cold were controlled from the anterior hypothalamus
- E. The counter-current exchanges of temperature between warm arterial blood flowing towards limbs and the cold venous blood coming from extremities conserved body heat.

Which one of the following options represents a combination of **INCORRECT** statements?

- 1. A and B
- 2. B and C
- 3. C and D
- 4. D and E

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931703**

Option 1 ID : **3398936581**

Option 2 ID : **3398936582**

Option 3 ID : **3398936583**

Option 4 ID : **3398936584**  
Status : **Not Answered**  
Chosen Option : --

**Q.24** During mitosis in a eukaryotic cell incorrect kinetochore attachments are corrected by a system of trials and errors. The tension-based mechanism acting at the kinetochore is linked with ensuring that sister chromatid pairs are properly oriented at the spindle. Which one of the following kinases is tethered to the inner kinetochore and phosphorylates the microtubule attachment site, including the Ndc 80 complex to regulate sister chromatids attachments in a bi-orientation manner?

1. Aurora A kinase
2. Aurora B kinase
3. Aurora C kinase
4. c-Jun N-terminal kinase

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931675**  
Option 1 ID : **3398936469**  
Option 2 ID : **3398936470**  
Option 3 ID : **3398936471**  
Option 4 ID : **3398936472**  
Status : **Not Answered**  
Chosen Option : --

**Q.25** The names of some specialized organs/structures are given in Column A and their location in organisms are given in Column B.

| Column A |                   | Column B |                                               |
|----------|-------------------|----------|-----------------------------------------------|
| A.       | Crystalline style | i.       | Stomach of bivalves                           |
| B.       | Hastate plate     | ii.      | Stomach of crustaceans                        |
| C.       | Organs of Bojanus | iii.     | Kidney of gastropods                          |
| D.       | Mehlis's gland    | iv.      | Female reproductive system of <i>Fasciola</i> |

Select the correct matches:

1. A – ii, B – i, C – iv, D – iii
2. A – iii, B – iv, C – ii, D – i
3. A – i, B – ii, C – iii, D – iv
4. A – iv, B – iii, C – i, D – ii

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931716**  
Option 1 ID : **3398936633**  
Option 2 ID : **3398936634**  
Option 3 ID : **3398936635**  
Option 4 ID : **3398936636**

Status : **Answered**  
Chosen Option : 3

**Q.26** Which of the following events/examples represent observation of evolutionary changes on a human time scale? Here human time scale is defined by an average human age of approximately 70-80 years.

1. Complete eye degeneration in cave fishes
2. Human bipedalism
3. Evolution of flowering plants
4. Drug resistance in HIV

**Options** 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**  
Question ID : **3398931718**  
Option 1 ID : **3398936641**  
Option 2 ID : **3398936642**  
Option 3 ID : **3398936643**  
Option 4 ID : **3398936644**  
Status : **Answered**  
Chosen Option : 4

**Q.27** A mutant Trp repressor ( $\text{TrpR}^m$ ) that cannot bind tryptophan is isolated. In this mutant

- A. Trp operon is constitutively expressed.
- B. Trp operon is super-repressed.
- C. Trp repressor does not bind to the operator.
- D. only Trp leader sequence is transcribed.

Which one of the following options represents all correct statements?

1. A and C only
2. B and C only
3. A and D only
4. A only

**Options** 1. 1

2. 2
3. 3
4. 4

Question Type : **MCQ**  
Question ID : **3398931684**  
Option 1 ID : **3398936505**  
Option 2 ID : **3398936506**  
Option 3 ID : **3398936507**  
Option 4 ID : **3398936508**  
Status : **Not Answered**  
Chosen Option : --

**Q.28**

Physical attachment of cells in a tissue or organ is mediated by different types of junctions, one of which is anchoring junctions. This includes both cell-cell adhesions and cell-extracellular matrix adhesions. The central role of anchoring junctions is played by transmembrane adhesion proteins of which the major ones are cadherin and integrin. Which one of the following statements regarding cadherin and integrin is **NOT** correct?

1. Generally, cadherin mediates attachment of cell to cell whereas integrin mediates attachment of cells to extracellular matrix
2. Cadherin molecules of a specific subtype on one cell bind to cadherin molecules of the same or closely related subtype on adjacent cells
3. Both cadherin and integrin are composed of two non-covalently attached glycoprotein subunits which span the cell membrane
4. Integrin molecules generally act as extracellular matrix receptor

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931688**

Option 1 ID : **3398936521**

Option 2 ID : **3398936522**

Option 3 ID : **3398936523**

Option 4 ID : **3398936524**

Status : **Not Answered**

Chosen Option : --

**Q.29** The table given below lists animals and primary regions of domestication.

| Animal |             | Region of domestication |                |
|--------|-------------|-------------------------|----------------|
| A.     | Alpaca      | (i)                     | Central Andes  |
| B.     | Goat        | (ii)                    | South Asia     |
| C.     | Llama       | (iii)                   | Southwest Asia |
| D.     | Zebu cattle | (iv)                    | China          |

Which one of the following options represents the best match for animals and the primary region of their domestication?

1. A – (ii); B – (iv); C – (iii); D – (i)
2. A – (i); B – (iii); C – (i); D – (iv)
3. A – (iii); B – (i); C – (iv); D – (iii)
4. A – (i); B – (iii); C – (i); D – (ii)

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931735**

Option 1 ID : **3398936709**

Option 2 ID : **3398936710**

Option 3 ID : **3398936711**

Option 4 ID : **3398936712**

Status : **Answered**

Chosen Option : **3**

**Q.30**

The names of some genes in Column X and their involvement in photosystem I (PS I) or photosystem II (PS II) is provided in Column Y.

| Column X |              | Column Y |       |
|----------|--------------|----------|-------|
| A        | <i>psb A</i> | i.       | PS II |
| B        | <i>psa A</i> | ii.      | PS I  |
| C        | <i>lhcb1</i> |          |       |
| D        | <i>lhca1</i> |          |       |

Which one of the following combinations represents correct matches between columns X and Y?

1. A – i, B – ii, C – i, D – ii
2. A – ii, B – i, C – ii, D – i
3. A – i, B – ii, C – ii, D – i
4. A – ii, B – i, C – i, D – ii

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931700**

Option 1 ID : **3398936569**

Option 2 ID : **3398936570**

Option 3 ID : **3398936571**

Option 4 ID : **3398936572**

Status : **Answered**

Chosen Option : **2**

**Q.31** An enzyme follows Michaelis-Menten kinetics. The activity of the enzyme was measured in the presence or absence of a molecule, 'X'. Given below are the double reciprocal equations for the enzyme activity with or without 'X'.

(i) Without molecule 'X'  $\frac{1}{V_0} = \frac{K_m}{V_{max}} \left( \frac{1}{[S]} \right) + \frac{1}{V_{max}}$

(ii) With molecule 'X'  $\frac{1}{V_0} = \frac{K_m}{V_{max}} \left( \frac{1}{[S]} \right) + \frac{1}{V_{max}} \left( 1 + \frac{[X]}{K_X} \right)$

What kind of molecule is 'X'? Select from the options given below.

1. Temperature independent competitive inhibitor
2. Temperature dependent competitive inhibitor
3. Non-competitive inhibitor
4. Uncompetitive inhibitor

Options

1. 1
2. 2
3. 3
4. 4

Question Type : **MCQ**

Question ID : **3398931673**

Option 1 ID : **3398936461**

Option 2 ID : **3398936462**

Option 3 ID : **3398936463**

Option 4 ID : **3398936464**

Status : **Not Answered**

Chosen Option : **--**

**Q.32** Following are statements related to peptide/protein conformation.

- A. The circular dichroism spectra of collagen and a protein in  $\alpha$ -helical conformation will be identical.
- B. The allowed region for the dihedral angles  $\phi, \psi$  in Gly, spans a large area in the Ramachandran map. This can be drastically reduced by substituting the two hydrogens with methyl groups.
- C. Proline has high frequency of occurrence in  $\beta$ -turns.
- D. In a  $\beta$ -hairpin structure, the dihedral angles  $\phi, \psi$ , of amino acids flanking the  $\beta$ -turn region will be  $\sim -60^\circ, -30^\circ$ , respectively.

Choose the combination with both **INCORRECT** statements.

- 1. B and C
- 2. A and B
- 3. A and D
- 4. C and D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931669**

Option 1 ID : **3398936445**

Option 2 ID : **3398936446**

Option 3 ID : **3398936447**

Option 4 ID : **3398936448**

Status : **Not Answered**

Chosen Option : --

**Q.33** Following observations were made about mRNA degradation pathway in the eukaryotic organism:

- A. A sequence independent endonuclease attack initiates degradation pathway for all mRNAs
- B. Degradation of the majority of mRNAs is deadenylation dependent
- C. Initially, the poly(A) tail is shortened by the PAN2/3 complex, followed by a rapid digestion by CCR4-NOT complex
- D. mRNA decay occurs only by 3' to 5' exonuclease activity
- E. The 3' to 5' mRNA degradation step is catalyzed by the exosome complex

Which one of the following options represents the combination of correct statements?

- 1. B, C, E
- 2. B, D, E
- 3. A, B, D
- 4. A, C, E

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931680**

Option 1 ID : **3398936489**

Option 2 ID : **3398936490**

Option 3 ID : **3398936491**

Option 4 ID : **3398936492**

Status : **Not Answered**

Chosen Option : --

**Q.34** A football player injured in the heat of play did not feel pain until the game was over. This stress- induced analgesia was explained by the following proposed statements:

- The release of norepinephrine from brain stem catecholaminergic neurons in the amygdala reduced during stress
- The reduced release of 2-arachidonoglycerol (2AG) in brain contributed to stress-induced analgesia
- The inhibition of CB<sub>1</sub> receptors in many brain regions accounted for reduced analgesia in stress
- The activation of CB<sub>2</sub> receptors on microglia in stress caused analgesic effect

Which one of the following options represents both correct statements?

- A and B
- B and C
- C and D
- A and D

**Options**

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931702**

Option 1 ID : **3398936577**

Option 2 ID : **3398936578**

Option 3 ID : **3398936579**

Option 4 ID : **3398936580**

Status : **Not Answered**

Chosen Option : --

**Q.35** Column A lists names of microorganisms and column B lists the pollutants that are degraded by the microbes.

|     | Column A                               |       | Column B                   |
|-----|----------------------------------------|-------|----------------------------|
| I   | <i>Pseudomonas putida</i>              | (i)   | Methyl tert-butyl ether    |
| II  | <i>Methylobacterium petroleiphilum</i> | (ii)  | Heavy metal detoxification |
| III | <i>Alcaligenes eutrophus</i>           | (iii) | Toluene, naphthalene       |
| IV  | <i>Deinococcus radiodurans</i>         | (iv)  | Fuel hydrocarbon           |

Which one of the following options correctly matches the organism to the pollutant it most commonly degrades?

- I – (ii); II – (iv); III – (i); IV – (iii)
- I – (iii); II – (iv); III – (ii); IV – (i)
- I – (iii); II – (i); III – (iv); IV – (ii)
- I – (iv); II – (iii); III – (i); IV – (ii)

**Options**

- 1
- 2
- 3
- 4

Question Type : **MCQ**  
 Question ID : **3398931734**  
 Option 1 ID : **3398936705**  
 Option 2 ID : **3398936706**  
 Option 3 ID : **3398936707**  
 Option 4 ID : **3398936708**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.36** In a plant, male sterility is caused by the presence of a dominant allele for a nuclear gene (*Ms*). There are also lines which carry a gene whose dominant allele (*F*) restores male fertility. These are called restorer lines. A cross is made between a male sterile line and a homozygous restorer line which does not contain the *Ms* allele. Of the  $F_1$  progeny, only those that carry the *Ms* allele are allowed to self-pollinate. What is the probability of obtaining a male sterile line in the resulting  $F_2$  progeny? (The *Ms* and *F* genes assort independently).

1.  $1/4$
2.  $3/16$
3.  $3/4$
4.  $1/16$

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931711**  
 Option 1 ID : **3398936613**  
 Option 2 ID : **3398936614**  
 Option 3 ID : **3398936615**  
 Option 4 ID : **3398936616**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.37** Given below are four statements regarding the use of marker assisted selection (MAS) in plant breeding:

- A. Markers that are not linked to target traits cannot be used to test accumulation of the desired recurrent parent's genetic background in a backcross breeding program.
- B. Co-dominant markers are more effective for marker assisted backcrossing since they facilitate selection of heterozygous progeny.
- C. MAS can be used to facilitate backcrossing of recessive genes that influence traits of interest.
- D. Use of tightly linked flanking markers for a trait of interest increases linkage drag in a breeding program.

Which one of the following options represents a combination of all **INCORRECT** statements?

1. A and B
2. B and C
3. A and D
4. C and D

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**

Question ID : 3398931731

Option 1 ID : 3398936693

Option 2 ID : 3398936694

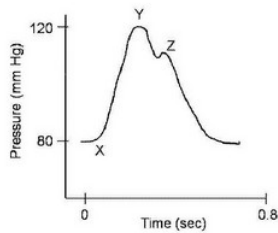
Option 3 ID : 3398936695

Option 4 ID : 3398936696

Status : Not Answered

Chosen Option : --

**Q.38** The blood forced into aorta during systole sets up a pressure wave that travels along arteries (arterial pulse wave). The following figure depicts the pressure wave recorded from an artery during a cardiac cycle and the table below represents points in the graph (column A) and associated features (column B).



| Column A |                                    | Column B |                          |
|----------|------------------------------------|----------|--------------------------|
| a.       | X                                  | i.       | Dichrotic notch          |
| b.       | Y                                  | ii.      | Systolic blood pressure  |
| c.       | (Y - X)                            | iii.     | Diastolic blood pressure |
| d.       | Z                                  | iv.      | Pulse pressure           |
| e.       | $\left[X + \frac{Y - X}{3}\right]$ | v.       | Mean arterial pressure   |

Which one of the following options represents a correct match between all terms of columns A and B?

1. a - i, b - iii, c - ii, d - v, e - iv
2. a - ii, b - iv, c - iii, d - v, e - i
3. a - iii, b - ii, c - iv, d - i, e - v
4. a - iv, b - v, c - i, d - iii, e - ii

- Options**
1. 1
  2. 2
  3. 3
  4. 4

Question Type : MCQ

Question ID : 3398931704

Option 1 ID : 3398936585

Option 2 ID : 3398936586

Option 3 ID : 3398936587

Option 4 ID : 3398936588

Status : Not Answered

Chosen Option : --

**Q.39**

Two islands (A and B) located approximately 180 km and 100 km respectively from the mainland. Island A is 160 sq. km, while Island B is 220 sq. km in area. Which one of the following statements is correct?

1. Island A is likely to have higher extinction and lower colonization rates than Island B.
2. Island B is likely to have higher extinction and lower colonization rates than Island A.
3. Island A is likely to have lower extinction rates and higher colonization rates than Island B.
4. Islands A and B are likely to have equal rates of extinction and colonization.

Options

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931723

Option 1 ID : 3398936661

Option 2 ID : 3398936662

Option 3 ID : 3398936663

Option 4 ID : 3398936664

Status : Answered

Chosen Option : 1

**Q.40** Compaction during early embryonic development involves activation of actin filaments. Which one of the following inhibitors would prevent formation of the blastula from the morula?

1. An inhibitor that would block the action of Gli1.
2. A specific inhibitor for stabilizing the function of Axin.
3. A specific inhibitor for GSK3 $\beta$
4. An inhibitor which would block Smad4.

Options

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931686

Option 1 ID : 3398936513

Option 2 ID : 3398936514

Option 3 ID : 3398936515

Option 4 ID : 3398936516

Status : Answered

Chosen Option : 3

**Q.41**

Signal Recognition Particle (SRP) plays an essential role in protein import in the endoplasmic reticulum (ER). In mammalian cells, SRP is a rod-like ribonucleoprotein complex containing six-protein subunits and one RNA molecule. SRP stalls protein translation by blocking:

- A. elongation of the polypeptide chain
- B. mRNA loading onto the ribosomes.
- C. assembly of 60S and 40S ribosome particles.
- D. binding of the initiation factors.

Which one of the following represents the correct statement/s?

- 1. A only
- 2. A and B
- 3. B and C
- 4. A and D

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931676**

Option 1 ID : **3398936473**

Option 2 ID : **3398936474**

Option 3 ID : **3398936475**

Option 4 ID : **3398936476**

Status : **Not Answered**

Chosen Option : --

**Q.42** The table below shows the number of unrooted and rooted trees generated when the number of taxa are three and four, respectively.

| Number of taxa | Number of unrooted trees | Number of rooted trees |
|----------------|--------------------------|------------------------|
| 3              | 1                        | 3                      |
| 4              | 3                        | 15                     |
| 5              | 15                       | ?                      |

The number of rooted trees generated when there are five taxa is:

- 1. 75
- 2. 78
- 3. 105
- 4. 126

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931729**

Option 1 ID : **3398936685**

Option 2 ID : **3398936686**

Option 3 ID : **3398936687**

Option 4 ID : **3398936688**

Status : **Answered**

Chosen Option : **3**

**Q.43**

Following are statements related to biophysical chemistry of molecules.

- A. When a solute is dissolved in a solvent, the increase in boiling point is independent of the number of particles into which the solute dissociates and dependent only on the molarity of the solute.
- B. When two atoms are linked by a covalent bond, van der Waals interaction between them contributes substantially to the bond energy.
- C. If a plot of reactant concentration versus time is not linear, but a plot of  $1/\text{reactant concentration}$  versus time is linear, the reaction is second order.
- D. Glucose, tyrosine and tryptophan can be easily distinguished by analyzing their UV spectra at equimolar concentration.

Choose the combination with both correct statements.

- 1. A and C
- 2. B and D
- 3. A and B
- 4. C and D

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931668**

Option 1 ID : **3398936441**

Option 2 ID : **3398936442**

Option 3 ID : **3398936443**

Option 4 ID : **3398936444**

Status : **Not Answered**

Chosen Option : --

**Q.44** Following statements were made while describing the characteristics of transposable elements:

- A. Most transposons use a common mechanism in which DNA is nicked to generate blunt ends for its subsequent incorporation.
- B. Homologous recombination between the repeats of a transposon may result in precise or imprecise excision.
- C. P elements are transposons which show differential splicing pattern in germline and somatic cells.
- D. In a transposon, *cis*-acting mutants that may prevent its transposition are generally located near the ends.
- E. An insertion sequence (IS) is a transposon, which is always flanked by long (more than 30 bases) direct repeats known as Long Terminal Repeats (LTR).

Which one of the following combinations of statements is correct?

- 1. A, C, E
- 2. B, C, D
- 3. C, D, E
- 4. A, B, D

Options 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931674**

Option 1 ID : **3398936465**

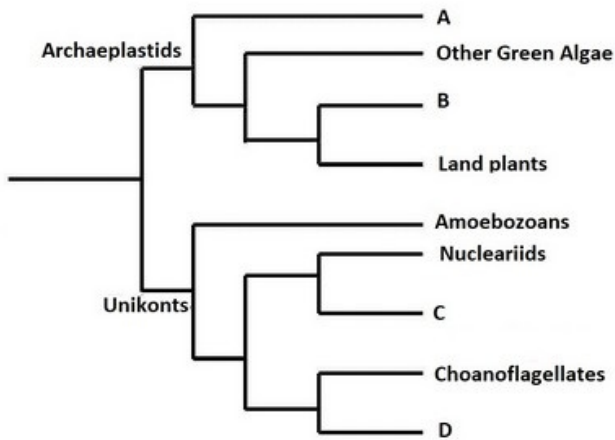
Option 2 ID : **3398936466**

Option 3 ID : **3398936467**

Option 4 ID : **3398936468**

Status : Not Answered  
Chosen Option : --

Q.45 Following diagram shows phylogeny of plants, fungi, and animals:



In the above diagram A, B, C and D represent; respectively;

1. Fungi, Red algae, Charophytes, Animals
2. Red algae, Charophytes, Animals, Fungi
3. Green algae, Red algae, Animals, Fungi
4. Red algae, Charophytes, Fungi, Animals

Options 1. 1  
2. 2  
3. 3  
4. 4

Question Type : MCQ  
Question ID : 3398931717  
Option 1 ID : 3398936637  
Option 2 ID : 3398936638  
Option 3 ID : 3398936639  
Option 4 ID : 3398936640  
Status : Not Answered  
Chosen Option : --

Q.46 Duschenne muscular dystrophy (DMD) is caused by a defective dystrophin gene and can be cured by removing a specific faulty exon. If a CRISPR/Cas9 based genome editing approach is to be designed to remove the faulty exon, some of the following conditions have to be met.

- A. Two guide RNA molecules to match the flanking regions of the faulty exon
- B. An efficient non-homologous end joining system in the host
- C. Two separate, specific Cas9 endonucleases to target both ends of the exon
- D. A single guide RNA that targets the intron preceding the exon

Choose the option that includes all the correct conditions.

1. A, B and C only
2. A and B only
3. C and D only
4. A and C only

Options 1. 1  
2. 2

3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931732**  
Option 1 ID : **3398936697**  
Option 2 ID : **3398936698**  
Option 3 ID : **3398936699**  
Option 4 ID : **3398936700**  
Status : **Not Answered**  
Chosen Option : --

**Q.47** Given below are some of the major characteristics of inflammatory responses against bacterial infections in general:

- A.  $TGF\beta$  levels are elevated
- B. Phagocytic capacity of macrophages is increased
- C. Complement system may get activated
- D. Self-reactive  $CD8^+$  T cells may get activated

Which one of the following combinations of above characteristics is most appropriate for inflammatory response against extracellular bacterial infections?

- 1. A and B
- 2. B and C
- 3. C and D
- 4. A and D

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931685**  
Option 1 ID : **3398936509**  
Option 2 ID : **3398936510**  
Option 3 ID : **3398936511**  
Option 4 ID : **3398936512**  
Status : **Answered**  
Chosen Option : **2**

**Q.48** Following observations were made about tRNA.

- A. tRNA encoding genes cluster at specific regions of the human genome
- B. 5' end of the mature tRNA is generated by RNase P mediated cleavage
- C. Modified bases may confer increased stability to tRNA
- D. Modified bases of tRNA do not affect the pattern of wobble pairing
- E. Suppressor tRNAs compete with the release factors to read the termination codons

Which one of the following combinations of statements represents correct observations?

- 1. A, C, E
- 2. B, E, D
- 3. B, C, E
- 4. A, B, D

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
 Question ID : **3398931679**  
 Option 1 ID : **3398936485**  
 Option 2 ID : **3398936486**  
 Option 3 ID : **3398936487**  
 Option 4 ID : **3398936488**  
 Status : **Not Answered**  
 Chosen Option : --

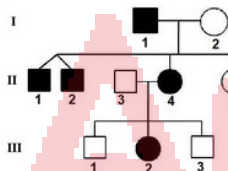
**Q.49** In most angiosperms, flowers have a perianth that consists of whorls of organs. Select the statement that is **INCORRECT** about the floral organs in angiosperms.

1. All petals are not homologous
2. If there is only one whorl of organs, these structures are referred to as tepals
3. Sepals tend to be initiated almost simultaneously and never in a spiral sequence.
4. Both sepals and petals can act as protective organs for inner floral organs and also as organs to attract pollinators

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931714**  
 Option 1 ID : **3398936625**  
 Option 2 ID : **3398936626**  
 Option 3 ID : **3398936627**  
 Option 4 ID : **3398936628**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.50** The given pedigree shows the inheritance of a trait



The following derivations are made from the pedigree chart:

- A. The trait can be Y-linked because I-1 parent produced II-4 child
- B. The trait cannot be X-linked recessive because II-4 parent produced III-1 and III-3 children
- C. The trait can be X-linked dominant because I-1 parent produced II-5 child
- D. The trait is unlikely to be autosomal recessive because II-6 and II-7 parents produced III-4 child.
- E. The trait may be autosomal dominant

Which one of the following options represents a combination of all correct statements?

1. B, D, E
2. A, B, D
3. B, C, D
4. A, C.

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**

Question ID : **3398931709**

Option 1 ID : **3398936605**

Option 2 ID : **3398936606**

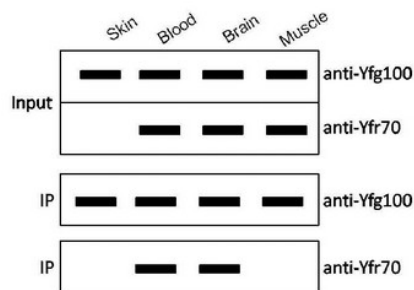
Option 3 ID : **3398936607**

Option 4 ID : **3398936608**

Status : **Not Answered**

Chosen Option : --

**Q.51** A student hypothesized that protein Yfg100 interacted with protein Yfr70 in a tissue-specific manner. To test this, an immunoprecipitation experiment was performed using antibodies to Yfg 100 and the samples were subjected to western blot using antibodies to both Yfg100 and Yfr70. The results obtained are shown below



Based on the results shown, identify the **INCORRECT** statement

- Protein Yfg100 is expressed in all tested tissues
- Yfg100 does not interact with Yfr70 in muscle
- Yfg100 interacts with Yfr70 in muscle but not in other tissues.
- Yfr70 is not expressed in skin

Options

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931738**

Option 1 ID : **3398936721**

Option 2 ID : **3398936722**

Option 3 ID : **3398936723**

Option 4 ID : **3398936724**

Status : **Not Answered**

Chosen Option : --

**Q.52** Which one of the following statements about DNA replication is **INCORRECT**?

- During DNA replication, when adjacent bidirectional forks converge, the lagging strand will meet the leading strand of the same template strand
- Mispaired nucleotide at the 3'-OH end of the primer strand triggers the 3'-5' exonucleolytic proof reading activity
- In a replication bubble moving bidirectionally, the same parental DNA strand cannot serve as a template for both the lagging and leading strand synthesis
- DNA replication involves a RNA-DNA chimeric molecule

Options

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931683**

Option 1 ID : **3398936501**

Option 2 ID : **3398936502**

Option 3 ID : **3398936503**

Option 4 ID : **3398936504**

Status : **Not Answered**

Chosen Option : --

**Q.53** A patient with primary hyperaldosteronism develops diabetic glucose tolerance. Following statements are proposed on the pathophysiological condition of the patient:

- A. the increase of serum potassium inhibits insulin secretion
- B. the depletion of serum potassium decreases insulin secretion
- C. the depletion of sodium decreases insulin secretion
- D. thiazide diuretics worsen the condition of this patient

Which one of the following options represents a combination of correct statements?

- 1. A and B
- 2. B and C
- 3. C and D
- 4. B and D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931705**

Option 1 ID : **3398936589**

Option 2 ID : **3398936590**

Option 3 ID : **3398936591**

Option 4 ID : **3398936592**

Status : **Not Answered**

Chosen Option : --

**Q.54** Given below are four statements on various methods used in molecular biology and recombinant DNA studies:

- A. Orientation of a cloned DNA fragment in a plasmid vector can be determined by using primers specific to the cloned fragment.
- B. Transcriptome sequencing cannot be used to identify differential expression profiles of mRNA in an organism.
- C. A DNA fragment with 5' overhangs can be converted into a blunt-ended fragment by using a nuclease but not by a DNA polymerase
- D. Oligonucleotide probes can be labelled at their 5' and 3' ends by using T4 polynucleotide kinase and terminal transferase, respectively

Which one of the following options consists of only correct statement/s?

- 1. A and C only
- 2. B only
- 3. C and D only
- 4. D only

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931737**

Option 1 ID : **3398936717**

Option 2 ID : **3398936718**

Option 3 ID : **3398936719**

Option 4 ID : **3398936720**

Status : **Not Answered**

Chosen Option : --

**Q.55** A guanine (G) base in DNA is susceptible to modification to 8-oxo-G because of oxidative damage. If the modified G residues are not removed by a DNA glycosylase (MutM or Fpg) prior to replication, an adenine (A) may be incorporated against 8-oxo-G. To avoid mutations, the cells have another DNA glycosylase called MutY. However, when the gene coding for MutY is deleted in *Escherichia coli*, the strain survives. This observation suggests that in *E. coli*

1. MutY is not responsible for the excision of 'A' incorporated against 8-oxo-G
2. alternate DNA repair pathways may substitute for the repair of A incorporated against 8-oxo-G
3. incorporation of 'A' against 8-oxo-G does not cause mutation in *E. coli*
4. the 8-oxo-G:A base pair in DNA distorts its structure in such a way that, during the next round of replication a 'G' is incorporated against A in the 8-oxo-G:A mispair.

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931682**

Option 1 ID : **3398936497**

Option 2 ID : **3398936498**

Option 3 ID : **3398936499**

Option 4 ID : **3398936500**

Status : **Not Answered**

Chosen Option : --

**Q.56** Given below are some properties that are applicable for T cell receptors:

- A. It is associated with a multi-component signal transducing complex, CD3, on the membrane
- B. It is divalent in nature
- C. It contains domains which are similar to the immunoglobulin fold structure
- D. It exhibits diversity generated by somatic mutation

Which one of the following combinations represents correct statements?

1. A and B
2. A and C
3. C and D
4. B and D

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931689**

Option 1 ID : **3398936525**

Option 2 ID : **3398936526**

Option 3 ID : **3398936527**

Option 4 ID : **3398936528**

Status : **Not Answered**

Chosen Option : --

**Q.57** Match the geological time period with the diversification events associated with them:

| Geological era | Event                                                                                         |
|----------------|-----------------------------------------------------------------------------------------------|
| A. Cenozoic    | i. Angiosperm diversification                                                                 |
| B. Mesozoic    | ii. Modern fauna diversification (bivalves, gastropods, bryozoans, malacostracan crustaceans) |
| C. Paleozoic   | iii. Oceanic radiation of early eukaryotes                                                    |
| D. Proterozoic | iv. Mammal diversification                                                                    |

1. A – ii, B – i, C – iii, D – iv

2. A – iv, B – i, C – ii, D – iii

3. A – ii, B – iv, C – i, D – iii

4. A – iv, B – iii, C – i, D – ii

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**

Question ID : **3398931728**

Option 1 ID : **3398936681**

Option 2 ID : **3398936682**

Option 3 ID : **3398936683**

Option 4 ID : **3398936684**

Status : **Answered**

Chosen Option : **3**

**Q.58** Given below are factors/terms associated with various aspects of plant growth and development:

| Column A |                                     | Column B |                                    |
|----------|-------------------------------------|----------|------------------------------------|
| A.       | Vacuolar-type programmed cell death | i.       | Self-incompatibility               |
| B.       | S-locus                             | ii.      | Adaxial-Abaxial patterning of leaf |
| C.       | <i>CONSTANS</i>                     | iii.     | Megasporogenesis                   |
| D.       | <i>Knox</i>                         | iv.      | Flowering in long photoperiods     |

Which one of the following options represents the most appropriate match between all terms of Column A and Column B?

1. A – ii, B – iii, C – iv, D – i

2. A – iii, B – i, C – iv, D – ii

3. A – ii, B – iv, C – i, D – iii

4. A – iv, B – i, C – ii, D – iii

**Options** 1. 1

2. 2

3. 3

4. 4

Question Type : **MCQ**  
 Question ID : **3398931690**  
 Option 1 ID : **3398936529**  
 Option 2 ID : **3398936530**  
 Option 3 ID : **3398936531**  
 Option 4 ID : **3398936532**  
 Status : **Not Answered**  
 Chosen Option : --

**Q.59** Hippo pathway is responsible for the trophoblast and inner cell mass (ICM) differentiation during mammalian development. Which one of the following is true for ICM formation?

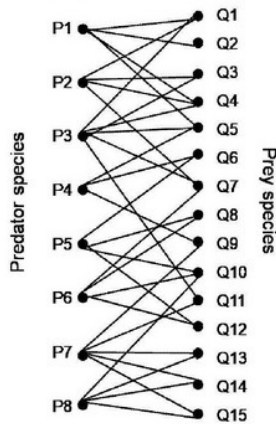
1. The Tead4 transcription factor, when active, promotes transcription of *Cdx2* gene leading to ICM formation.
2. If LATS kinase phosphorylates the YAP transcriptional coactivator, the phosphorylated form of YAP does not enter the nucleus and gets degraded which leads to ICM formation.
3. In the absence of functional LATS protein, the YAP transcriptional cofactor can bind to Tead4 to activate *Cdx2* gene promoting ICM
4. Synthesis of *Cdx2* upregulates Oct4 and Nanog leading to ICM formation.

Options 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931695**  
 Option 1 ID : **3398936549**  
 Option 2 ID : **3398936550**  
 Option 3 ID : **3398936551**  
 Option 4 ID : **3398936552**  
 Status : **Answered**  
 Chosen Option : 4

**Q.60**

Predator-prey interactions in a community are represented in the figure below.



Given below are some statements related to the above figure:

- Predators and prey are generalists
- Predators have expanded their prey base over time
- Predators and prey have co-evolved
- There is speciation in prey while predators are prone to extinction

Which one of the following options represents statement/s that can be correctly inferred from the figure?

- (i) and (iii)
- (iii) only
- (i) only
- (ii) and (iv)

Options

- 1
- 2
- 3
- 4

Question Type : MCQ

Question ID : 3398931724

Option 1 ID : 3398936665

Option 2 ID : 3398936666

Option 3 ID : 3398936667

Option 4 ID : 3398936668

Status : Answered

Chosen Option : 4

**Q.61** Plants expressing bacterial *NahG* (Salicylate hydroxylase) are known to be defective in inducing systemic acquired resistance (SAR). A researcher applied the following synthetic chemicals on the *NahG* expressing plants.

- 2,6-dichloroisonicotinic acid (INA)
- Benzo (1,2,3) thiodiazole-7-carbothionic acid S-methyl ester (BTH)

Which one of the following statements is correct?

- INA induces SAR but BTH does not induce SAR
- INA does not induce SAR but BTH induces SAR
- Both INA and BTH induce SAR
- Neither INA nor BTH induce SAR

Options

- 1
- 2
- 3
- 4

Question Type : **MCQ**

Question ID : **3398931699**

Option 1 ID : **3398936565**

Option 2 ID : **3398936566**

Option 3 ID : **3398936567**

Option 4 ID : **3398936568**

Status : **Not Answered**

Chosen Option : --

**Q.62** Two *petite* yeasts, *Mat-a* and *Mat-α* are crossed. The diploid is *grande*. After a few mitotic divisions, the *grande* diploid is sporulated. The analysis of a large number of tetrads yielded a 2:2 ratio of *petite*: *grande*. A few potential scenarios describing the reason for this segregation pattern are stated below:

- A. The parental strains had two different mitochondrial *rho*<sup>-</sup> mutations
- B. One of the parents had a recessive nuclear *petite* mutation
- C. Only one of the mitochondrial *petite* mutation is inherited in the tetrads
- D. The mitochondria inherited are wild type.

Which one of the following options represents a combination of all correct statements?

- 1. A, B and C
- 2. B and D only
- 3. A and D only
- 4. B and C only

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**

Question ID : **3398931708**

Option 1 ID : **3398936601**

Option 2 ID : **3398936602**

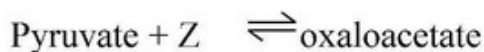
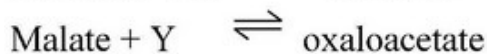
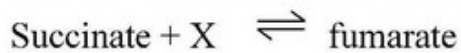
Option 3 ID : **3398936603**

Option 4 ID : **3398936604**

Status : **Not Answered**

Chosen Option : --

**Q.63** In the following transformations,



The correct combination of X, Y, Z is

- 1. X=FAD, Y=NAD<sup>+</sup>, Z=ATP
- 2. X= ATP, Y= FAD, Z= NAD<sup>+</sup>
- 3. X= NAD<sup>+</sup>, Y= FAD, Z=ATP
- 4. X= NAD<sup>+</sup>, Y= ATP, Z= FAD

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : **MCQ**  
 Question ID : **3398931672**  
 Option 1 ID : **3398936457**  
 Option 2 ID : **3398936458**  
 Option 3 ID : **3398936459**  
 Option 4 ID : **3398936460**  
 Status : **Answered**  
 Chosen Option : **2**

- Q.64** Chromatin remodelling leading to histone modifications is invariably required for regulation of transcriptional activity of eukaryotic genes. The residues in histone tails may be methylated or acetylated. The nature of these modifications
1. is identical on all the nucleosomes of a gene
  2. varies between the nucleosomes present in the transcription initiation and elongation regions
  3. is always fixed for the nucleosomes in the promoter regions of the genes that are transcriptionally active
  4. in the transcription initiation regions is identical for the genes that are sensitive to nuclease activity

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931681**  
 Option 1 ID : **3398936493**  
 Option 2 ID : **3398936494**  
 Option 3 ID : **3398936495**  
 Option 4 ID : **3398936496**  
 Status : **Not Answered**  
 Chosen Option : **--**

- Q.65** In a flower species, light pink locus is hypostatic to pigment development locus.  $R$  is for pigment development and  $W$  for light pink. The recessive allele ( $w$ ) in light pink locus gives red colour and recessive allele in pigment locus ( $r$ ) gives white colour. What will be the phenotype of  $W/-, r/r$  and  $w/w, r/r$ ?
1. Red, Pink
  2. Pink, White
  3. Red, Red
  4. White, White

**Options** 1. 1  
 2. 2  
 3. 3  
 4. 4

Question Type : **MCQ**  
 Question ID : **3398931713**  
 Option 1 ID : **3398936621**  
 Option 2 ID : **3398936622**  
 Option 3 ID : **3398936623**  
 Option 4 ID : **3398936624**  
 Status : **Answered**  
 Chosen Option : **3**

**Q.66**

Given below are examples of animals and their behaviours.

- A. Elephant : Innate and learnt behaviour
- B. Ant : Innate behaviour only
- C. Whale : Learnt behaviours only
- D. Bee : Innate and learnt behaviours

Which one of the following options represents a correct combination of true and false?

- 1. A : True B : False C : False D : True
- 2. A : True B : True C : True D : False
- 3. A : False B : True C : True D : False
- 4. A : True B : True C : True D : True

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : MCQ

Question ID : 3398931726

Option 1 ID : 3398936673

Option 2 ID : 3398936674

Option 3 ID : 3398936675

Option 4 ID : 3398936676

Status : Answered

Chosen Option : 1

**Q.67** The two cell types, Anchor cell and vulval precursor cells are involved in vulva formation in *C. elegans*. The following statements are given towards understanding the roles of these two cell types and their signalling activities:

- A. Anchor cell is a germ cell from the gonad which sends induction signal to vulva for maintaining differentiation states.
- B. The six vulval precursor cells, influenced by anchor cell, form an equivalence group
- C. The cell directly beneath the anchor cell divides to form the central vulval cells, while the two flanking cells divide to become the lateral vulval cells
- D. The three cells further away from anchor cell generate hypodermal cells
- E. Lin3 signal from anchor cell forms a gradient and activates vulva forming genes in central and lateral cells
- F. The Notch-Delta mediated mechanism of restricting adjacent cell fates is called Lateral inhibition.

Which combination of the above statements is correct towards vulva formation in *C. elegans*?

- 1. A, B and E only
- 2. A, B, E and F
- 3. A, B, C and D
- 4. B, C, D, E and F

Options

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : MCQ

Question ID : 3398931693

Option 1 ID : 3398936541

Option 2 ID : 3398936542

Option 3 ID : 3398936543

Option 4 ID : 3398936544

Status : Answered

Chosen Option : 3

**Q.68** The following statements were made regarding photosynthesis:

- A. Conversion of 3-phosphoglycerate into glyceraldehyde 3- phosphate is a reduction process which utilizes ATP as well as NADH in Calvin cycle
- B. Conversion of ribulose 5-phosphate to ribulose 1,5-bisphosphate utilizes one third of the total ATP requirements of carbon fixation in Calvin cycle.
- C. Sucrose is synthesized outside the chloroplast and uses uridine triphosphate to activate glucose.
- D. Starch is a glucose polymer which is synthesized in chloroplast stroma and uses ATP

Which one of the following options represents a combination of correct statements?

- 1. C and D
- 2. B and D
- 3. A and C
- 4. A and D

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : MCQ

Question ID : 3398931697

Option 1 ID : 3398936557

Option 2 ID : 3398936558

Option 3 ID : 3398936559

Option 4 ID : 3398936560

Status : Answered

Chosen Option : 3

**Q.69** Below is a table showing the number of species and actual food web links observed in three different ecosystems.

| Ecosystem | No. of species | Observed food web links |
|-----------|----------------|-------------------------|
| A         | 11             | 25                      |
| B         | 21             | 70                      |
| C         | 51             | 200                     |

By calculating connectance as a measure of relative complexity of food webs, infer which of the following statements is correct?

- 1. Connectance increases as species richness increases.
- 2. Connectance decreases as species richness increases.
- 3. Connectance is constant regardless of species richness.
- 4. Relationship between species richness and connectance is stochastic.

**Options**

- 1. 1
- 2. 2
- 3. 3
- 4. 4

Question Type : MCQ

Question ID : 3398931719

Option 1 ID : 3398936645

Option 2 ID : 3398936646

Option 3 ID : 3398936647

Option 4 ID : 3398936648  
Status : Answered  
Chosen Option : 1

**Q.70** Given below are some statements related to bacterial toxins.

- A. Exotoxins are usually heat stable proteins secreted by bacteria.
- B. Exotoxins are usually heat labile proteins secreted by bacteria.
- C. Endotoxins are heat stable lipopolysaccharide-protein complexes of the outer membrane of gram-negative bacteria.
- D. Endotoxins are heat labile lipoproteins of the outer membrane of gram-negative bacteria.

Which one of the following options represents a combination of correct statements?

- 1. A and B
- 2. B and C
- 3. B and D
- 4. A and D

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : MCQ  
Question ID : 3398931715  
Option 1 ID : 3398936629  
Option 2 ID : 3398936630  
Option 3 ID : 3398936631  
Option 4 ID : 3398936632  
Status : Not Answered  
Chosen Option : --

**Q.71** A small number (approx. 10) of mice are introduced into an uninhabited island. Their population grows exponentially initially and after 4 years, reaches a population size of 520 after which the population stays stable. At what point would you expect the population to attain its highest growth rate?

- 1. When the population size is 260
- 2. When the mice population was first introduced
- 3. Their population growth rate remains constant throughout
- 4. When the population size reaches 520

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : MCQ  
Question ID : 3398931722  
Option 1 ID : 3398936657  
Option 2 ID : 3398936658  
Option 3 ID : 3398936659  
Option 4 ID : 3398936660  
Status : Answered  
Chosen Option : 3

**Q.72**

Following statements were made about the presence of various hydrogen bond acceptor/donor groups in the major groove of B form DNA.

- 4 and 6 amino groups, of cytosine and adenine, respectively.
- 4 and 6 keto groups of thymine and guanine, respectively.
- 2 and 6 amino groups of guanine and adenine, respectively.
- 2 keto and 4 amino groups of thymine and cytosine, respectively.

Which one of the following options consists of all correct statements?

- (i) and (ii)
- (ii) and (iii)
- (iii) and (iv)
- (i) and (iv)

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931670**  
Option 1 ID : **3398936449**  
Option 2 ID : **3398936450**  
Option 3 ID : **3398936451**  
Option 4 ID : **3398936452**  
Status : **Not Answered**  
Chosen Option : --

**Q.73** Given below are sampling techniques and their features.

| Sampling technique |                      | Features |                                                                                                                     |
|--------------------|----------------------|----------|---------------------------------------------------------------------------------------------------------------------|
| A.                 | Stratified sampling  | (i)      | Population is divided into groups/clusters and a sample of groups/clusters is chosen using a probability method     |
| B.                 | Systematic sampling  | (ii)     | Population is divided into groups/clusters and within each group/cluster, a probability sample is selected from it. |
| C.                 | Opportunity sampling | (iii)    | Only participants available and willing to participate are used.                                                    |
| D.                 | Clustered sampling   | (iv)     | Samples are selected at regular intervals from the population                                                       |

Which one of the following options correctly matches sampling techniques with their features?

- A – (ii); B – (i); C – (iv); D – (iii)
- A – (ii); B – (iv); C – (iii); D – (i)
- A – (i); B – (iv); C – (iii); D – (ii)
- A – (i); B – (iv); C – (ii); D – (iii)

**Options** 1. 1  
2. 2  
3. 3  
4. 4

Question Type : **MCQ**  
Question ID : **3398931742**

Option 1 ID : 3398936737

Option 2 ID : 3398936738

Option 3 ID : 3398936739

Option 4 ID : 3398936740

Status : Not Answered

Chosen Option : --

**Q.74** Suppose a population has three age classes. Females in the second and third age classes produce four and three offsprings, respectively. While 50% female in the first age class survive into the second age class, only 30% females survive into the third age class. The

Leslie matrix for this population is given by  $L = \begin{pmatrix} 0 & 4 & 3 \\ 0.5 & 0 & 0 \\ 0 & 0.3 & 0 \end{pmatrix}$

If there are 10 individuals in each of the three age classes, the number of individuals in the next iteration would be:

1. 50
2. 78
3. 100
4. 65

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931720

Option 1 ID : 3398936649

Option 2 ID : 3398936650

Option 3 ID : 3398936651

Option 4 ID : 3398936652

Status : Not Answered

Chosen Option : --

**Q.75** A plant cell with turgor pressure of 0.1 MPa and osmotic pressure of 0.7 MPa is placed in a salt solution of 0.6 MPa osmotic pressure. Considering that all other pressures and coefficients have no effect on water potential, the following statements were recorded:

- A. Water potential of the salt solution will be higher as compared to that of plant cell.
- B. Higher osmotic pressure will lower water potential, but higher turgor pressure will raise water potential. Therefore, both of these components are important to calculate water potential.
- C. There will be no net movement of water in the cell.
- D. Higher turgor pressure will force the water to move out of the cell.

Which one of the following options represents a combination of correct statements?

1. A and D
2. A and B
3. C and D
4. B and C

**Options**

1. 1
2. 2
3. 3
4. 4

Question Type : MCQ

Question ID : 3398931696

Option 1 ID : 3398936553

Option 2 ID : 3398936554

Option 3 ID : 3398936555  
Option 4 ID : 3398936556  
Status : Not Answered  
Chosen Option : --

