

Test Booklet Code

**B**

This Booklet contains 24 pages.

Do not open this test Booklet until you are asked to do so.

**Important Instructions :**

1. The test is of 3 hours (180 minutes) duration and the Test Booklet contains 180 multiple-choice questions (four options with a single correct answer) from Physics, Chemistry and Biology. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer sheet.
2. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
3. Use Blue/ Black Ball Point Pen only for writing particulars on this page/ marking responses on Answer Sheet
4. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
5. Syllabus of this test is: Complete NEET Syllabus (as per communications from NTA & NMC)
6. The CODE for this Booklet is B. Make sure that the CODE printed on the original Copy of the Answer Sheet is the same as that on this Test Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
8. Use of white fluid for correction is NOT permissible on the Answer Sheet.
9. Each candidate must show on-demand his /her Admit Card to the Invigilator.
10. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
11. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.
12. Use of Electronic/ Manual Calculator is prohibited.
13. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
15. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/ Answer Sheet in the Attendance Sheet.

**Expected Qs in  
NEET 2026  
180/180**

# #NEETbeforeNEET

Name of the Candidate (in Capitals) : \_\_\_\_\_

Roll Number : in figures \_\_\_\_\_

: in words \_\_\_\_\_

Centre of Examination (in Capitals) : \_\_\_\_\_

Candidate's Signature : \_\_\_\_\_ Invigilator's Signature : \_\_\_\_\_

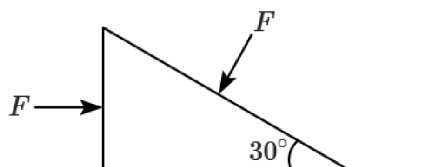
Facsimile signature stamp of

Centre Superintendent : \_\_\_\_\_



## PHYSICS

**1** The wedge, considered to be very light but strong, is acted upon by two very large forces,  $F$  each, acting perpendicular to the respective faces. The wedge just slips on the ground due to friction. The coefficient of friction is nearly:



|    |                      |    |                      |
|----|----------------------|----|----------------------|
| 1. | $\frac{1}{2}$        | 2. | $\frac{\sqrt{3}}{2}$ |
| 3. | $\frac{1}{\sqrt{3}}$ | 4. | $\sqrt{3}$           |

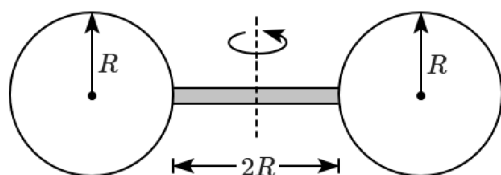
**2** The drift speed of electrons when a current of 1.5 A flows through a copper wire of cross-sectional area  $5 \text{ mm}^2$  is  $v$ . If the electron density in copper is  $9 \times 10^{28} \text{ m}^{-3}$ , and the charge of an electron is  $e = 1.6 \times 10^{-19} \text{ C}$ , then the value of the drift speed  $v$  (in mm/s) is close to:

|    |      |    |     |
|----|------|----|-----|
| 1. | 0.02 | 2. | 3   |
| 3. | 2    | 4. | 0.2 |

**3** A random molecule from hydrogen gas at 400 K is allowed to enter a chamber containing helium gas at 200 K. The speed of the hydrogen molecule as a result of collision with the helium molecules:

|    |                   |    |                          |
|----|-------------------|----|--------------------------|
| 1. | increases         | 2. | decreases                |
| 3. | remains unchanged | 4. | may increase or decrease |

**4** Two identical spherical balls of mass  $M$  and radius  $R$  each are attached to the two ends of a rod of length  $2R$  and mass  $M$ . The moment of inertia of the system about the axis passing perpendicularly through the centre of the rod is:



|    |                       |    |                       |
|----|-----------------------|----|-----------------------|
| 1. | $\frac{137}{15} MR^2$ | 2. | $\frac{17}{15} MR^2$  |
| 3. | $\frac{209}{15} MR^2$ | 4. | $\frac{152}{15} MR^2$ |

**5** Which, of the following quantities, has the same dimensions as resistance?

|    |                                                |    |                                                |
|----|------------------------------------------------|----|------------------------------------------------|
| 1. | Inductance $\times$ Time                       | 2. | $\frac{\text{Time}}{\text{Capacitance}}$       |
| 3. | $\frac{\text{Inductance}}{\text{Capacitance}}$ | 4. | $\frac{\text{Capacitance}}{\text{Inductance}}$ |

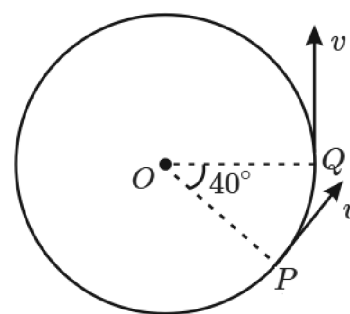
**6** A light source produces an intensity of  $I$  on a screen. Two Polaroids  $P_1$  and  $P_2$  are placed between the source and the screen such that the intensity on the screen reduces to  $\frac{I}{2}$ . When  $P_2$  is rotated by a certain angle, the intensity further becomes  $\frac{3I}{8}$ . By what angle should  $P_2$  be rotated to produce this change?

|    |            |    |            |
|----|------------|----|------------|
| 1. | $30^\circ$ | 2. | $45^\circ$ |
| 3. | $90^\circ$ | 4. | $60^\circ$ |

**7** The error in the measurement of length is 1% and that in the measurement of time 0.5%; then the error in measuring  $g$  by a simple pendulum is:

1. 0%
2. 1.5%
3. 2%
4. 4%

**8** A particle undergoes uniform circular motion with speed  $v$ . As it moves between two points  $P$  and  $Q$  on the circle, the angle between the corresponding radius vectors is  $40^\circ$ . The magnitude of the change in velocity of the particle during this motion is:



1.  $2v \cos 40^\circ$
2.  $2v \sin 40^\circ$
3.  $2v \cos 20^\circ$
4.  $2v \sin 20^\circ$

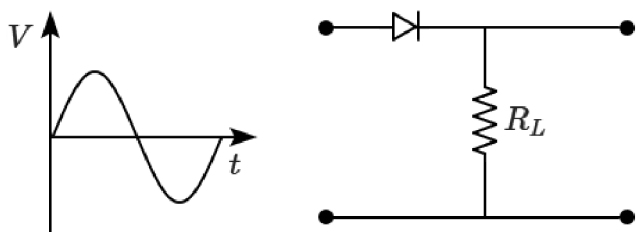
**9** A metal plate of area  $1 \times 10^{-4} \text{ m}^2$  is illuminated by a radiation of intensity  $16 \text{ mW/m}^2$ . The work function of the metal is  $5 \text{ eV}$ , and the energy of the incident photons is  $10 \text{ eV}$ . If only 10% of the incident energy contributes to the emission of photoelectrons, what are the number of photoelectrons emitted per second and their maximum kinetic energy, respectively?

|    |                               |    |                              |
|----|-------------------------------|----|------------------------------|
| 1. | $10^{14}$ and $10 \text{ eV}$ | 2. | $10^{12}$ and $5 \text{ eV}$ |
| 3. | $10^{11}$ and $5 \text{ eV}$  | 4. | $10^{10}$ and $5 \text{ eV}$ |

**10** A particle  $A$  of mass  $m$  and charge  $q$  is accelerated through a potential difference of  $50 \text{ V}$ . Another particle  $B$  of mass  $4m$  and charge  $q$  is accelerated through a potential difference of  $2500 \text{ V}$ . What is the approximate ratio of their de-Broglie wavelengths  $\frac{\lambda_A}{\lambda_B}$ ?

1. 10.00
2. 0.07
3. 14.14
4. 4.47

**11** In the given p-n junction diode circuit, a sinusoidal input signal is applied. Assume the diode is ideal.



The output voltage waveform across the load resistor  $R_L$  would be:

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

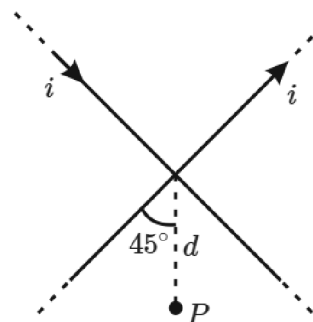
**12** The acceleration of an electron in the first Bohr orbit ( $n = 1$ ) of a hydrogen atom is given by:

|    |                             |    |                              |
|----|-----------------------------|----|------------------------------|
| 1. | $\frac{h^2}{\pi^2 m^2 r^3}$ | 2. | $\frac{h^2}{4\pi^2 m^2 r^3}$ |
| 3. | $\frac{h^2}{4\pi m^2 r^3}$  | 4. | $\frac{h^2}{8\pi^2 m^2 r^3}$ |

**13** Young's double-slit experiment is performed with identical slits separated by a distance  $d$ , and with light of wavelength  $\lambda$ . The screen is placed at a point which is at a distance  $D$  from the double-slit, as usual. A convex lens of focal length  $f$  is inserted between the double-slit and the screen, very close to the double slit. The screen is adjusted (i.e. the value of  $D$  is slowly varied) until a clear interference pattern is formed. The fringe width equals:

|    |                        |    |                               |
|----|------------------------|----|-------------------------------|
| 1. | $\frac{\lambda f}{d}$  | 2. | $\frac{2\lambda f}{d}$        |
| 3. | $\frac{\lambda f}{2d}$ | 4. | $\frac{\lambda f}{d\sqrt{2}}$ |

**14** Two infinitely long current-carrying conductors, each carrying a current  $i$ , are placed perpendicular to each other as shown in the figure. What is the net magnetic field at point  $P$ , which is located at a distance  $d$  from the point of intersection of the two conductors?



|    |                                                                             |    |                                                                             |
|----|-----------------------------------------------------------------------------|----|-----------------------------------------------------------------------------|
| 1. | $\frac{\mu_0 i}{\sqrt{2}\pi d} \left(1 - \frac{1}{\sqrt{2}}\right) \otimes$ | 2. | $\frac{2\mu_0 i}{\sqrt{2}\pi d} \otimes$                                    |
| 3. | $\frac{\mu_0 i}{\sqrt{2}\pi d} \otimes$                                     | 4. | $\frac{\mu_0 i}{\sqrt{2}\pi d} \left(1 + \frac{1}{\sqrt{2}}\right) \otimes$ |

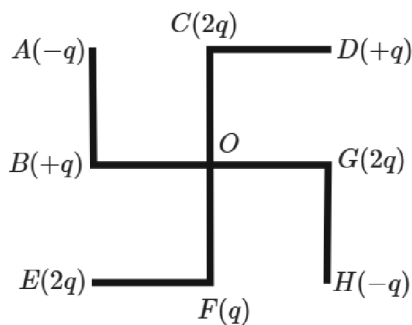
**15** How does the elasticity of a material change when its temperature is increased?

1. increases
2. decreases
3. remains constant
4. may increase or decrease

**16** A sample of an ideal gas undergoes isothermal expansion. If  $dQ$ ,  $dU$ , and  $dW$  represent the heat supplied to the system, the change in internal energy, and the work done by the system, respectively, which of the following statements is correct?

|    |                                                           |
|----|-----------------------------------------------------------|
| 1. | $dQ$ is positive, $dU$ is positive, and $dW$ is positive. |
| 2. | $dQ$ is positive, $dU$ is zero, and $dW$ is positive.     |
| 3. | $dQ$ is positive, $dU$ is positive, and $dW$ is zero.     |
| 4. | $dQ$ is negative, $dU$ is negative, and $dW$ is negative. |

**17** As shown in the figure, eight charges are placed on a structure where each side has length  $l$ . What is the magnitude of the net electric field at point  $O$ ?



|    |                                                             |    |                                                       |
|----|-------------------------------------------------------------|----|-------------------------------------------------------|
| 1. | $\frac{1}{4\pi\epsilon_0} \frac{q}{(2l^2)} (2\sqrt{2} - 1)$ | 2. | $\frac{1}{4\pi\epsilon_0 (2l)^2}$                     |
| 3. | $\frac{1}{4\pi\epsilon_0} \frac{q}{(l^2)}$                  | 4. | $\frac{1}{4\pi\epsilon_0} \frac{2q}{(2l)} (\sqrt{2})$ |

**18** Given below are two statements:

|                       |                                                                                                                                                                                                               |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | Two SHMs, acting along perpendicular directions, are imposed on a particle: the SHMs have the same amplitude & frequency but differ in phase by $\frac{\pi}{2}$ . Their resultant is uniform circular motion. |
| <b>Reason (R):</b>    | It is clear that the two SHMs can be taken as $A \cos \omega t$ along $\hat{i}$ & $A \sin \omega t$ along $\hat{j}$ , and their combination gives circular motion in a circle of radius $A$ .                 |

|    |                                                                          |
|----|--------------------------------------------------------------------------|
| 1. | Both (A) and (R) are True and (R) is the correct explanation of (A).     |
| 2. | Both (A) and (R) are True but (R) is not the correct explanation of (A). |
| 3. | (A) is True but (R) is False.                                            |
| 4. | (A) is False but (R) is True.                                            |

**19** The energy released per fission of a nucleus of  $X^{240}$  is 200 MeV. If all the atoms present in 120 g of pure  $X^{240}$  undergo fission, what is the total energy released?

|    |                          |    |                          |
|----|--------------------------|----|--------------------------|
| 1. | $4.2 \times 10^{25}$ MeV | 2. | $8.2 \times 10^{25}$ MeV |
| 3. | $6.2 \times 10^{25}$ MeV | 4. | $2.2 \times 10^{25}$ MeV |

**20** Given below are two statements:

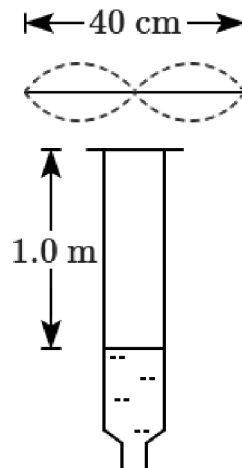
|                      |                                                                                                           |
|----------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | Energy is stored by a current-carrying inductance, and this is proportional to the square of the current. |
| <b>Statement II:</b> | The EMF developed by an inductance is proportional to the rate of change of current.                      |

|    |                                                       |
|----|-------------------------------------------------------|
| 1. | Statement I is incorrect and Statement II is correct. |
| 2. | Both Statement I and Statement II are correct.        |
| 3. | Both Statement I and Statement II are incorrect.      |
| 4. | Statement I is correct and Statement II is incorrect. |

**21** A telescope has a tube length of 60 cm and a magnifying power of 5. What is the focal length of its eyepiece?

|    |       |    |       |
|----|-------|----|-------|
| 1. | 40 cm | 2. | 10 cm |
| 3. | 20 cm | 4. | 30 cm |

**22** Consider the situation shown in the figure, where a wire with a mass of 4.0 g oscillates in its second harmonic, causing the air column in the tube to vibrate in its fundamental mode. Given that the speed of sound in air is 340 m/s, the tension in the wire is:



|    |        |    |        |
|----|--------|----|--------|
| 1. | 7.6 N  | 2. | 8.5 N  |
| 3. | 11.6 N | 4. | 15.0 N |

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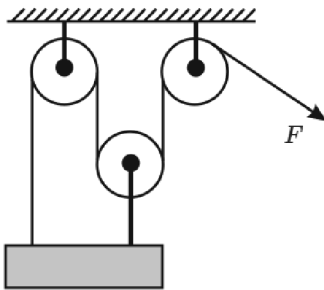
**23** Arrange the following types of electromagnetic waves in decreasing order of their wave number:

|     |                       |
|-----|-----------------------|
| (A) | AM radio waves        |
| (B) | TV and FM radio waves |
| (C) | Microwaves            |
| (D) | Short radio waves     |

Choose the correct code in decreasing order:

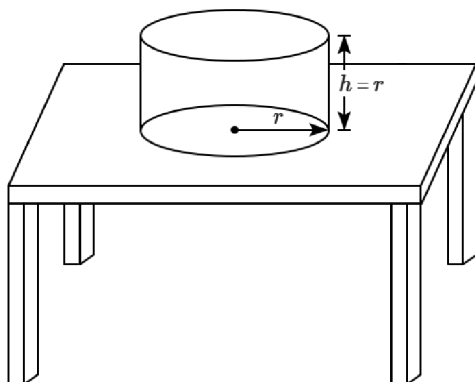
|                          |                          |
|--------------------------|--------------------------|
| 1. (A) > (B) > (D) > (C) | 2. (C) > (D) > (B) > (A) |
| 3. (A) > (B) > (C) > (D) | 4. (D) > (C) > (B) > (A) |

**24** What power is required to lift a 30 kg mass vertically upward through a distance of 2 m in exactly 60 s when using a frictionless pulley system that reduces the required lifting force by a factor of 3? (take  $g = 10 \text{ m/s}^2$ )



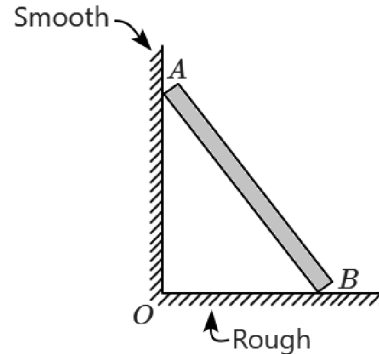
|         |          |
|---------|----------|
| 1. 4 W  | 2. 10 W  |
| 3. 24 W | 4. 120 W |

**25** A cylindrical glass beaker of uniform thickness is placed on a wooden table as shown. Its height ( $h$ ) is equal to its radius ( $r$ ). The coefficient of linear expansion of the glass is  $\alpha$ . If the temperature of the beaker is raised by  $\theta$ , its centre-of-mass rises by:



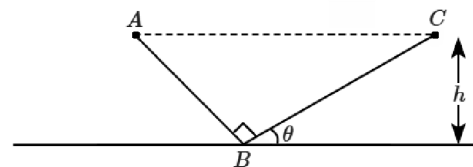
|                                |                                 |
|--------------------------------|---------------------------------|
| 1. $\alpha h \theta$           | 2. $\frac{\alpha h \theta}{2}$  |
| 3. $\frac{\alpha h \theta}{3}$ | 4. $\frac{2\alpha h \theta}{3}$ |

**26** A uniform ladder of weight  $W$  is placed against a smooth vertical wall, as shown in the figure. It is kept in equilibrium due to the force of friction ( $f_B$ ) acting on it at  $B$  from the ground. The normal reactions at  $A$  and  $B$  have magnitudes  $N_A$  and  $N_B$ , respectively. Then:



|                                          |                            |
|------------------------------------------|----------------------------|
| 1. $N_A = f_B$                           | 2. $N_B = W$               |
| 3. $N_A \cdot OA = W \cdot \frac{OB}{2}$ | 4. All the above are true. |

**27** A small particle slides up and down along a smooth path  $ABC$  ( $\angle B = 90^\circ$ ), under the action of gravity, coming to a stop briefly at the highest points ( $A, C$ ) of the path  $ABC$ . The path is rounded at  $B$  to facilitate the back and forth motion. The time taken for the particle to go from  $A$  to  $C$  is:

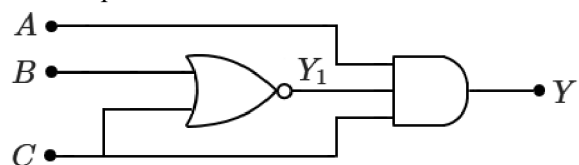


|                                                                                       |                                                                                     |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1. $\sqrt{\frac{2h}{g}} (\sin \theta + \cos \theta)$                                  | 2. $\sqrt{\frac{2h}{g}} (\sin^2 \theta + \cos^2 \theta)$                            |
| 3. $\sqrt{\frac{2h}{g}} \left( \frac{1}{\sin \theta} + \frac{1}{\cos \theta} \right)$ | 4. $\sqrt{\frac{2h}{g}} \left( \frac{1}{\sin^2 \theta \cdot \cos^2 \theta} \right)$ |

**Based on the information provided below, answer the questions (28-29).**

A three-input AND gate is TRUE only when all the inputs to it are TRUE.

In the given logic circuit, the intermediate output is  $Y_1$  and the final output is  $Y$ .



**28** The final output  $Y$ , when  $C = 1$ , is:

|            |                |
|------------|----------------|
| 1. $A$     | 2. $A \cdot B$ |
| 3. $A + B$ | 4. $0$         |

**29** When  $A = B = 1$ , the output  $Y$  equals:

|    |     |    |           |
|----|-----|----|-----------|
| 1. | $C$ | 2. | $\bar{C}$ |
| 3. | 0   | 4. | 1         |

**30** A flat coil carrying a current has a magnetic moment  $\vec{\mu}$ .

It is placed in a magnetic field  $\vec{B}$ , and the torque acting on the coil is  $\vec{\tau}$ . Consider the following statements:

|     |                                                                   |
|-----|-------------------------------------------------------------------|
| (A) | $\vec{\tau} = \vec{\mu} \times \vec{B}$                           |
| (B) | $\vec{\tau} = \vec{B} \times \vec{\mu}$                           |
| (C) | $ \vec{\tau}  = \vec{\mu} \cdot \vec{B}$                          |
| (D) | $\vec{\tau}$ is perpendicular to both $\vec{\mu}$ and $\vec{B}$ . |

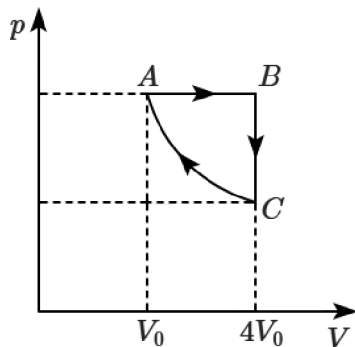
Choose the correct option from the options given below:

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

**31** 1 mole of an equimolar mixture of hydrogen and helium gas is taken through the processes  $AB$ ,  $BC$  &  $CA$ :

|       |                                                          |
|-------|----------------------------------------------------------|
| (i)   | process $AB$ – Isobaric expansion quadrupling the volume |
| (ii)  | process $BC$ – Isochoric cooling                         |
| (iii) | process $CA$ – Adiabatic compression                     |

The temperature of the gas mixture (consider ideal) is  $T_0$  at the point  $C$ .



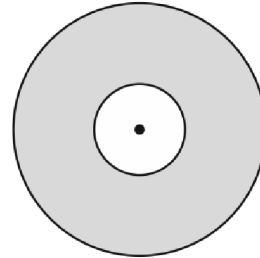
The work done by the gas in the process  $AB$  equals:

|    |          |    |          |
|----|----------|----|----------|
| 1. | $6RT_0$  | 2. | $12RT_0$ |
| 3. | $18RT_0$ | 4. | $24RT_0$ |

**32** A charge of  $5 \times 10^{-8}$  C is located at a point 10 cm away from point  $P$ , creating an electric potential of  $4.5 \times 10^4$  V at  $P$ . What is the work done in bringing a charge of  $6 \mu\text{C}$  from infinity to point  $P$ ?

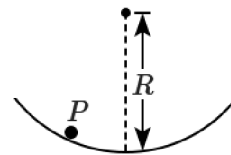
1.  $2.7 \times 10^{-2}$  J
2. 0.27 J
3.  $27 \times 10^4$  J
4. 0.0027 J

**33** A perfectly diamagnetic sphere contains a small spherical cavity at its centre, which is filled with a paramagnetic substance. The entire system is placed in a uniform external magnetic field  $\vec{B}$ . What is the magnetic field inside the paramagnetic substance?



|    |                                                                  |
|----|------------------------------------------------------------------|
| 1. | 0                                                                |
| 2. | Equal to $\vec{B}$                                               |
| 3. | Much greater than $B$ and in the same direction as $\vec{B}$     |
| 4. | Much greater than $B$ and in the opposite direction to $\vec{B}$ |

**34** A small particle  $P$  makes oscillations at the bottom of a spherically shaped smooth glass bowl of radius  $R$ . The time period of small oscillations is:



|    |                           |    |                            |
|----|---------------------------|----|----------------------------|
| 1. | $2\pi\sqrt{\frac{R}{g}}$  | 2. | $2\pi\sqrt{\frac{R}{2g}}$  |
| 3. | $2\pi\sqrt{\frac{2R}{g}}$ | 4. | $2\pi\sqrt{\frac{2R}{5g}}$ |

**35** A harmonic wave is represented by the equation:

$$y = A \sin \left[ 314 \left( \frac{t}{0.5 \text{ s}} - \frac{x}{100 \text{ m}} \right) \right]$$

Based on this expression, identify the correct values of the physical quantities associated with the wave, namely the frequency  $n$  and the wavelength  $\lambda$ .

- (A)  $n = 2$  Hz  
 (B)  $n = 100$  Hz  
 (C)  $\lambda = 2$  m  
 (D)  $\lambda = 100$  m Choose the correct option from the given ones:

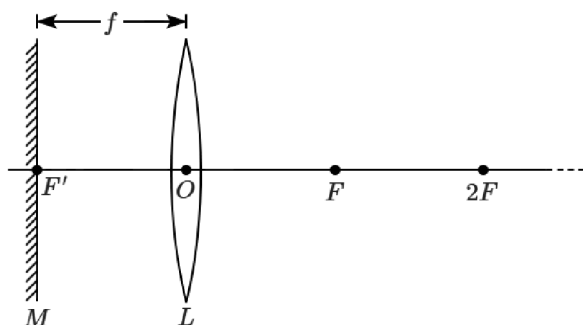
|    |                       |
|----|-----------------------|
| 1. | (A), (B) and (C) only |
| 2. | (A) and (B) only      |
| 3. | (B) and (C) only      |
| 4. | (B), (C) and (D) only |

- 36** A shell of mass  $m$  is projected with a velocity  $u$ , at an angle  $\theta$  with the horizontal. The work done by gravity on the projectile, till it reaches maximum height, has the value:



|    |                                  |    |                                                                                |
|----|----------------------------------|----|--------------------------------------------------------------------------------|
| 1. | $-\frac{1}{2}mu^2$               | 2. | $-\frac{1}{2}mu^2 \sin^2 \theta$                                               |
| 3. | $-\frac{1}{2}mu^2 \cos^2 \theta$ | 4. | $-\frac{1}{2}mu^2 \left( \frac{1}{\sin^2 \theta \times \cos^2 \theta} \right)$ |

- 37** A plane mirror is placed at the focus of a thin convex lens: the principal axis of the lens being normal to the mirror. A point object is placed at different locations on the principal axis ( $F$ ,  $2F$ , infinity, etc) as mentioned in **Column-I** & the corresponding final image location is given in **Column-II**. Match these.



| Column-I |                           | Column-II |                         |
|----------|---------------------------|-----------|-------------------------|
| (A)      | Object at $F$             | (I)       | Image between $F$ & $O$ |
| (B)      | Object at $2F$            | (II)      | Image at infinity       |
| (C)      | Object at infinity        | (III)     | Image at $O$            |
| (D)      | Object between $F$ & $2F$ | (IV)      | Image at $F$            |

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

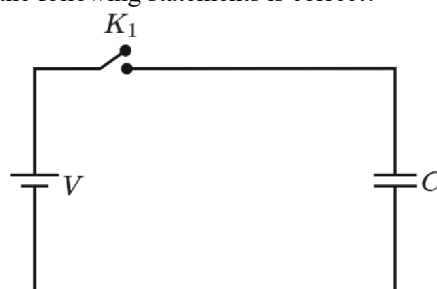
- 38** A circular coil with 1000 turns, each having an area of  $1 \text{ m}^2$ , is rotated about its vertical diameter at a rate of one revolution per second in a uniform horizontal magnetic field of  $0.07 \text{ T}$ . What is the maximum induced voltage generated in the coil?

1. 220 V
2. 330 V
3. 440 V
4. 550 V

- 39** Let  $R$  be the radius of the Earth. What is the general expression for the loss of gravitational potential energy of a body of mass  $m$  falling from a height  $h$  to the Earth's surface?

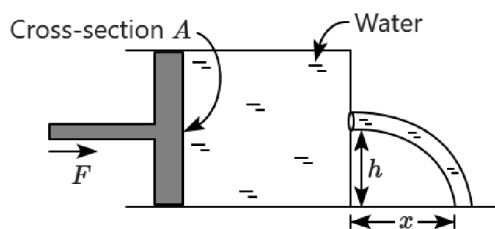
|    |                            |    |                            |
|----|----------------------------|----|----------------------------|
| 1. | $mgh$                      | 2. | $mgh \frac{R}{R+h}$        |
| 3. | $mgh \sqrt{\frac{R+h}{R}}$ | 4. | $mgh \sqrt{\frac{R}{R+h}}$ |

- 40** A capacitor  $C$  is connected to a battery of EMF  $V$  through a key  $K_1$ . The capacitor is first charged by closing  $K_1$ . The key is then opened, and a dielectric slab of dielectric constant  $K$  is inserted between the plates of the capacitor. Which of the following statements is correct?



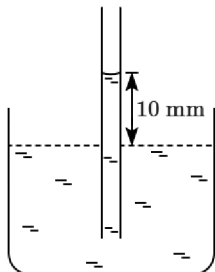
|    |                                         |
|----|-----------------------------------------|
| 1. | The potential across $C$ will increase. |
| 2. | The charge on $C$ will increase.        |
| 3. | The potential across $C$ will decrease. |
| 4. | The charge on $C$ will decrease.        |

- 41** A liquid of density  $\rho$  is forced out through a small hole by means of a piston of cross-section 'A', on which a force  $F$  is applied. The flow is streamline. The liquid stream strikes the ground at a distance ' $x$ ' in front of the hole. The hole is in the middle of the right face and its height is ' $h$ ' above the ground. The expression for  $x^2$  is:



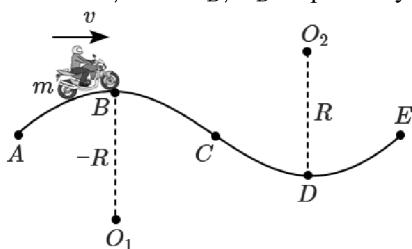
|    |                       |    |                       |
|----|-----------------------|----|-----------------------|
| 1. | $\frac{4Fh}{A\rho g}$ | 2. | $\frac{2Fh}{A\rho g}$ |
| 3. | $\frac{Fh}{A\rho g}$  | 4. | $\frac{Fh}{2A\rho g}$ |

- 42** A glass capillary tube (of bore radius  $r$ ) is inserted vertically into water, and water level within the tube is 10 mm above the level outside, far from the tube. If the tube is inclined by  $60^\circ$  with respect to the vertical, the water column within the tube will have a length of:



|    |       |    |                 |
|----|-------|----|-----------------|
| 1. | 10 mm | 2. | 20 mm           |
| 3. | 5 mm  | 4. | $10\sqrt{3}$ mm |

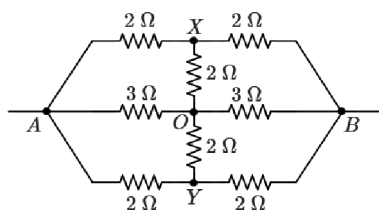
- 43** A motorcyclist drives on a road  $ABCDE$ , where the initial part is curved 'upward' ( $O_1B = R$ ) and the final part is curved 'downward' ( $O_2D = R$ ). The total mass (man + motorcycle) is  $m$ , and man's speed  $v$  is constant. Let the normal reactions at  $B, D$  be  $N_B, N_D$  respectively.



Then:

|    |                                                            |    |                                                            |
|----|------------------------------------------------------------|----|------------------------------------------------------------|
| 1. | $N_B = mg + \frac{mv^2}{R}$<br>$N_D = mg - \frac{mv^2}{R}$ | 2. | $N_B = mg - \frac{mv^2}{R}$<br>$N_D = mg + \frac{mv^2}{R}$ |
| 3. | $N_B = mg + \frac{mv^2}{R}$<br>$N_D = \frac{mv^2}{R} - mg$ | 4. | $N_B = \frac{mv^2}{R} - mg$<br>$N_D = \frac{mv^2}{R} + mg$ |

- 44** The resistance of the network between  $A$  &  $B$  equals:



|    |                      |    |                       |
|----|----------------------|----|-----------------------|
| 1. | $7 \Omega$           | 2. | $\frac{12}{7} \Omega$ |
| 3. | $\frac{3}{2} \Omega$ | 4. | $\frac{2}{3} \Omega$  |

- 45** A particle moves so that its position is given by:

$$\vec{r} = (\cos t)\hat{i} + (\sin t)\hat{j},$$

where  $t$  is the time. All quantities are in SI. The mass of the particle is 1 kg. The kinetic energy of the particle is:

|    |       |    |         |
|----|-------|----|---------|
| 1. | 0.5 J | 2. | 0.25 J  |
| 3. | 0.2 J | 4. | 0.125 J |

## CHEMISTRY

- 46** Which haloarene is the most reactive towards aromatic nucleophilic substitution?

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

- 47** An aromatic compound (A) with molecular formula  $C_7H_6NO_2Cl_2$ , on reduction with  $Sn/HCl$  gives (B). Compound (B) reacts with  $NaNO_2/HCl$  to give (C). (B) does not form an azo dye with  $\beta$ -naphthol. However, (C) gives a red colour with ceric ammonium nitrate (CAN test). Oxidation of (C) gives an acid (D). Decarboxylation of (D) gives (E), which forms only a single mononitro derivative (F) on nitration. Oxidation of (D) followed by decarboxylation gives (E), and nitration of (E) gives only one mononitro product (F). Identify the correct IUPAC name of (F) from the following options:

- 1,2-dichloro-4-nitrobenzene
- 1,3-dichloro-2-nitrobenzene
- 1,4-dichloro-2-nitrobenzene
- 1,3-dichloro-5-nitrobenzene

- 48** In the estimation of sulphur by the Carius method, 0.468 g of an organic sulphur compound afforded 0.668 g of barium sulphate. The percentage of sulphur in the given compound is:

|    |         |    |         |
|----|---------|----|---------|
| 1. | 19.59 % | 2. | 25.46 % |
| 3. | 09.25 % | 4. | 27.59 % |

**49** The intermolecular forces between benzene molecules are approximately equal in strength to those between toluene molecules. For a benzene + toluene mixture, identify the incorrect statements.

|     |                                                  |
|-----|--------------------------------------------------|
| (a) | $\Delta H_{\text{mix}} = \text{Zero}$            |
| (b) | $\Delta V_{\text{mix}} = \text{Zero}$            |
| (c) | The mixture forms a minimum-boiling azeotrope    |
| (d) | The mixture does not behave as an ideal solution |

Which option lists the incorrect statements?

|    |                |    |                |
|----|----------------|----|----------------|
| 1. | <b>a and b</b> | 2. | <b>b and c</b> |
| 3. | <b>c and d</b> | 4. | <b>a and d</b> |

**50** Which of the following is an essential amino acid?

- Valine
- Alanine
- Serine
- All of the above

**51** Which of the following statements are true?

|       |                                                                                                          |
|-------|----------------------------------------------------------------------------------------------------------|
| (i)   | The chromate ion is square planar.                                                                       |
| (ii)  | The green manganate ion is diamagnetic.                                                                  |
| (iii) | Dichromate can be prepared using chromate.                                                               |
| (iv)  | Dark green $\text{KMnO}_4$ disproportionates in acidic and neutral mediums.                              |
| (v)   | For d-block elements, ionic character decreases for increasing oxidation numbers of the metal in oxides. |

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

**52** In which of the following reactions does hydrogen peroxide act as an oxidizing agent?

- $\text{HOCl} + \text{H}_2\text{O}_2 \rightarrow \text{H}_3\text{O}^+ + \text{Cl}^- + \text{O}_2$
- $\text{I}_2 + \text{H}_2\text{O}_2 + 2\text{OH}^- \rightarrow 2\text{I}^- + 2\text{H}_2\text{O} + \text{O}_2$
- $2\text{MnO}_4^- + 3\text{H}_2\text{O}_2 \rightarrow 2\text{MnO}_2 + 3\text{O}_2 + 2\text{H}_2\text{O} + 2\text{OH}^-$
- $\text{PbS} + 4\text{H}_2\text{O}_2 \rightarrow \text{PbSO}_4 + 4\text{H}_2\text{O}$

**53** How many positional isomers are possible for dihalogen derivatives of propane?

|    |           |    |          |
|----|-----------|----|----------|
| 1. | Five (5)  | 2. | Two (2)  |
| 3. | Three (3) | 4. | Four (4) |

**54** Which of the following statements related to the modern periodic table is incorrect?

|    |                                                                                                                                                              |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | The p-block has 6 columns, because a maximum of 6 electrons can occupy all the orbitals in a p-shell.                                                        |
| 2. | The d-block has 8 columns, because a maximum of 8 electrons can occupy all the orbitals in a d-subshell.                                                     |
| 3. | Each block contains a number of columns equal to the number of electrons that can occupy that subshell.                                                      |
| 4. | The block indicates the value of the azimuthal quantum number (l) for the last subshell that received electrons in building up the electronic configuration. |

**55** Among the following sequences, the sequences that contain atomic numbers of only representative elements are:

|     |                   |     |               |
|-----|-------------------|-----|---------------|
| (a) | 3, 33, 53, 87     | (b) | 2, 10, 22, 36 |
| (c) | 7, 17, 25, 37, 48 | (d) | 9, 35, 51, 88 |

Choose the correct option:

- (a), (d)
- (b), (c)
- (c), (d)
- (b), (d)

**56** Match the types of organic reactions in **List-I** with the corresponding phenomenon in **List-II**:

|     | <b>List-I (Type of reaction)</b> |       | <b>List-II (Phenomenon)</b>   |
|-----|----------------------------------|-------|-------------------------------|
| (a) | $\text{SN}^2$                    | (i)   | Walden inversion              |
| (b) | $\text{SN}^1$                    | (ii)  | Carbanion intermediate        |
| (c) | $\text{E}_2$                     | (iii) | Anti-periplanar configuration |
|     |                                  | (iv)  | Carbocation intermediate      |

|    | a  | b  | c   |
|----|----|----|-----|
| 1. | i  | iv | iii |
| 2. | i  | ii | iii |
| 3. | iv | ii | i   |
| 4. | ii | iv | i   |

**57** The electrical conductivity of mercury at  $0^\circ\text{C}$  is  $1.07 \times 10^6 \text{ S m}^{-1}$ . If the resistance of a conductivity cell filled with mercury is  $0.243 \Omega$ , and the cell constant of the cell is expressed in the form of  $x \times 10^4 \text{ m}^{-1}$ , the value of x is:

- 26
- 2.6
- 48
- 4.8

**58** Which of the following compounds is the weakest Bronsted base?

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

**59** Calculate the molecular weight of a substance whose 7.0% by mass solution in water freezes at  $-0.93^{\circ}\text{C}$ :  
[Given: Cryoscopic constant of water =  $1.86^{\circ}\text{C kg mol}^{-1}$ ]

1.  $140 \text{ g mol}^{-1}$
2.  $150.5 \text{ g mol}^{-1}$
3.  $160 \text{ g mol}^{-1}$
4.  $155 \text{ g mol}^{-1}$

**60** An alkane with the molecular formula  $\text{C}_5\text{H}_{12}$  (A), on chlorination at  $300^{\circ}\text{C}$ , yields a mixture of four different monochlorinated derivatives: (B), (C), (D), and (E). Two of these derivatives give the same alkene (F). The oxidation of (F) with hot alkaline  $\text{KMnO}_4$  followed by acidification results in two distinct organic products, (G) and (H).

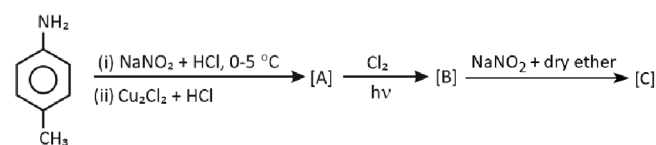
The product (H) is:

1. Propanoic acid
2. Ethanoic acid
3. Methanoic acid
4. Butanoic acid

**61** Two half-cells of electrode potential of  $E_1$  and  $E_2$  are combined to form a cell of electrode potential  $E_3$ , and  $n_1, n_2$  and  $n_3$  are the number of electrons exchanged in the first, second, and combined half-cells, respectively. Which, among the given formulae, is correctly framed?

|    |                                         |
|----|-----------------------------------------|
| 1. | $E_3 = E_2 - E_1$                       |
| 2. | $E_3 = \frac{E_1 n_1 + E_2 n_2}{n_3}$   |
| 3. | $E_3 = \frac{E_1 n_1 - E_2 n_2}{n_3^2}$ |
| 4. | $E_3 = E_1 + E_2$                       |

**62** In the following reaction sequence, major product [C] is:



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

**63** The rate constant of a reaction increases by 5% when the temperature is increased from  $27^{\circ}\text{C}$  to  $28^{\circ}\text{C}$ . The energy of activation for the reaction is:

1.  $36.6 \text{ kJ mol}^{-1}$
2.  $46.6 \text{ kJ mol}^{-1}$
3.  $16.6 \text{ kJ mol}^{-1}$
4.  $26.6 \text{ kJ mol}^{-1}$

**64** How many of the following molecules have all of their atoms in the same plane?  
 $\text{CH}_2\text{CH}_2, \text{F}_2\text{O}, \text{HCHO}, \text{NH}_3, \text{CO}_2, \text{BeCl}_2, \text{H}_2\text{O}_2$

1. Two (2)
2. Four (4)
3. Five (5)
4. Six (6)

**65** Why is the concentration of a pure solid or a pure liquid not included in the equilibrium constant expression?

|    |                                                                           |
|----|---------------------------------------------------------------------------|
| 1. | Solid and liquid concentrations are independent of their quantities.      |
| 2. | Solids and liquids react slowly.                                          |
| 3. | Solids and liquids at equilibrium do not interact with the gaseous phase. |
| 4. | The molecules of solids and liquids cannot migrate to the gaseous phase.  |

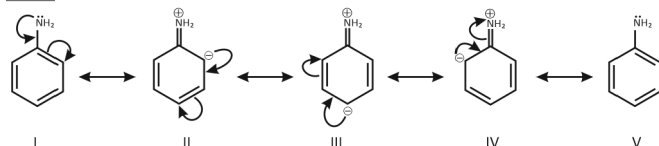
Contd...

**75** What is the increasing order of the following compounds towards  $HCN$  addition?

|       |  |      |  |
|-------|--|------|--|
| (i)   |  | (ii) |  |
| (iii) |  | (iv) |  |

- (i) < (iii) < (iv) < (ii)
- (iii) < (iv) < (i) < (ii)
- (iii) < (i) < (iv) < (ii)
- (iii) < (iv) < (ii) < (i)

**76** Resonance structures of aniline are shown below:



Considering the above structures, it can be concluded that

|    |                                                                              |
|----|------------------------------------------------------------------------------|
| 1. | 60% of the molecules of aniline exist as structures II, III, and IV.         |
| 2. | In aniline, the N-atom carries one unit of positive charge.                  |
| 3. | Aniline has a dipole moment with the N-atom as the positive end.             |
| 4. | The meta position of aniline is electron-deficient in comparison to benzene. |

**77** An organic compound (A) gives a positive Liebermann's nitroso reaction (also called Liebermann reaction) and on treatment with  $CHCl_3/KOH$  followed by hydrolysis gives compounds (B) and (C).

Compound (B) gives a colour with Schiff's reagent but (C) does not. (C) is also steam volatile. Compound (C) on treatment with  $LiAlH_4$  gives (D), which has the molecular formula  $C_7H_8O_2$ . Compound (D) on oxidation gives (E). Compound (E) reacts with  $(CH_3CO)_2O/CH_3COOH$  to give a pain reliever (F).

What is the name of the compound (D)?

- Benzyl alcohol
- o-Hydroxybenzyl alcohol
- p-Hydroxybenzyl alcohol
- Salicyl alcohol

**78** If the difference between the bond orders of  $CO$  and  $NO^+$  is  $\frac{x}{2}$ , then the value of  $x$  is:

|    |     |    |     |
|----|-----|----|-----|
| 1. | 0   | 2. | 2   |
| 3. | 0.5 | 4. | 1.5 |

**79** Which of the following compounds can show metamerism?

- $CH_3 - O - C_2H_5$
- $CH_3 - O - CH_3$
- $CH_3 - CO - C_2H_5$
- $C_2H_5 - S - C_2H_5$

**80** Given below are two statements:

|                       |                                                           |
|-----------------------|-----------------------------------------------------------|
| <b>Assertion (A):</b> | $CCl_4$ does not give a white precipitate with $AgNO_3$ . |
| <b>Reason (R):</b>    | $CCl_4$ is a covalent compound.                           |

- Both (A) and (R) are True and (R) is the correct explanation of (A).
- Both (A) and (R) are True but (R) is not the correct explanation of (A).
- (A) is True, but (R) is False.
- Both (A) and (R) are False.

**81** Consider the following statements about group 13 elements of the periodic table:

- Electronegativity decreases down the group.
- Size increases down the group.
- Ionization energy decreases down the group.
- Boiling point of Boron is maximum.
- Melting point of Boron is maximum.

Choose the correct option:

- A, B, C are correct
- A, D, E are correct
- D, and E are correct
- A, B, D, and E are correct

**82** Which element is expected to have the greatest polarizability?

- Fe
- Ca
- Na
- S

**83** Which of the following statements is incorrect?

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | $PH_3$ shows lower proton affinity than $NH_3$ .                   |
| 2. | $PF_3$ exists but $NF_5$ does not.                                 |
| 3. | $NO_2$ can dimerise easily.                                        |
| 4. | $SO_2$ can act as an oxidizing agent, but not as a reducing agent. |

**84** 100 g of a 98% (by mass) solution of  $H_2SO_4$  is mixed with 100 g of a 49% (by mass) solution of  $H_2SO_4$ . The mole fraction of  $H_2SO_4$  in the resulting solution is:

|    |      |    |      |
|----|------|----|------|
| 1. | 0.9  | 2. | 0.1  |
| 3. | 0.67 | 4. | 0.33 |

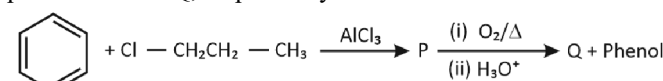
**85** One mole of an ideal gas changes its state from A (2.0 atm, 3.0 L) to B (2.0 atm, 7.0 L). During this process, the change in internal energy ( $\Delta U$ ) = 30 L-atm. The change in enthalpy ( $\Delta H$ ) for the process (in L-atm) is:

|    |    |    |                   |
|----|----|----|-------------------|
| 1. | 22 | 2. | 38                |
| 3. | 25 | 4. | None of the above |

**86** For the reaction,  $CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$ , the equilibrium constant at 500 K is 10.5. If at equilibrium, the concentrations of  $CO$  and  $H_2$  are 0.250 M and 0.120 M, respectively, determine the equilibrium concentration of  $CH_3OH$ :

1. 0.0378 M
2. 0.0435 M
3. 0.546 M
4. 0.0499 M

**87** Consider the given reaction scheme and determine the products P and Q, respectively:



|    |                   |    |                   |
|----|-------------------|----|-------------------|
| 1. | and $CH_3CH_2CHO$ | 2. | and $CH_3COCH_3$  |
| 3. | and $CH_3COCH_3$  | 4. | and $CH_3CH_2CHO$ |

**88** The concentration of each anion  $Br^-$ ,  $Cl^-$ ,  $CO_3^{2-}$ ,  $AsO_4^{3-}$  is maintained at 0.1 M. Based on their respective solubility product constants ( $K_{sp}$ ), determine which silver salt will require the minimum concentration of  $Ag^+$  ions to start precipitating from the solution:

1.  $AgBr$  ( $K_{sp} = 5 \times 10^{-13}$ )
2.  $AgCl$  ( $K_{sp} = 1.8 \times 10^{-10}$ )
3.  $Ag_2CO_3$  ( $K_{sp} = 8.1 \times 10^{-12}$ )
4.  $Ag_3AsO_4$  ( $K_{sp} = 1 \times 10^{-22}$ )

**89** Which of the following statements is correct?

|    |                                                               |
|----|---------------------------------------------------------------|
| 1. | Enamine acts as both a nucleophile as well as an electrophile |
| 2. | Enamine has two nucleophilic centers                          |
| 3. | Enamine has single nucleophilic center                        |
| 4. | Enamine can't be acylated                                     |

**90** Consider the following statements:

|     |                                                                                                                                                  |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) | Crystal field theory (CFT) considers the metal-ligand bond to be covalent, arising purely from overlapping between the metal ion and the ligand. |
| (b) | Octacarbonyldicobalt (0) has a Co-Co bond.                                                                                                       |
| (c) | Ruby is an aluminium oxide ( $Al_2O_3$ ) containing about 0.5–1% $Zn^{2+}$ ions.                                                                 |

The correct statement(s) is/are:

1. (a) and (b) only
2. (b) and (c) only
3. (c) only
4. (b) only

## BIOLOGY

**91** According to Oparin and Haldane, which gases were present in significant amounts in the primeval Earth's atmosphere at the time of the origin of life?

- A:** Oxygen  
**B:** Ammonia  
**C:** Methane  
**D:** Hydrogen sulphide  
**E:** Hydrogen

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

**92** The intrinsic rate of natural increase (r) of a population is defined as:

|    |                                                                      |
|----|----------------------------------------------------------------------|
| 1. | The maximum population size that can be sustained indefinitely       |
| 2. | The difference between natality and mortality under ideal conditions |
| 3. | The rate of increase in population size due to immigration alone     |
| 4. | The proportion of reproductive individuals in a population           |

**93** Match List-I with List-II.

|    | List-I<br>[Type of joint] |      | List-II<br>[Example]             |
|----|---------------------------|------|----------------------------------|
| A. | Fibrous                   | I.   | Between adjacent vertebrae       |
| B. | Cartilaginous             | II.  | Between atlas and axis vertebrae |
| C. | Gliding synovial          | III. | Between carpal bones             |
| D. | Pivot synovial            | IV.  | Sutures in skull                 |

Choose the correct answer from the options given below:

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

**94** From the statements given below, choose the correct option:

|           |                                                                                                                     |
|-----------|---------------------------------------------------------------------------------------------------------------------|
| <b>A.</b> | Gross primary productivity is the available biomass for the consumption of autotrophs, herbivores, and decomposers. |
| <b>B.</b> | Decomposition is largely an oxygen-requiring process.                                                               |
| <b>C.</b> | Being colloidal in nature, humus is highly susceptible to microbial action and undergoes rapid decomposition.       |
| <b>D.</b> | Each trophic level has a certain mass of living material at a particular time, called the standing crop.            |
| <b>E.</b> | In most ecosystems, all the pyramids of number, of energy, and of biomass are upright.                              |

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

**95** What type of proteins are the histones?

|    |                                                                            |
|----|----------------------------------------------------------------------------|
| 1. | Positively charged acidic proteins rich in glutamic acid and aspartic acid |
| 2. | Negatively charged acidic proteins rich in glutamic acid and aspartic acid |
| 3. | Positively charged basic proteins rich in lysine and arginine              |
| 4. | Negatively charged basic proteins rich in lysine and arginine              |

**96** Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

|                       |                                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | The repression of <i>lac</i> operon by repressor is referred to as negative regulation.             |
| <b>Reason (R):</b>    | The inducer of the <i>lac</i> operon removes the repressor from the operator to turn the operon on. |

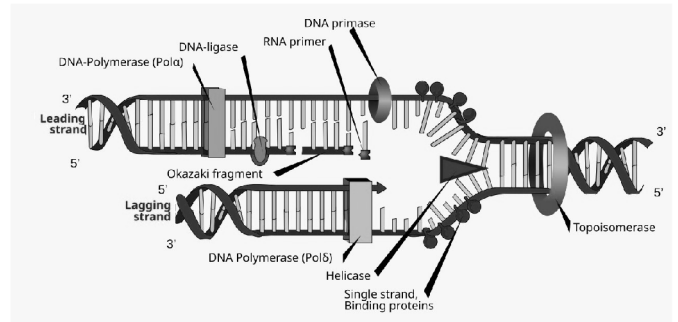
In the light of the above statements, choose the correct answer from the options given below:

|    |                                                                          |
|----|--------------------------------------------------------------------------|
| 1. | Both (A) and (R) are True and (R) is the correct explanation of (A).     |
| 2. | Both (A) and (R) are True but (R) is NOT the correct explanation of (A). |
| 3. | (A) is True but (R) is False.                                            |
| 4. | (A) is False but (R) is True.                                            |

**97** In a dicotyledonous stem :

|    |                                                                                        |
|----|----------------------------------------------------------------------------------------|
| 1. | The hypodermis is sclerenchymatous.                                                    |
| 2. | The vascular bundles are conjoined and closed.                                         |
| 3. | The endodermis is also referred to as the starch sheath.                               |
| 4. | The pericycle is present on the outer side of the endodermis as patches of parenchyma. |

**98** Observe the given figure showing the process of DNA replication and identify the parts that are not correctly labelled:



1. RNA primer and DNA ligase
2. Leading Strand and Lagging Strand
3. Okazaki Fragment and RNA Primer
4. Helicase and Okazaki Fragment

**99** Which gastrointestinal hormone acts on the exocrine pancreas and stimulates secretion of water and bicarbonate ions?

|                               |                    |
|-------------------------------|--------------------|
| 1. Secretin                   | 2. Cholecystokinin |
| 3. Gastric inhibitory peptide | 4. Gastrin         |

**100** In order to initiate the process of transcription, the prokaryotic RNA polymerase associates transiently with:

|                |                 |
|----------------|-----------------|
| 1. Rho factor  | 2. Theta factor |
| 3. Beta factor | 4. Sigma factor |

**101** "A system changes over time, but at each step, the outcome is not fixed — it can go in more than one direction, each with a certain chance. Even with full knowledge of the present, the future cannot be predicted with absolute certainty."

The type of process described above is called a:

1. Deterministic process
2. Periodic Process
3. Static process
4. Stochastic process

**102** Identify the incorrect statement.

|    |                                     |
|----|-------------------------------------|
| 1. | Morphine is an analgesic.           |
| 2. | Cocaine is a CNS stimulant.         |
| 3. | Datura is hallucinogenic.           |
| 4. | Atropine is a very potent sedative. |

# NEETbeforeNEET

**103** We should conserve biodiversity as it plays a major role in many ecosystem services that nature provides. This type of argument in favour of conserving biodiversity is called :

|    |                               |
|----|-------------------------------|
| 1. | Narrowly Utilitarian Argument |
| 2. | Broadly utilitarian argument  |
| 3. | Ethical Argument              |
| 4. | Legal and Social Argument     |

**104** Mono-adelphous condition, where the stamens are united into one bunch or one bundle, is seen in:

|    |            |    |         |
|----|------------|----|---------|
| 1. | China rose | 2. | Pea     |
| 3. | Citrus     | 4. | Mustard |

**105** Which of the following scientists is credited with developing a method to determine the amino acid sequence in proteins, and a method for sequencing DNA fragments that was later used in the Human Genome Project?

|    |                    |
|----|--------------------|
| 1. | Linus Pauling      |
| 2. | Frederick Sanger   |
| 3. | Paul Berg          |
| 4. | Marshall Nirenberg |

**106** Given below are two statements:

|                      |                                                                                    |
|----------------------|------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | Formation of interfascicular cambium in plants is an example of redifferentiation. |
| <b>Statement II:</b> | Formation of a tracheary element in plants is an example of differentiation.       |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**107** Which of the following best describes adaptive radiation?

|    |                                                                                                      |
|----|------------------------------------------------------------------------------------------------------|
| 1. | Evolution of unrelated species occupying similar ecological niches in different geographical regions |
| 2. | Evolution of different species from a common ancestor, each adapted to different ecological niches   |
| 3. | Gradual evolution of a single species without diversification into new forms                         |
| 4. | Evolution of similar traits in closely related species due to shared ancestry                        |

**108** Identify the correct statement regarding the hormone Angiotensin-II:

|    |                                                                                           |
|----|-------------------------------------------------------------------------------------------|
| 1. | It is secreted as an inactive precursor by the juxtaglomerular cells in the human kidney. |
| 2. | It is a very strong vasodilator.                                                          |
| 3. | It activates the adrenal cortex to release aldosterone.                                   |
| 4. | It makes the collecting duct permeable to water and urea.                                 |

**109** In oocytes of certain vertebrates, which of the following stages of meiosis I (prophase I) can last for months or years?

|    |           |    |            |
|----|-----------|----|------------|
| 1. | Diploene  | 2. | Diakinesis |
| 3. | Pachytene | 4. | Zygotene   |

**110** A woman who is a carrier for a genetic disorder marries an unaffected man. Some of their sons are affected by the disorder, while all daughters are either normal or carriers. Which of the following inheritance patterns best explains this observation?

|    |                                 |
|----|---------------------------------|
| 1. | Autosomal dominant inheritance  |
| 2. | Autosomal recessive inheritance |
| 3. | X-linked dominant inheritance   |
| 4. | X-linked recessive inheritance  |

**111** Match **List-I** with **List-II**.

|    | <b>List-I</b><br>[Biocontrol agent] |      | <b>List-II</b><br>[Effective against] |
|----|-------------------------------------|------|---------------------------------------|
| A. | Ladybird                            | I.   | Aphids                                |
| B. | Dragon fly                          | II.  | Prickly pear cactus                   |
| C. | Bacillus thuringiensis              | III. | Mosquitoes                            |
| D. | A moth                              | IV.  | Butterfly caterpillars                |

Choose the correct answer from the options given below:

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

**112** Which of the following white blood cells are the major phagocytes in our body?

|    |                                 |
|----|---------------------------------|
| 1. | T lymphocytes and B lymphocytes |
| 2. | Basophils and Eosinophils       |
| 3. | Neutrophils and Monocytes       |
| 4. | NK Cells and Macrophages        |

**113** Which complex of the mitochondrial electron transport system consists of cytochromes a and a<sub>3</sub> and two copper centres?

|    |             |    |            |
|----|-------------|----|------------|
| 1. | Complex I   | 2. | Complex II |
| 3. | Complex III | 4. | Complex IV |

## 114 Match List-I with List-II.

|    | List-I [Type of tissue]            |      | List-II [Location]         |
|----|------------------------------------|------|----------------------------|
| A. | Cuboidal brush bordered epithelium | I.   | Skin                       |
| B. | Ciliated epithelium                | II.  | Proximal convoluted tubule |
| C. | Dense regular connective tissue    | III. | Fallopian tubes            |
| D. | Dense irregular connective tissue  | IV.  | Tendon                     |

Choose the correct answer from the options given below:

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

## 115 Identify the correct statements regarding the protists:

|    |                                                                                                                                         |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|
| A: | Diatoms are the chief producers in the oceans.                                                                                          |
| B: | Rapid multiplication of dinoflagellates like Gonyaulax can make the sea appear red.                                                     |
| C: | Almost all euglenoids are marine organisms having pigments which are unique and entirely different from those present in higher plants. |
| D: | Under suitable conditions, slime moulds form an aggregation called plasmodium, which may grow and spread over several feet.             |
| E: | All protozoa are heterotrophs.                                                                                                          |

1. Only A, B, and C are correct.
2. Only A, B, D, and E are correct.
3. Only B, C, D, and E are correct.
4. A, B, C, D, and E are correct.

## 116 Identify the correct statements regarding C<sub>4</sub> plants.

|    |                                                                                                                                                                             |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A: | They do not use the C <sub>3</sub> pathway or the Calvin cycle as the main biosynthetic pathway.                                                                            |
| B: | The bundle sheath cells in such plants are characterised by having a large number of chloroplasts, thick walls impervious to gaseous exchange, and no intracellular spaces. |
| C: | The primary carbon dioxide acceptor is a five-carbon molecule, RuBP.                                                                                                        |
| D: | The bundle sheath cells are rich in an enzyme, ribulose biphosphate carboxylase - oxygenase, but lack PEPcase.                                                              |

1. Only A and B are correct.
2. Only C and D are correct.
3. Only A and C are correct.
4. Only B and D are correct.

## 117 Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).

|                       |                                                                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | At low light intensity, increasing CO <sub>2</sub> concentration significantly increases the rate of photosynthesis in C <sub>3</sub> plants. |
| <b>Reason (R):</b>    | Atmospheric CO <sub>2</sub> concentration is a limiting factor for C <sub>3</sub> plants under optimal light conditions.                      |

In the light of the above statements, choose the correct answer from the options given below:

|    |                                                                          |
|----|--------------------------------------------------------------------------|
| 1. | Both (A) and (R) are True and (R) is the correct explanation of (A).     |
| 2. | Both (A) and (R) are True but (R) is NOT the correct explanation of (A). |
| 3. | (A) is True but (R) is False.                                            |
| 4. | (A) is False but (R) is True.                                            |

## 118 Which of the following most accurately explains the role of Bacillus thuringiensis in pest control?

|    |                                                                                                                                                           |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | It produces toxins that are directly active in the environment and kill all insects on contact irrespective of their feeding behaviour.                   |
| 2. | It produces enzymes that degrade plant cell walls, making the plant toxic to herbivorous insects.                                                         |
| 3. | It infects plants and induces systemic resistance, thereby preventing insect attack through hormonal changes.                                             |
| 4. | It produces protein crystals that, when ingested by insect larvae, are activated in the alkaline gut to release toxins that destroy gut epithelial cells. |

## 119 Identify the incorrect statement.

|    |                                                                                             |
|----|---------------------------------------------------------------------------------------------|
| 1. | In angiosperms, the ovules after fertilisation develop into seeds.                          |
| 2. | Generally monocotyledonous seeds are non-endospermic.                                       |
| 3. | The seed coat in dicotyledonous seeds has two layers: the outer testa and the inner tegmen. |
| 4. | Monocotyledonous seeds consist of one large shield-shaped cotyledon known as scutellum.     |

## 120 Which of the following components is enzymatically removed during the conversion of proinsulin into biologically active insulin in humans?

|    |                 |    |           |
|----|-----------------|----|-----------|
| 1. | Disulfide Bonds | 2. | C-peptide |
| 3. | A-peptide       | 4. | B-peptide |

# NEETbeforeNEET

**121** Which of the following is not a salient feature of the genetic code?

|    |                                                                                                             |
|----|-------------------------------------------------------------------------------------------------------------|
| 1. | The codon is a triplet and 61 codons code for amino acids and three codons do not code for any amino acids. |
| 2. | The genetic code is degenerate, meaning that some codons can code for more than one amino acid.             |
| 3. | The codon is read in mRNA in a contiguous manner and there are no punctuations.                             |
| 4. | The code is nearly universal.                                                                               |

**122** Biogas is a mixture of gases containing predominantly:

|    |                |    |                |
|----|----------------|----|----------------|
| 1. | Carbon Dioxide | 2. | Green Hydrogen |
| 3. | Ammonia        | 4. | Methane        |

**123** Given below are two statements:

|                      |                                                              |
|----------------------|--------------------------------------------------------------|
| <b>Statement I:</b>  | Lipids are not strictly macromolecules.                      |
| <b>Statement II:</b> | Lipids come under acid insoluble fraction of a typical cell. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**124** A couple has three sons. What is the probability that their next child will be a daughter?

|    |                                                                             |
|----|-----------------------------------------------------------------------------|
| 1. | 1/8, because the probability decreases with each successive son             |
| 2. | 3/4, because three sons have already been born                              |
| 3. | 1/2, because sex determination is independent of previous births            |
| 4. | 1/4, because the father can only contribute a Y chromosome after three sons |

**125** Identify the organelles present in a typical eukaryotic cell that are single membrane bound, part of the endomembrane system, and do not participate in protein synthesis or transport modification:

- A:** Endoplasmic reticulum  
**B:** Mitochondria  
**C:** Golgi apparatus  
**D:** Lysosomes  
**E:** Vacuoles

|    |                                                  |    |                                       |
|----|--------------------------------------------------|----|---------------------------------------|
| 1. | Only <b>A</b> and <b>C</b>                       | 2. | Only <b>D</b> and <b>E</b>            |
| 3. | Only <b>A</b> , <b>C</b> , <b>D</b> and <b>E</b> | 4. | Only <b>C</b> , <b>D</b> and <b>E</b> |

**126** Identify the disorders that can be classified as 'aneuploidies'?

- A:** Down's Syndrome  
**B:** Phenylketonuria  
**C:** Turner's syndrome  
**D:** Red green colour blindness  
**E:** Haemophilia

|    |                                                  |    |                                                        |
|----|--------------------------------------------------|----|--------------------------------------------------------|
| 1. | Only <b>A</b> , <b>B</b> , <b>C</b> and <b>D</b> | 2. | Only <b>A</b> and <b>C</b>                             |
| 3. | Only <b>B</b> , <b>C</b> and <b>E</b>            | 4. | <b>A</b> , <b>B</b> , <b>C</b> , <b>D</b> and <b>E</b> |

**127** Which of the following is used to treat some rare cases of emphysema?

|    |                              |
|----|------------------------------|
| 1. | Human alpha-lactalbumin      |
| 2. | Adenosine deaminase          |
| 3. | Polynucleotide phosphorylase |
| 4. | Alpha-1 Antitrypsin          |

**128** Given below are two statements:

|                      |                                                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | In an aquatic ecosystem, Grazing Food Chain (GFC) is the major conduit for energy flow.                             |
| <b>Statement II:</b> | There are no connections between the detritus food chain and the grazing food chain at any levels in any ecosystem. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**129** Identify the common human diseases that are spread by mosquito vectors?

- A:** Dengue  
**B:** Ascariasis  
**C:** Filariasis  
**D:** Amoebic dysentery  
**E:** Malaria

|    |                                       |    |                                       |
|----|---------------------------------------|----|---------------------------------------|
| 1. | <b>A</b> , <b>B</b> and <b>E</b> only | 2. | <b>B</b> , <b>C</b> and <b>D</b> only |
| 3. | <b>A</b> , <b>C</b> and <b>E</b> only | 4. | Only <b>A</b> and <b>E</b>            |

**130** Which evolutionary biologist, often called the Darwin of the 20th century, pioneered the currently accepted definition of a biological species?

|    |               |    |                |
|----|---------------|----|----------------|
| 1. | Ernst Mayr    | 2. | Norman Myers   |
| 3. | Ernst Haeckel | 4. | Norman Borlaug |

**131** Identify the correct statements.

|           |                                                                                                                                                                  |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A:</b> | Terrestrial adaptations necessitated the production of nitrogenous wastes like urea and uric acid for conservation of water as they are less toxic than ammonia. |
| <b>B:</b> | Some amount of urea may be retained in the kidney matrix of mammals to maintain a desired osmolarity.                                                            |
| <b>C:</b> | Antennal glands or green glands perform the excretory function in all arthropods.                                                                                |
| <b>D:</b> | Protonephridia are the only excretory structures which have no role in osmoregulation.                                                                           |

1. Only **A** and **B** are correct.
2. Only **C** and **D** are correct.
3. Only **A** and **C** are correct.
4. Only **A** and **D** are correct.

**132** Match **List-I** with **List-II**.

|    | <b>List-I</b>   |      | <b>List-II</b>                                        |
|----|-----------------|------|-------------------------------------------------------|
| A. | Olfactory lobes | I.   | Mid brain of frog                                     |
| B. | Optic lobes     | II.  | Ureters and oviduct open separately into cloaca       |
| C. | Male frogs      | III. | Fore brain of frog                                    |
| D. | Female frogs    | IV.  | Ureters act as urogenital duct which open into cloaca |

Choose the correct answer from the options given below:

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

**133** Given below are two statements:

|                      |                                                                                                          |
|----------------------|----------------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | Rhino viruses initially infect the nose and respiratory passage but later infect lungs in most patients. |
| <b>Statement II:</b> | Aedes mosquitoes are vectors for diseases like dengue and chikungunya.                                   |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**134** Match **List-I** with **List-II**.

|    | <b>List-I</b><br>[Human embryonic developmental milestone] |      | <b>List-II</b><br>[Foetal life timeline]               |
|----|------------------------------------------------------------|------|--------------------------------------------------------|
| A. | The foetus develops limbs and digits                       | I.   | During the fifth month                                 |
| B. | The limbs and external genital organs are well developed   | II.  | By the end of about 24 weeks                           |
| C. | The first movements of the foetus                          | III. | By the end of 12 weeks (first trimester)               |
| D. | Eye-lids separate, and eyelashes are formed                | IV.  | By the end of about 24 weeks (end of second trimester) |

Choose the correct answer from the options given below:

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

**135** Match **List-I** with **List-II**:

|    | <b>List-I</b><br>[Biological name] |      | <b>List-II</b><br>[Common name] |
|----|------------------------------------|------|---------------------------------|
| A. | <i>Adamsia</i>                     | I.   | Sea fan                         |
| B. | <i>Gorgonia</i>                    | II.  | Sea lily                        |
| C. | <i>Echinus</i>                     | III. | Sea anemone                     |
| D. | <i>Antedon</i>                     | IV.  | Sea urchin                      |

Choose the correct answer from the options given below:

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

**136** Which of the following statements are correct?

|           |                                                                                                                                                                                                  |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A:</b> | In agar gel electrophoresis, the DNA fragments separate according to their size through the sieving effect provided by the agarose gel.                                                          |
| <b>B:</b> | The DNA fragments separated by agarose gel electrophoresis can be visualised only after staining the DNA with a compound known as methylene blue, followed by exposure to ultraviolet radiation. |
| <b>C:</b> | Transformation is a procedure through which a piece of DNA is introduced into a host bacterium.                                                                                                  |
| <b>D:</b> | Agrobacterium tumefaciens is a pathogen that has the capability to infect almost all monocot plants naturally.                                                                                   |
| <b>E:</b> | Since DNA is a hydrophilic molecule, it can easily pass through cell membranes.                                                                                                                  |

|    |                            |    |                            |
|----|----------------------------|----|----------------------------|
| 1. | <b>B</b> and <b>D</b> only | 2. | <b>D</b> and <b>E</b> only |
| 3. | <b>C</b> and <b>D</b> only | 4. | <b>A</b> and <b>C</b> only |

**137** Identify the correct statement.

|    |                                      |
|----|--------------------------------------|
| 1. | All chordates are vertebrates.       |
| 2. | All Protochordates are Urochordates. |
| 3. | All mammals are viviparous.          |
| 4. | All reptiles are poikilotherms.      |

**138** Regarding the co-factors associated with enzymes:

|           |                                                                                                                                                                                                           |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A:</b> | Prosthetic groups are organic compounds and are distinguished from other cofactors in that they are tightly bound to the apoenzyme.                                                                       |
| <b>B:</b> | Co-enzymes are organic compounds and their association with the apoenzyme is only transient, usually occurring during the course of catalysis.                                                            |
| <b>C:</b> | A number of enzymes require metal ions for their activity, which form coordination bonds with side chains of the active site and at the same time form one or more coordination bonds with the substrate. |
| <b>D:</b> | Catalytic activity is lost when the co-factor is removed from the enzyme.                                                                                                                                 |

1. Only **A**, **B**, and **C** are correct.
2. Only **A**, **B**, and **D** are correct.
3. Only **B**, **C**, and **D** are correct.
4. **A**, **B**, **C**, and **D** are correct.

**139** Given below are two statements:

|                      |                                                                                          |
|----------------------|------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | Corpora quadrigemina are located on the ventral side of the mid-brain.                   |
| <b>Statement II:</b> | Cerebral hemispheres are connected by a tract of fibrous tissues called corpus callosum. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**140** Which of the following methods employed for conservation of biodiversity will come under ex-situ methods?

- A:** Zoological parks  
**B:** Wildlife safari parks  
**C:** Seed banks  
**D:** Cryopreservation of gametes  
**E:** Sacred groves

|    |                                                  |    |                                                  |
|----|--------------------------------------------------|----|--------------------------------------------------|
| 1. | Only <b>A</b> , <b>B</b> , <b>C</b> and <b>D</b> | 2. | Only <b>A</b> , <b>B</b> , <b>C</b> and <b>E</b> |
| 3. | Only <b>A</b> , <b>B</b> , <b>D</b>              | 4. | Only <b>B</b> , <b>C</b> , <b>D</b> and <b>E</b> |

**141** Given below are two statements:

|                      |                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | In addition to proteins, viruses also contain genetic material, that could be either RNA or DNA. |
| <b>Statement II:</b> | Viroids are larger than viruses and prions are smaller than viruses.                             |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**142** Arrange the following steps involved in the formation of recombinant DNA and its introduction into a host cell in the correct sequence:

|           |                                                                                                       |
|-----------|-------------------------------------------------------------------------------------------------------|
| <b>A.</b> | Formation of phosphodiester bonds between vector and foreign DNA by DNA ligase                        |
| <b>B.</b> | Generation of compatible sticky ends on vector and insert DNA using the same restriction endonuclease |
| <b>C.</b> | Introduction of recombinant DNA into a suitable host cell                                             |
| <b>D.</b> | Isolation of plasmid vector and foreign DNA fragment                                                  |

Options:

|    |               |    |               |
|----|---------------|----|---------------|
| 1. | D → A → B → C | 2. | B → D → A → C |
| 3. | D → B → A → C | 4. | B → A → D → C |

**143** The given figure shows:



1. Palmately Compound Leaf
2. Pinnately Compound Leaf
3. Alternate phyllotaxy
4. Whorled phyllotaxy

**144** Identify the correct statements regarding the process of translation in prokaryotes:

|           |                                                                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A:</b> | Charging of tRNA is also called amino acylation of tRNA.                                                                                  |
| <b>B:</b> | When the larger subunit of the ribosome encounters an mRNA, the process of translation of the mRNA to proteins begins.                    |
| <b>C:</b> | A translational unit in an mRNA is the sequence of RNA that is flanked by the start codon and the stop codon and codes for a polypeptide. |
| <b>D:</b> | The ribosome also acts as a catalyst where 23S rRNA in bacteria is the enzyme [a ribozyme] for the formation of the peptide bond.         |

|                                  |                                  |
|----------------------------------|----------------------------------|
| 1. Only <b>A, B</b> and <b>C</b> | 2. Only <b>A, C</b> and <b>D</b> |
| 3. Only <b>B, C</b> and <b>D</b> | 4. <b>A, B, C</b> and <b>D</b>   |

**145** Which plant growth regulators chemically are terpenes?

|             |                 |
|-------------|-----------------|
| 1. Auxin    | 2. Gibberellins |
| 3. Ethylene | 4. Cytokinins   |

**146** Given below are two statements:

|                      |                                                                       |
|----------------------|-----------------------------------------------------------------------|
| <b>Statement I:</b>  | Lobefins evolved into the first amphibians.                           |
| <b>Statement II:</b> | About 65 million years ago, most of the birds evolved into dinosaurs. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|                                                                       |
|-----------------------------------------------------------------------|
| 1. Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**147** Given below are two statement: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

|                       |                                                                                                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | Early detection and timely treatment of sexually transmitted infections (STIs) are essential to prevent long-term complications such as infertility, pelvic inflammatory disease, and increased risk of acquiring other infections. |
| <b>Reason (R):</b>    | All sexually transmitted infections if detected early and treated properly are completely curable.                                                                                                                                  |

In the light of the above statements, choose the correct answer from the options given below:

|                                                                                                          |
|----------------------------------------------------------------------------------------------------------|
| 1. Both <b>(A)</b> and <b>(R)</b> are True and <b>(R)</b> is the correct explanation of <b>(A)</b> .     |
| 2. Both <b>(A)</b> and <b>(R)</b> are True but <b>(R)</b> is NOT the correct explanation of <b>(A)</b> . |
| 3. <b>(A)</b> is True but <b>(R)</b> is False.                                                           |
| 4. <b>(A)</b> is False but <b>(R)</b> is True.                                                           |

**148** Given below are two statements:

|                      |                                                |
|----------------------|------------------------------------------------|
| <b>Statement I:</b>  | Monoecy prevents autogamy but not geitonogamy. |
| <b>Statement II:</b> | Dioecy prevents both autogamy and geitonogamy. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|                                                                       |
|-----------------------------------------------------------------------|
| 1. Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**149** Heterosporous plants include:

- A.** *Funaria*  
**B.** *Selaginella*  
**C.** *Pinus*  
**D.** *Eucalyptus*  
**E.** *Sequoia*

|                                  |                                     |
|----------------------------------|-------------------------------------|
| 1. Only <b>A, B</b> and <b>C</b> | 2. Only <b>B, C, D</b> and <b>E</b> |
| 3. Only <b>B, C</b> and <b>E</b> | 4. <b>A, B, C, D</b> and <b>E</b>   |

**150** In which of the following types of the chromosome is the centromere situated close to its end, forming one extremely short and one very long arm?

|                    |                |
|--------------------|----------------|
| 1. Acrocentric     | 2. Telocentric |
| 3. Sub-Metacentric | 4. Metacentric |

**151** Regarding the advantages offered by the seeds to the angiosperms:

|           |                                                                                                                                      |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>A:</b> | Seed formation is more dependable.                                                                                                   |
| <b>B:</b> | Seeds have better adaptive strategies for dispersal to new habitats and help the species to colonise other areas.                    |
| <b>C:</b> | Seeds have sufficient food reserves so that the young seedlings are nourished until they are capable of photosynthesis on their own. |
| <b>D:</b> | Being products of sexual reproduction, seeds generate new genetic combinations, leading to variations.                               |

1. Only **A, B**, and **C** are correct.  
 2. Only **B, C**, and **D** are correct.  
 3. Only **A** and **D** are correct.  
 4. **A, B, C**, and **D** are correct.

**152** Which layer in the cell envelope of a typical prokaryotic cell determines the shape of the cell and provides a strong structural support to prevent it from bursting or collapsing?

|                |                  |
|----------------|------------------|
| 1. Slime Layer | 2. Capsule       |
| 3. Cell Wall   | 4. Cell Membrane |

**153** Which of the following is not a characteristic feature of the gymnosperm *Cycas*?

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | The stems are branched.                                            |
| 2. | Coralloid roots are associated with nitrogen-fixing cyanobacteria. |
| 3. | The pinnate leaves persist for a few years.                        |
| 4. | Male cones and megasporophylls are born on different trees.        |

**154** An onion root tip cell has 16 chromosomes. How many chromosomes will this cell have after S-phase?

|    |    |    |    |
|----|----|----|----|
| 1. | 4  | 2. | 8  |
| 3. | 16 | 4. | 32 |

**155** Ethylene is one of the most commonly used PGRs in agriculture. Which of the following is not a use of this PGR?

|    |                                                    |
|----|----------------------------------------------------|
| 1. | Promotion of female flowers in cucumbers           |
| 2. | Hastening of fruit ripening in tomatoes and apples |
| 3. | Induction of parthenocarpy in tomatoes             |
| 4. | Thinning of cotton, cherry, and walnut.            |

**156** Arrange the following events of skeletal muscle contraction in the correct chronological order:

1. Release of  $\text{Ca}^{2+}$  from the sarcoplasmic reticulum
2. Formation of cross-bridges between actin and myosin
3. Binding of  $\text{Ca}^{2+}$  to troponin
4. Exposure of active sites on actin filaments
5. Hydrolysis of ATP to ADP +  $\text{P}_i$  by the myosin head

Options:

1.  $1 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 2$
2.  $1 \rightarrow 4 \rightarrow 3 \rightarrow 5 \rightarrow 2$
3.  $5 \rightarrow 1 \rightarrow 3 \rightarrow 4 \rightarrow 2$
4.  $1 \rightarrow 3 \rightarrow 5 \rightarrow 4 \rightarrow 2$

**157** Given below are two statements:

|                      |                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | Casparian strips are found in the shoots of vascular plants, specifically within the endodermis. |
| <b>Statement II:</b> | Starch sheath is another name for the endodermis in the root of dicotyledonous plants.           |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**158** The mycelium of a fungus is observed to be branched and septate. It produces asexual spores externally on specialised hyphae, while sexual spores are formed within sac-like structures arranged in fruiting bodies. This organism most likely belongs to:

1. Phycomycetes
2. Ascomycetes
3. Basidiomycetes
4. Deuteromycetes

**159** A tetraploid angiosperm ( $4n = 48$ ) undergoes double fertilization. What will be the chromosome number in each polar nucleus, the endosperm, and the embryo, respectively?

|    |            |    |            |
|----|------------|----|------------|
| 1. | 12, 36, 24 | 2. | 24, 60, 48 |
| 3. | 24, 72, 48 | 4. | 48, 72, 48 |

**160** Which of the following statement is incorrect about the characteristic features of Aves [birds]?

|    |                                                                                 |
|----|---------------------------------------------------------------------------------|
| 1. | The presence of feathers is a characteristic feature and all birds can fly.     |
| 2. | The four limbs are modified into wings.                                         |
| 3. | Endoskeleton is fully ossified and the long bones are hollow with air cavities. |
| 4. | Heart is completely four-chambered and they are warm-blooded.                   |

**161** What are the products of Krebs citric acid cycle?

- A:** Oxaloacetic acid  
**B:** CoA  
**C:** NADPH  
**D:**  $\text{CO}_2$   
**E:**  $\text{FADH}_2$

|    |                                  |    |                                  |
|----|----------------------------------|----|----------------------------------|
| 1. | Only <b>A, B, D</b> and <b>E</b> | 2. | Only <b>B, C, D</b> and <b>E</b> |
| 3. | Only <b>D</b> and <b>E</b>       | 4. | Only <b>C, D</b> and <b>E</b>    |

**162** In frogs :

|    |                                                                                              |
|----|----------------------------------------------------------------------------------------------|
| 1. | The body is divisible into head, neck, trunk, and tail.                                      |
| 2. | The fore limbs end in five digits and they are larger and more muscular than the hind limbs. |
| 3. | Gas exchange takes place through skin during aestivation and hibernation.                    |
| 4. | The ear is an organ of hearing but not an organ of balancing.                                |

**163** Match List-I with List-II.

|    | List-I<br>[Population interaction] |      | List-II<br>[Nature] |
|----|------------------------------------|------|---------------------|
| A. | Amensalism                         | I.   | - / 0               |
| B. | Commensalism                       | II.  | + / -               |
| C. | Predation                          | III. | - / -               |
| D. | Competition                        | IV.  | + / 0               |

Choose the correct answer from the options given below:

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

**164** Recombinant DNA technology has enabled the production of safer vaccines by expressing viral antigens in host organisms. The recombinant vaccine used against Hepatitis B is produced using which of the following organisms?

1. *Escherichia coli*
2. *Saccharomyces cerevisiae*
3. *Bacillus subtilis*
4. *Agrobacterium tumefaciens*

**165** Given below are two statements:

|                      |                                                                                                              |
|----------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Statement I:</b>  | ELISA is based on the principle of antigen-antibody interaction.                                             |
| <b>Statement II:</b> | Very low concentration of a bacteria or virus can be detected by amplification of their nucleic acid by PCR. |

In the light of the above statements, choose the most appropriate answer from the options given below:

|    |                                                                    |
|----|--------------------------------------------------------------------|
| 1. | Both <b>statement I</b> and <b>statement II</b> are correct        |
| 2. | Both <b>statement I</b> and <b>statement II</b> are incorrect      |
| 3. | <b>Statement I</b> is correct but <b>statement II</b> is incorrect |
| 4. | <b>Statement I</b> is incorrect but <b>statement II</b> is correct |

**166** In a mating between two people of intermediate skin colour, each heterozygous at all three gene loci for skin colour, what is the chance their child will have a very light skin?

|    |      |    |      |
|----|------|----|------|
| 1. | 1/64 | 2. | 1/4  |
| 3. | 3/4  | 4. | 9/64 |

**167** Which of the following is not an aromatic amino acid?

|    |                |    |            |
|----|----------------|----|------------|
| 1. | Phenyl alanine | 2. | Tryptophan |
| 3. | Tyrosine       | 4. | Threonine  |

**168** Acid in the stomach, saliva in the mouth, and tears from the eyes are what types of barriers in the innate immune response?

1. Physical Barriers
2. Physiological Barriers
3. Cellular Barriers
4. Cytokine Barriers

**169** Which of the following most accurately explains cryptic colouration as an adaptive feature in organisms?

|    |                                                                                                                                              |
|----|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | A protective adaptation in which an organism develops bright and contrasting colours to warn predators about its toxicity or unpalatability. |
| 2. | An adaptive feature in which an organism resembles another harmful or unpalatable species to avoid predation.                                |
| 3. | A protective mechanism in which an organism blends with its surrounding environment, making it difficult for predators or prey to detect it. |
| 4. | A behavioural adaptation in which an organism actively changes its location to avoid predators despite having conspicuous body colours.      |

**170** Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

|                       |                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | Thyroid hormones ( $T_3$ and $T_4$ ) act on their target cells by binding to intracellular receptors.    |
| <b>Reason (R):</b>    | Thyroid hormones are lipophilic and can cross the plasma membrane to reach receptors inside the nucleus. |

In the light of the above statements, choose the correct answer from the options given below:

|    |                                                                                                       |
|----|-------------------------------------------------------------------------------------------------------|
| 1. | Both <b>(A)</b> and <b>(R)</b> are True and <b>(R)</b> is the correct explanation of <b>(A)</b> .     |
| 2. | Both <b>(A)</b> and <b>(R)</b> are True but <b>(R)</b> is NOT the correct explanation of <b>(A)</b> . |
| 3. | <b>(A)</b> is True but <b>(R)</b> is False.                                                           |
| 4. | <b>(A)</b> is False but <b>(R)</b> is True.                                                           |

**171** Statins produced by the yeast *Monascus purpureus* have been commercialised as:

|    |                                                            |
|----|------------------------------------------------------------|
| 1. | Blood Cholesterol-Lowering Agents                          |
| 2. | A highly specific immunosuppressant                        |
| 3. | A clot buster used in treatment of coronary artery disease |
| 4. | A probiotic added to products like curd                    |

**172** Match List-I with List-II.

|    | List-I<br>[Mechanism of sex determination] |      | List-II<br>[Example] |
|----|--------------------------------------------|------|----------------------|
| A. | XX-XY male heterogamety                    | I.   | Humans               |
| B. | ZZ-ZW female heterogamety                  | II.  | Grasshoppers         |
| C. | XX-XO male heterogamety                    | III. | Honeybees            |
| D. | Haplodiploidy                              | IV.  | Birds                |

Choose the correct answer from the options given below:

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

**173** Match **List-I** with **List-II**.

|    | <b>List-I</b>           |      | <b>List-II</b> |
|----|-------------------------|------|----------------|
| A. | Palmately compound leaf | I.   | Guava          |
| B. | Pinnately compound leaf | II.  | Silk cotton    |
| C. | Alternate phyllotaxy    | III. | China rose     |
| D. | Opposite phyllotaxy     | IV.  | Neem           |

Choose the correct answer from the options given below:

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

**174** After three cycles of replication in the Meselson and Stahl Experiment, starting with DNA initially labeled with heavy nitrogen ( $^{15}\text{N}$ ) and then shifted to light nitrogen ( $^{14}\text{N}$ ), what percentage of daughter DNA molecules will be hybrid ( $^{15}\text{N}$ - $^{14}\text{N}$ )?

1. 50%
2. 25%
3. 12.5%
4. 0%

**175** Which of the following is an advantage of the golden rice?

|    |                                         |
|----|-----------------------------------------|
| 1. | Enhanced Tolerance to Abiotic Stresses  |
| 2. | Reduced Reliance on Chemical Pesticides |
| 3. | Increased efficiency of mineral usage   |
| 4. | Enhanced Nutritional Value of Food      |

**176** Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

|                       |                                                                                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Assertion (A):</b> | It is possible to regenerate whole plants from explants, i.e. any part of a plant can be taken out and grown in a test tube under sterile conditions in special nutrient media.                 |
| <b>Reason (R):</b>    | It is important that the nutrient medium used must provide a carbon source such as sucrose and also inorganic salts, vitamins, amino acids, and growth regulators like auxins, cytokinins, etc. |

In the light of the above statements, choose the correct answer from the options given below:

|    |                                                                          |
|----|--------------------------------------------------------------------------|
| 1. | Both (A) and (R) are True and (R) is the correct explanation of (A).     |
| 2. | Both (A) and (R) are True but (R) is NOT the correct explanation of (A). |
| 3. | (A) is True but (R) is False.                                            |
| 4. | (A) is False but (R) is True.                                            |

**177** During the follicular phase of the menstrual cycle, the endometrium of the uterus undergoes regeneration and proliferation. This change is primarily mediated by :

|    |                                    |
|----|------------------------------------|
| 1. | Progesterone                       |
| 2. | Oestrogen                          |
| 3. | Luteinising hormone (LH)           |
| 4. | Follicle-stimulating hormone (FSH) |

**178** Which part of the nodal musculature of the human heart is auto-excitabile?

- A:** SA node  
**B:** AV node  
**C:** Bundle of His  
**D:** Purkinje fibers

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

**179** Match **List-I** with **List-II**.

|    | <b>List-I</b><br>[Recent extinction] |      | <b>List-II</b><br>[Continent/Country] |
|----|--------------------------------------|------|---------------------------------------|
| A. | Dodo                                 | I.   | Australia                             |
| B. | Quagga                               | II.  | Africa                                |
| C. | Thylacine                            | III. | Mauritius                             |
| D. | Stellar's sea cow                    | IV.  | Russia                                |

Choose the correct answer from the options given below:

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

**180** Which of the following cells is primarily targeted and destroyed by HIV in the human body?

|    |                                                       |
|----|-------------------------------------------------------|
| 1. | B-lymphocytes, responsible for antibody production    |
| 2. | Cytotoxic T-cells, involved in killing infected cells |
| 3. | T-helper cells, that coordinate immune responses      |
| 4. | Natural killer cells, involved in innate immunity     |