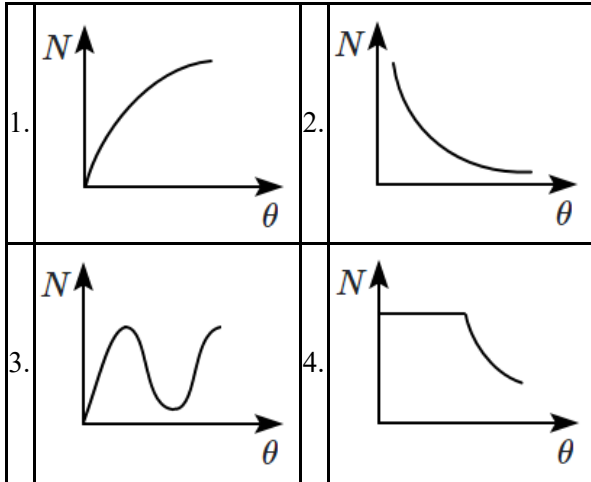


Physics

1. Which graphs best represent the relationship between the number of scattered particles detected (N) and the scattering angle (θ) in Rutherford's experiment?



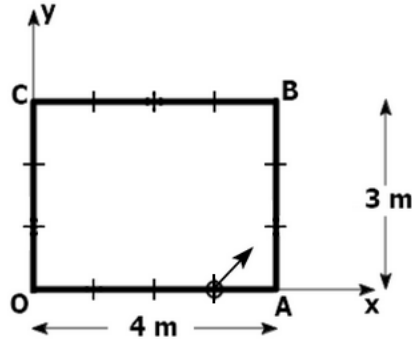
2. In a double-slit experiment, when the light of wavelength 400 nm was used, the angular width of the first minima formed on a screen placed 1 m away, was found to be 0.2° . What will be the angular width of the first minima, if the entire experimental apparatus is immersed in water? ($\mu_{\text{water}} = \frac{4}{3}$)

1. 0.1°
2. 0.266°
3. 0.15°
4. 0.05°

3. If λ_X , λ_I , λ_M and λ_γ are the wavelengths of X-rays, infrared rays, microwaves and γ -rays respectively, then:

1.	$\lambda_\gamma < \lambda_X < \lambda_I < \lambda_M$
2.	$\lambda_M < \lambda_I < \lambda_X < \lambda_\gamma$
3.	$\lambda_X < \lambda_\gamma < \lambda_M < \lambda_I$
4.	$\lambda_X < \lambda_I < \lambda_\gamma < \lambda_M$

4. A ball is released with a velocity $(2\hat{i} + 2\hat{j})$ m/s on the rectangular pool table from the point $(3, 0)$ m. All the collisions of the ball are elastic.



After the 4th collision with the edges of the board, the location and velocity of the ball will be:

1.	$(3, 0)$ m and $(2\hat{i} + 2\hat{j})$ m/s
2.	$(0, 2)$ m and $(2\hat{i} - 2\hat{j})$ m/s
3.	$(1, 0)$ m and $(2\hat{i} + 2\hat{j})$ m/s
4.	$(2, 2)$ m and $(-2\hat{i} - 2\hat{j})$ m/s

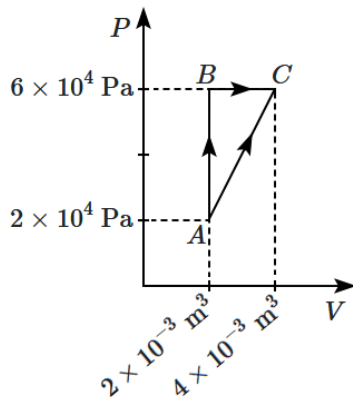
5. A transformer has an efficiency of 90% working on 200 V and 3 kW power supply. If the current in the secondary coil is 6 A, the voltage across the secondary coil and the current in the primary coil, respectively, are:

1. 300 V, 15 A
2. 450 V, 15 A
3. 450 V, 13.5 A
4. 600 V, 15 A

6. 300 g of water at 0°C is taken in a calorimeter and steam (100°C) is continuously passed through it. Assume that there is no loss of heat to the environment. The final temperature of the system is 40°C . Ignore the heat capacity of the calorimeter. If the total mass of the water in the calorimeter is 320 g, the specific latent heat capacity of vaporisation of water is:

1.	540 cal/g	2.	270 cal/g
3.	560 cal/g	4.	600 cal/g

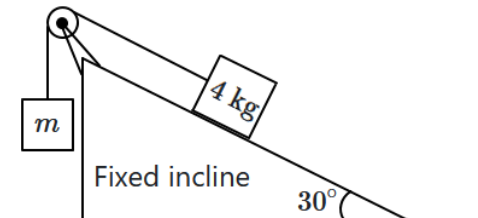
7. The figure below shows two paths that may be taken by gas to go from state A to state C .



In process AB , 400 J of heat is added to the system, and in process BC , 100 J of heat is added to the system. The heat absorbed by the system in the process AC will be:

1. 380 J
2. 500 J
3. 460 J
4. 300 J

8. Assume that the rope and pulley are ideal, and that the system is frictionless. For what value of m will the 4 kg remain at rest?

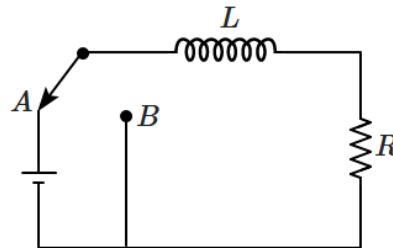


1. 4 kg
2. 8 kg
3. 2 kg
4. 1 kg

9. If the equation of a wave is represented by: $y = 10^{-4} \sin\left(100t - \frac{x}{10}\right)$ m, where x is in meters and t in seconds, then the velocity of the wave will be:

1.	100 m/s	2.	4 m/s
3.	1000 m/s	4.	0 m/s

10. An inductor (L) and a resistor (R) are connected in series and a battery is connected, as shown in the figure. Once the current becomes steady, the power in the resistance is P_R and the energy stored in the inductor is U_L . The switch is suddenly (and smoothly) toggled to the position B allowing the inductor to discharge. The time in which the energy stored becomes $\frac{1}{2}$ its initial value is:



1.	$\frac{U_L}{P_R}$	2.	$\frac{U_L \ln 2}{P_R}$
3.	$\frac{2U_L \ln 2}{P_R}$	4.	$\frac{2U_L}{P_R}$

11. The angle between the electric lines of force and the equipotential surface is:

1. 180°
2. 0°
3. 45°
4. 90°

12. The equation of simple harmonic motion may not be expressed as: (where each term has its usual meaning)

1. $x = A \sin(\omega t + \phi)$
2. $x = A \cos(\omega t - \phi)$
3. $x = A \sin(\omega t) + B \cos(\omega t)$
4. $x = A \sin(\omega t + \phi) + B \sin(2\omega t + \phi)$

13. A metal wire has mass $(0.4 \pm 0.002)\text{ g}$, radius $(0.3 \pm 0.001)\text{ mm}$ and length $(5 \pm 0.02)\text{ cm}$. The maximum possible percentage error in the measurement of density will nearly be:

1. 1.4%
2. 1.2%
3. 1.3%
4. 1.6%

14. The equations of motion for a projectile are given as $x = 36t$ and $2y = 96t - 9.8t^2$, where x and y are in metres and t is in seconds. What is the angle of projection (measured from the x -axis)?

1.	$\sin^{-1}\left(\frac{4}{5}\right)$	2.	$\sin^{-1}\left(\frac{3}{5}\right)$
3.	$\sin^{-1}\left(\frac{4}{3}\right)$	4.	$\sin^{-1}\left(\frac{3}{4}\right)$

15. When a raindrop of radius r falls through the air with a given velocity v , the viscous force acting on it will be:

1. proportional to r
2. proportional to r^2
3. proportional to $1/r$
4. independent of r

16. Match List-I with List-II:

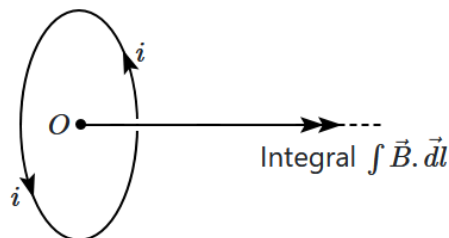
	List-I (Application of Gauss Law)		List-II (Value of $ E $)
A.	The field inside a thin shell	I.	$\frac{\lambda}{2\pi\epsilon_0 r} \hat{n}$
B.	The field outside a thin shell	II.	$\frac{q}{4\pi\epsilon_0 R^2} \hat{r}$
C.	The field of thin shell at the surface	III.	$\frac{q}{4\pi\epsilon_0 r^2} \hat{r}$
D.	The field due to a long charged wire	IV.	zero

(Here symbols have their usual meaning and R is the radius of the thin shell)

Choose the correct answer from the options given below:

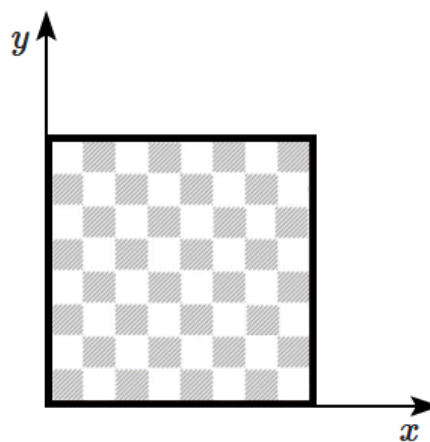
1.	A-IV, B-III, C-I, D-II
2.	A-I, B-II, C-III, D-IV
3.	A-IV, B-III, C-II, D-I
4.	A-I, B-III, C-II, D-IV

17. A circular wire carrying a current i produces an axial magnetic field (B). The integral $\int \vec{B} \cdot d\vec{l}$ taken from O to ∞ along the axis equals:



1.	$\mu_0 i$	2.	$\frac{\mu_0 i}{2}$
3.	$\frac{\mu_0 i}{4}$	4.	$\frac{\mu_0 i}{\sqrt{2}}$

18. Consider a chessboard, as shown in the figure, where the width of each square is 2 cm. Assume that all pieces are kept at the centres of the squares, before and after a move. Also, assume that each single move takes 2 s – irrespective of however many squares (distance) are taken.



What is the maximum possible displacement of a rook (♖) in a single move?

Note: A rook can move any number of squares along only x or only y (positive or negative) direction.

1.	14 cm	2.	16 cm
3.	18 cm	4.	$16\sqrt{2}$ cm

19. The elastic energy density in a stretched wire is:

1.	$(\text{stress})^2 \times \text{strain}$	2.	$\text{stress} \times \text{strain}$
3.	$\frac{1}{2} \times \text{stress} \times \text{strain}$	4.	$\text{stress} \times (\text{strain})^2$

20. Two cities are 150 km apart. The electric power is sent from one city to another city through copper wires. The fall of potential per km is 8 volts and the average resistance per km is 0.5 ohm. The power loss in the wire is:

1. 19.2 W
2. 19.2 kW
3. 19.2 J
4. 12.2 kW

21. An *LCR* series circuit is connected to an A.C source of variable angular frequency ω and a fixed voltage amplitude. The current amplitude in the circuit is found to be the same for two angular frequencies ω_1 and ω_2 . The resonance angular frequency of this circuit must be:

1. $[\omega_1 \omega_2]^{1/2}$
2. $\frac{\omega_1 + \omega_2}{2}$
3. $\frac{\omega_1 \omega_2}{\omega_1 + \omega_2}$
4. None of these

22. A small permanent magnet is placed 'antiparallel' to a uniform magnetic field B . A null point is found at a distance r , on the axis of the magnet. Then, r is proportional to (nearly):

1. B^{-3}	2. B^{-2}
3. $B^{-1/2}$	4. $B^{-1/3}$

23. Light of wavelength 500 nm is incident on metal with work function 2.28 eV. The de-Broglie wavelength of the emitted electron is:

1. $< 2.8 \times 10^{-10}$ m	2. $< 2.8 \times 10^{-9}$ m
3. $\geq 2.8 \times 10^{-9}$ m	4. $\leq 2.8 \times 10^{-12}$ m

24. An electromagnetic wave is moving along negative $z(-z)$ direction and at any instant of time, at a point, its electric field vector is $3\hat{j}$ V/m. The corresponding magnetic field at that point and instant will be: (Take $c = 3 \times 10^8$ ms⁻¹)

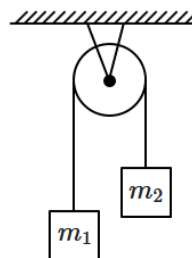
1. $10\hat{i}$ nT	2. $-10\hat{i}$ nT
3. \hat{i} nT	4. $-\hat{i}$ nT

25. Select the correct option based on the statements:

Statement I:	The magnetic field of a circular loop at very far away point on the axial line varies with distance as like that of a magnetic dipole.
Statement II:	The magnetic field due to magnetic dipole varies inversely with the square of the distance from the centre on the axial line.

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

26. Two masses m_1 and m_2 are hanging on the sides of the smooth and light pulley. The system is released to move. If ($m_1 > m_2$), then the acceleration of the centre of mass of the system constituted by m_1 and m_2 is:



1. $\left(\frac{m_1 - m_2}{m_1 + m_2}\right) g$	2. $\left(\frac{m_1 - m_2}{m_1 + m_2}\right)^2 g$
3. g	4. zero

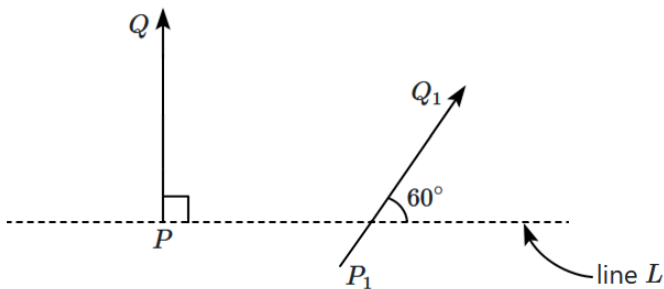
27. If a coil of wire having N turns is placed in a uniform time-varying magnetic field B , and the area of the coil is A , then an emf is induced in the coil:

1. NAB	2. $NA \frac{dB}{dt}$
3. $\int NABdt$	4. $NA \frac{d^2B}{dt^2}$

28. The ratio of wavelengths of the last line of the Balmer series and the last line of the Lyman series is:

1. 1
2. 4
3. 0.5
4. 2

29. A simple linear object (PQ) undergoes reflection in a plane mirror, and the image (P_1Q_1) is shown. The angles made by PQ and P_1Q_1 with the line L are 90° and 60° respectively.



The mirror must make an angle, with the line L , of:

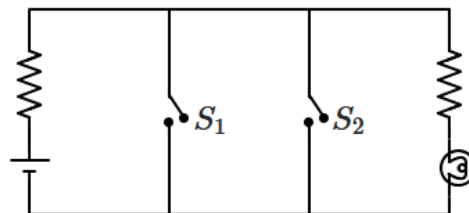
1. 30°	2. 75°
3. 15°	4. -30°

30. Given below are two statements:

Assertion (A):	The ratio $\frac{\vec{a} \times \vec{b}}{\vec{a} \cdot \vec{b}} = \tan \theta$, where θ is the angle between the vectors \vec{a}, \vec{b} .
Reason (R):	The $\vec{a} \times \vec{b}$ has the magnitude: $ab \sin \theta$, and $\vec{a} \cdot \vec{b}$ has the magnitude: $ab \cos \theta$, where θ is the angle between the vectors \vec{a}, \vec{b} .

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.

31. Identify the equivalent logic gate represented by the circuit given below:



1. OR gate	2. NOR gate
3. AND gate	4. NAND gate

32. On increasing the number density of a gas in a vessel, the mean free path of a gas:

1. decreases
2. increases
3. remains the same
4. becomes double

33. An electrical device which offers a low resistance to the current in one direction but high resistance to the current in the opposite direction is called:

1. resistor
2. capacitor
3. inductor
4. diode

34. Which of the following particles, is unstable?

1. Proton
2. Neutron
3. Electron
4. Antineutrino

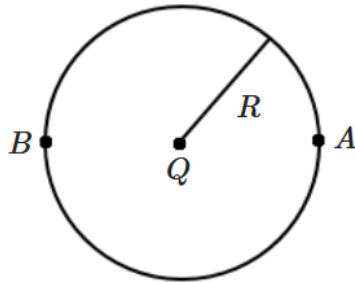
35. A planet of mass m , moves in a circular orbit around the sun (mass: $M, M \gg m$); the angular momentum of the planet in its orbit being L . The speed of the planet in its orbit equals:

1.	$\frac{GMm}{2L}$	2.	$\frac{GMm}{L}$
3.	$\frac{2GMm}{L}$	4.	$\frac{4GMm}{L}$

36. The transverse wave propagating through a medium is given by $y = A \cos 2\pi \left[ft - \frac{x}{\lambda} \right]$. If the maximum particle velocity of the medium is two times the velocity of the wave through the medium, then:

1.	$\lambda = 3.14A$	2.	$\lambda = 6.28A$
3.	$6.28\lambda = A$	4.	$3.14\lambda = A$

37. A charge Q is placed at the centre of a thin spherical shell of radius R . An electron is moved from point A to point B (see figure). The total work done will be:



1.	zero
2.	$\frac{Q}{4\pi\epsilon_0 R}$
3.	$\frac{Q}{4\pi\epsilon_0 (2R)}$
4.	depends on the path followed

38. An atom of atomic mass 242, having binding energy per nucleon 8.4 MeV, breaks into two atoms of atomic mass 121 (each with binding energy per nucleon of 7.1 MeV). What would be the absolute Q -value of the reaction?

1.	150 MeV	2.	314.6 MeV
3.	208.4 MeV	4.	290.8 MeV

39. The angular width of the central maximum in the Fraunhofer diffraction for $\lambda = 6000 \text{ \AA}$ is θ_0 . When the same slit is illuminated by another monochromatic light, the angular width decreases by 30%. The wavelength of this light is:

1.	1800 \AA	2.	4200 \AA
3.	420 \AA	4.	6000 \AA

40. Two pendulums of length 121 cm and 100 cm start vibrating in phase. At some instant, the two are at their mean position in the same phase. The minimum number of vibrations of the shorter pendulum after which the two are again in phase at the mean position is:

1.	8	2.	11
3.	9	4.	10

41. A wire of length L meters carrying a current of I ampere is bent in the form of a circle. What is its magnetic moment?

1. $\frac{IL^2}{4} \text{ A-m}^2$
2. $\frac{I \times \pi L^2}{4} \text{ A-m}^2$
3. $\frac{2IL^2}{\pi} \text{ A-m}^2$
4. $\frac{IL^2}{4\pi} \text{ A-m}^2$

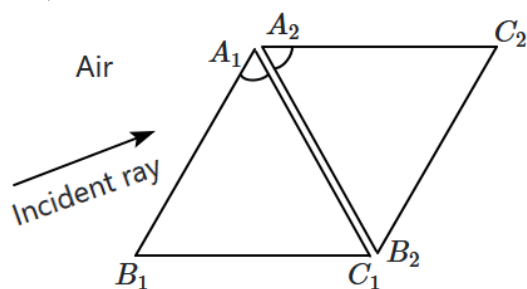
42. The threshold frequency of a photoelectric metal is ν_0 . If the light of frequency $4\nu_0$ is incident on this metal, then the maximum kinetic energy of emitted electrons will be:

1.	$h\nu_0$	2.	$2h\nu_0$
3.	$3h\nu_0$	4.	$4h\nu_0$

43. Three cells of the same EMF E but different internal resistances: $1\ \Omega$, $2\ \Omega$, $3\ \Omega$ are connected in parallel. The EMF of the resulting combination is:

1. E
2. $1.2E$
3. $0.8E$
4. $0.5E$

44. Two equilateral prisms, made of glass, are placed back-to-back so that the emerging ray from A_1B_1 enters the surface A_2B_2 . The first prism is placed at minimum deviation, and this minimum deviation is 60° .

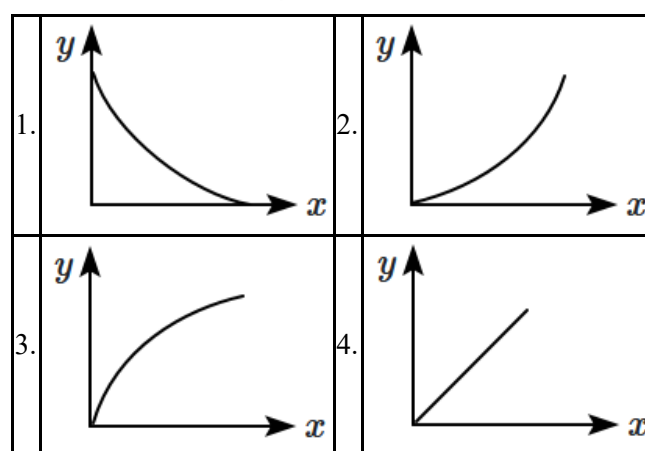
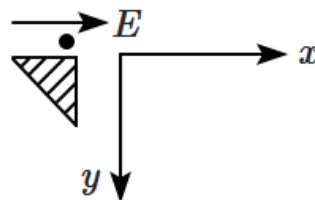


The net angular deviation of the incident ray, after passing through both prisms, is:

1.	60°	2.	30°
3.	120°	4.	0°

45. A small point mass carrying a positive charge is released from the edge of a table. There is a uniform electric field in the horizontal direction. Which of the following options correctly describes the trajectory of the mass?

(The curves are drawn schematically and are not to scale).



Chemistry

46. The most basic oxide among the following is:

1. CrO
2. Cr_2O_3
3. CrO_3
4. Cr_2O_4

47. The pH of a $0.01\ M$ $NaOH$ (aq) solution will be:

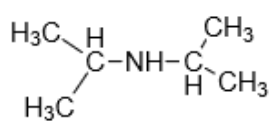
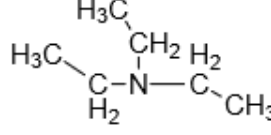
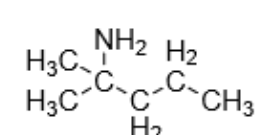
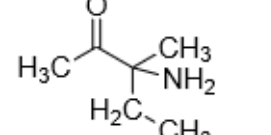
1.	7.01	2.	2
3.	12	4.	9

48. Given below are two statements:

Statement I:	In some cases, oxygen shows a positive oxidation number, though it is an electronegative element.
Statement II:	Fluorine is more electronegative than oxygen.

1. **Statement I** is false but **Statement II** is true.
2. Both **Statement I** and **Statement II** are true.
3. Both **Statement I** and **Statement II** are false.
4. **Statement I** is true but **Statement II** is false.

49. Which amine reacts with Hinsberg's reagent to produce an alkali insoluble product?

1.		2.	
3.		4.	

50. Mole fraction of benzene in a solution where benzene constitutes 30% by mass in carbon tetrachloride (CCl₄) is

1. 0.46
2. 0.64
3. 0.91
4. 0.19

51. Match **Column-I** with **Column-II** and mark the correct option:

	Column-I		Column-II
(A)	Peptide linkage	(i)	Inversion
(B)	Nucleic acid	(ii)	Polysaccharide
(C)	Hydrolysis of cane sugar	(iii)	Proteins
(D)	Starch	(iv)	Nucleotides

1. (A) → (ii), (B) → (i), (C) → (iii), (D) → (iv)
2. (A) → (iv), (B) → (i), (C) → (ii), (D) → (iii)
3. (A) → (iii), (B) → (iv), (C) → (i), (D) → (ii)
4. (A) → (i), (B) → (iii), (C) → (iv), (D) → (ii)

52. Consider the given two statements:

Statement I:	A Daniell cell consists of zinc and copper electrodes immersed in solutions of their respective salts.
Statement II:	Mercury cell consists of zinc-mercury amalgam as the anode and a paste of HgO & carbon as the cathode.

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

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.

53. What is the molality of a solution in which the mole fraction of ethanol is 0.08?

1. 6.32 mol kg⁻¹
2. 4.83 mol kg⁻¹
3. 3.82 mol kg⁻¹
4. 2.84 mol kg⁻¹

54. Which of the following conversion results in decrease in bond order and change in magnetic behaviour?

1. O₂ → O₂⁻
2. O₂ → O₂⁺
3. N₂⁺ → N₂
4. N₂ → N₂⁻

55. If:

(i) energy of the subshell depends only on 'n' instead of 'n + l'

(ii) each orbital can accommodate a maximum of up to one electron

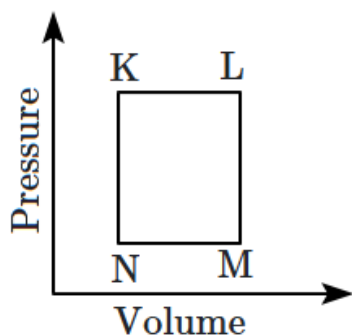
then for an element having an atomic number is 33, the correct statement is:

1. The group number is 5 and the period number is 4.
2. The period number is 5.
3. The last shell has only 1 electron.
4. The last electron is in the 4th shell.

56. The incorrect statement among the following regarding the collision theory of chemical reactions is:

1.	The reactant molecule is assumed to be a hard sphere.
2.	Collision frequency between reactants is the only factor that determines the rate of the reaction.
3.	The steric factor takes into account the relative orientation of the reactant molecules during collisions.
4.	The theory does not take into account the structural aspects of the molecules during a collision.

57. A fixed mass 'm' of a gas is subjected to the transformation of states from *K* to *L*, *L* to *M*, then *M* to *N*, and back to *K* as shown in the figure.



The succeeding operations that enable this transformation of states are:

1. Heating, cooling, heating, cooling
2. Cooling, heating, cooling, heating
3. Heating, cooling, cooling, heating
4. Cooling, heating, heating, cooling

58. What is the product formed when an alkyl halide reacts with RCOOAg (silver carboxylate)?

1.	Ester	2.	Aldehyde
3.	Ether	4.	Ketone

59. A compound among the following having a similar structure to graphite is:

1. B
2. B_4C
3. B_2H_6
4. BN

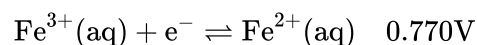
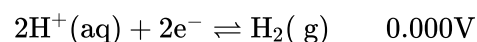
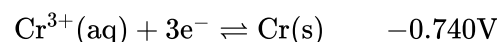
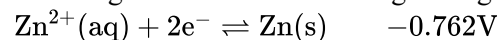
60. Mark the correct statement regarding entropy.

1.	At 0°C , the entropy of a perfectly crystalline substance is taken to be zero.
2.	At absolute zero temperature, the entropy of a perfectly crystalline substance is positive.
3.	At absolute zero temperature, the entropy of all crystalline substances is taken to be zero.
4.	At absolute zero temperature, the entropy of a perfectly crystalline substance is taken to be zero.

61. Which one of the following elements has the highest 3rd ionization potential?

1. Na
2. Mg
3. Al
4. Si

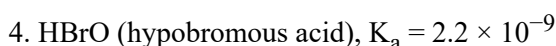
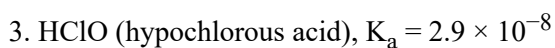
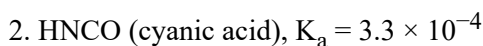
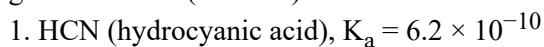
62. The standard reduction potentials at 298 K for the following half-cell reactions are given against each.



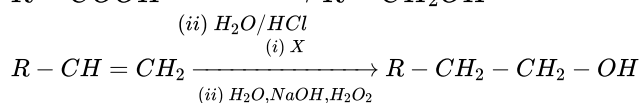
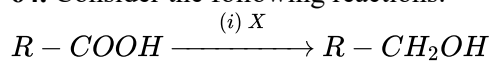
Which is the strongest reducing agent?

1. $\text{Zn}(\text{s})$
2. $\text{Cr}(\text{s})$
3. $\text{H}_2(\text{g})$
4. $\text{Fe}^{2+}(\text{aq})$

63. Which of the following acids will dissociate to the greatest extent (in water)?



64. Consider the following reactions:



Identify 'X' in above reactions:

1. B_2H_6	2. $LiAlH_4$
3. $NaBH_4$	4. H_2/Pd

65. For reaction $A \rightarrow B$, the rate constant $k_1 = A_1 e^{-E_{a1}/(RT)}$ and for the reaction $X \rightarrow Y$, the rate constant $k_2 = A_2 e^{-E_{a2}/(RT)}$. If $A_1 = 10^8$, $A_2 = 10^{10}$ and $E_{a1} = 600$ cal/mol, $E_{a2} = 1800$ cal/mol, then the temperature at which $k_1 = k_2$ is: (Given : $R = 2$ cal/K - mol)

1. 1200 K	2. 1200×4.606 K
3. $\frac{1200}{4.606}$ K	4. $\frac{600}{4.606}$ K

66. Treatment of cyclopentanone with methyl lithium generates:

1. Cyclopentanonyl cation
2. Cyclopentanonyl radical
3. Cyclopentanonyl biradical
4. Cyclopentanonyl anion

67. The freezing point depression constant for water is $1.86 \text{ }^\circ\text{C m}^{-1}$. If 5.00 g Na_2SO_4 is dissolved in 45.0 g H_2O , the freezing point is changed by $-3.82 \text{ }^\circ\text{C}$. The Van't Hoff factor for Na_2SO_4 is:

1. 2.63	2. 3.11
3. 0.381	4. 2.05

68. Given below are two statements:

Statement I:	Aniline does not undergo Friedel-Crafts alkylation reaction.
Statement II:	Aniline cannot be prepared through Gabriel synthesis.

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

69. Nitrogen detection in an organic compound is carried out by Lassaigne's test. The blue colour formed corresponds to which of the following formulae:

1. $Fe_3[Fe(CN)_6]_2$
2. $Fe_4[Fe(CN)_6]_3$
3. $Fe_4[Fe(CN)_6]_2$
4. $Fe_3[Fe(CN)_6]_3$

70. From the given set of 14th group elements, the element having the lowest ionisation potential is:

1. Si	2. Ge
3. Sn	4. Pb

71. In which compounds addition reaction will take place according to anti-Markovnikov's rule?

- (i) $H_2C = CH - NO_2$
- (ii) $H_2C = CH - CHO$
- (iii) $H_2C = CH - CN$
- (iv) $CH_3 - CH = CH_2$

Select the correct answer from the codes given below:

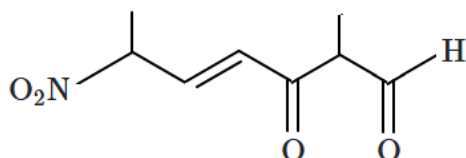
Codes:

1. (i), (ii) and (iii)
2. (i), (ii) and (iv)
3. (i) and (ii)
4. (i) and (iii)

72. The compound which reacts with HBr obeying Markownikoff's rule is:

1.	$H_2C = CH_2$
2.	
3.	
4.	

73. The correct IUPAC name of the following compound is :



- 2-Methyl-6-nitro-3-oxohept-4-enal
- 2, 6-Dimethyl-6-nitro-oxohex-4-enal
- 2-Methyl-6-nitrohept-4-en-1, 3-dione
- 2-Methyl-6-nitro-3-oxohept-3-enal

74. What is the oxidation number of Cl in $CaOCl_2$ (bleaching powder)?

- Zero, because it contains Cl_2
- 1, because it contains Cl^-
- +1, because it contains ClO^-
- +1 and -1 because it contains ClO^- and Cl^-

75. Which is the correct statement for the given acids?

1.	Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid
2.	Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid
3.	Both are triprotic acids
4.	Both are diprotic acids

76. Amylopectin is a branched chain polymer of $\alpha - D$ glucose units in which chain is formed by C1-C4 glycosidic linkage while branching occurs by

- C2-C5 glycosidic linkage
- C1-C5 glycosidic linkage
- C1-C6 glycosidic linkage
- C2-C6 glycosidic linkage

77. Match Column I (formulae of the isomers) with Column II (type of isomerism) and select the correct option:

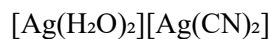
	Column I (Pair of isomers)	Column II (Type of isomerism)
(p)	(I) $[Co(NH_3)_6][Cr(CN)_6]$ (II) $[Cr(NH_3)_6][Co(CN)_6]$	(a) Ionisation
(q)	(III) $[PtCl_2(NH_3)_4]Br_2$ (IV) $[PtBr_2(NH_3)_4]Cl_2$	(b) Hydrate
(r)	(V) $[Co(SCN)(NH_3)_5]Cl_2$ (VI) $[Co(NCS)(NH_3)_5]Cl_2$	(c) Coordination
(s)	(VII) $[Cr(H_2O)_6]Cl_3$ (VIII) $[CrCl_2(H_2O)_4]Cl \cdot 2H_2O$	(d) Geometrical
		(e) Linkage

- p-(d), q-(a), r-(e), s-(b)
- p-(a), q-(c), r-(b), s-(e)
- p-(c), q-(a), r-(e), s-(b)
- p-(a), q-(c), r-(e), s-(b)

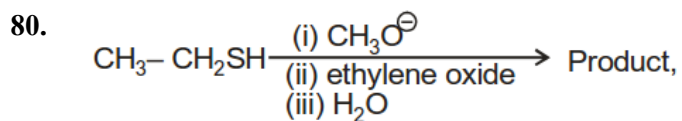
78. Which of the following statements is false?

1.	On passing H_2S through acidified $K_2Cr_2O_7$ solution, a milky colour is observed.
2.	$Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis.
3.	$K_2Cr_2O_7$ solution in an acidic medium is orange.
4.	$K_2Cr_2O_7$ solution becomes yellow in increasing the pH beyond 7

79. The IUPAC name of the following complex is:



- Diaquasilver(I) dicyanidoargentate (I)
- Dicyanidosilver(II) diaquaargentate(II)
- Diaquasilver(II) dicyanidoargentate(II)
- Dicyanidosilver(I) diaquaargentate(I)



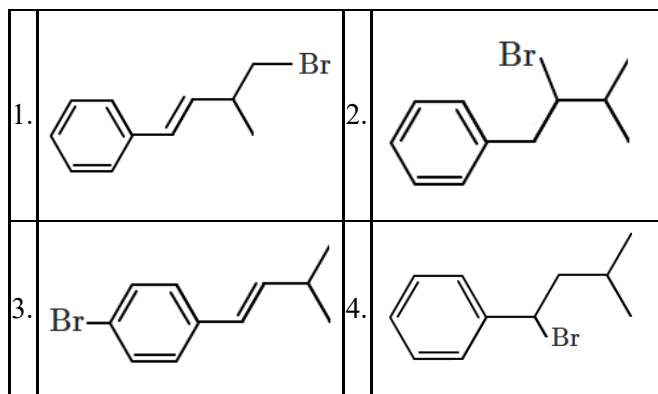
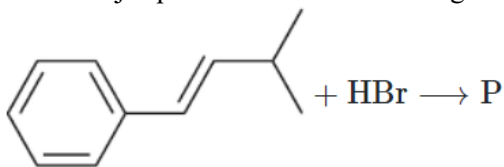
Product is

- (1) $\text{CH}_3-\text{CH}_2-\text{S}-\text{CH}_2-\text{CH}_2-\text{OH}$
- (2) $\text{CH}_3-\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_2-\text{OH}$
- (3) $\text{CH}_3-\text{CH}_2\text{O}^\ominus$
- (4) $\text{CH}_3-\text{CH}_2-\text{S}^\oplus \begin{matrix} \text{CH}_2 \\ \text{CH}_2 \end{matrix}$

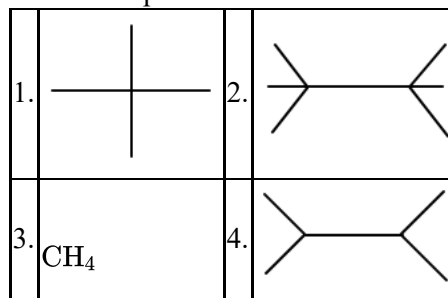
81. Which of the following interhalogen compounds has an incorrectly identified shape?

1. IF_7 : Pentagonal bipyramidal
2. ClF_5 : Square pyramidal
3. BrF_3 : Bent T-shaped
4. BrF_5 : Trigonal bipyramidal

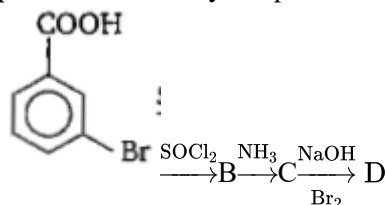
82. The major product P of the following reaction is



83. Which of the following alkanes will give the maximum number of isomers when a monochloro-substituted product is obtained?



84. In a set of reactions, m-bromobenzoic acid gave a product D. Identify the product D.



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

85. Incorrect statements among the following are:

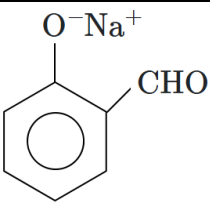
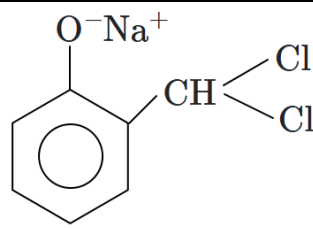
(a)	Group I radicals are precipitated as chloride
(b)	Group IV radicals are precipitated as sulphide
(c)	Group V radicals are precipitated as hydroxide
(d)	Group III radicals are precipitated as chloride

1. (a), (b) and (d)
2. (c) and (d)
3. (a), (b) and (c)
4. (a), (b), (c) and (d)

86. Which of these structures is not a valid canonical structure?

1. $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH} - \oplus\text{NH}_3$
2. $\oplus\text{CH}_2 - \text{CH} = \text{CH} - \ominus\text{CH} - \oplus\text{NH}_3$
3. $\oplus\text{CH}_2 - \text{CH} = \text{CH} - \text{CH} = \text{NH}_3$
4. None of the above

87. Which of the following is not the intermediate observed in the Reimer Tiemann Reaction?

1.		2.	$:\text{CCl}_2$
3.		4.	CHCl_3

88. Which of the following solutions will cause Mohr's salt to precipitate out as iron (II) hydroxide?

1. Hydrochloric acid	2. Sodium hydroxide
3. Sulphuric acid	4. Potassium nitrate

89. When an alcoholic solution of ethylene dibromide is heated with granulated zinc, the compound formed is:

- (1) ethane
- (2) ethylene
- (3) butane
- (4) isobutane

90. Among the following transformations, the hybridization of the central atom remains unchanged in:

1. $\text{CO}_2 \rightarrow \text{HCOOH}$
2. $\text{BF}_3 \rightarrow \text{BF}_4^-$
3. $\text{NH}_3 \rightarrow \text{NH}_4^+$
4. $\text{PCl}_3 \rightarrow \text{PCl}_5$

Biology

91. Consider the given two statements:

Assertion (A):	Mutualism in plant-animal interactions often leads to co-evolution of both species.
Reason (R):	Co-evolution ensures that pollinators develop mechanisms to steal nectar without aiding pollination.

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.	Both (A) and (R) are False.

92. Any part of a plant taken out and grown in a test tube under sterile conditions in special nutrient media for generating new plants is called:

1.	Implant	2.	Explant
3.	Supplant	4.	Plantlet

93. Which of the following PGR is present in coconut milk which is used in tissue culture?

1. Cytokinin
2. Auxin
3. Gibberellin
4. Ethylene

94. First discovered restriction endonuclease that always cuts DNA molecules at a particular point by recognizing a specific sequence of six base pairs is:

1. *EcoRI*
2. Adenosine deaminase
3. Thermostable DNA polymerase
4. *Hind II*

95. Which one of the following pairs is not correctly matched?

1.	Abscisic acid - Stomatal closure
2.	Gibberellic acid - Leaves fall
3.	Cytokinin - Cell division
4.	IAA - Cell wall elongation

96. Rh incompatibility during pregnancy occurs when:

1.	An Rh-negative mother carries an Rh-positive fetus, leading to hemolytic disease of the newborn.
2.	An Rh-positive mother carries an Rh-negative fetus, causing maternal immune response.
3.	Both mother and fetus are Rh-negative, resulting in anemia.
4.	Both mother and fetus are Rh-positive, leading to blood clotting.

97. The structure that covers the shoot apex in a monocot seedling and provides protection as it pushes through the soil is known as what?

1. Coleoptile
2. Coleorhiza
3. Plumule
4. Radicle

98. Consider the given two statements:

Statement I:	Properties of tissues are present in the constituent cells and similarly properties of cellular organelles are present in the molecular constituents of the organelle.
Statement II:	All living organisms – present, past and future, are linked to one another by the sharing of the common genetic material, but to varying degrees.

1. Statement I is correct; **Statement II** is incorrect
2. **Statement I** is correct; **Statement II** is correct
3. **Statement I** is incorrect; **Statement II** is incorrect
4. **Statement I** is incorrect; **Statement II** is correct

99. Which of the following conditions are favorable for oxygen binding to hemoglobin?

1.	Low pO ₂ , high pCO ₂ , low H ⁺ concentration, low temperature.
2.	High pO ₂ , low pCO ₂ , low H ⁺ concentration, low temperature.
3.	High pO ₂ , high pCO ₂ , high H ⁺ concentration, high temperature.
4.	Low pO ₂ , low pCO ₂ , high H ⁺ concentration, high temperature.

100. Coenzymes differ from prosthetic groups because:

1.	Coenzymes are tightly bound to the enzyme, while prosthetic groups are transiently associated.
2.	Coenzymes are transiently associated, while prosthetic groups are tightly bound to the enzyme.
3.	Coenzymes are always composed of metal ions.
4.	Coenzymes are part of the enzyme's primary structure.

101. In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids:

1.	20	2.	64
3.	61	4.	60

102. In pteridophytes:

I:	the main plant body is a gametophyte
II:	body is differentiated into true root, stem and leaves
III:	organs possess well-differentiated vascular tissues

1. Only **I** and **II** are correct
2. Only **I** and **III** are correct
3. Only **II** and **III** are correct
4. **I, II** and **III** are correct

103.

Assertion (A):	The organic farmer holds the view that eradication of pest is undesirable
Reason (R):	Biocontrol is not a good strategy to control pest

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.	Both (A) and (R) are False

104. In a continuous culture system:

I:	the used medium is drained out from one side while fresh medium is added from the other.
II:	cells are maintained in their physiologically most active log/exponential phase.

1. Only I is correct
2. Only II is correct
3. Both I and II are correct
4. Both I and II are incorrect

105. Genetically engineered insulin for human is produced from:

1. *Escherichia coli*
2. *Pseudomonas putida*
3. *Bacillus thuringiensis*
4. *Rhizobium meliloti*

106. There are 8 and 7 bones respectively in:

1.	tarsal [ankle] and carpal [wrist]
2.	carpal[wrist] and tarsal[ankle]
3.	neurocranium and facial skeleton
4.	facial skeleton and neurocranium

107. Match each item in Column I with one in Column II and select the best match as your answer from the codes given:

	Column I [Plant part]		Column II [Type of vascular bundle]
A	Monocot root	P	Radial, two to four patches
B	Dicot root	Q	Radial, polyarch
C	Monocot stem	R	Conjoint, open, ring arrangement
D	Dicot stem	S	Conjoint, Closed and scattered

Codes:

	A	B	C	D
1.	P	Q	R	S
2.	Q	P	R	S
3.	Q	P	S	R
4.	P	Q	S	R

108. The muscle tissue in animals is a derivative of embryonic:

1. Ectoderm
2. Mesoderm
3. Endoderm
4. Partly ectoderm and partly endoderm

109. Which of the following will be true for C₄ plants but not for C₃ plants?

I.	Initially fix carbon dioxide in mesophyll cells as 4-carbon long compounds.
II.	Calvin cycle takes place in mesophyll cells

1.	Only I is correct
2.	Only II is correct
3.	Both I and II are correct
4.	Both I and II are incorrect

110. Which one of the following is an example of carrying out biological control of pests/diseases using microbes?

1. *Trichoderma* sp. against certain plant pathogens
2. *Nucleopolyhedrovirus* against white rust in Brassica
3. Bt-cotton to increase cotton yield
4. Ladybird beetle against aphids in mustard

111. In the context of floral symmetry, a flower that can be divided into two equal halves only in one particular plane is known as what type of flower?

1. Actinomorphic	2. Zygomorphic
3. Asymmetric	4. Radial

112. Consider the given two statements:

Assertion(A):	In artificial hybridization experiments, if the female parent bears bisexual flowers, removal of anthers from the flower bud before the anther dehisces using a pair of forceps is necessary.
Reason (R):	This is done to prevent self-pollination.

1.	Both (A) and (R) are True and (R) correctly explains (A).
2.	Both (A) and (R) are True but (R) does not correctly explain (A).
3.	(A) is True; (R) is False
4.	Both (A) and (R) are False

113. Which of the following is an incorrect statement?

1.	The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm.
2.	Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm.
3.	Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles.
4.	Microbodies are present both in plant and animal cells.

114. The organism shown below:



I:	is a bony fish.
II:	is unusual as the male is equipped with a brood pouch on the ventral, or front-facing, side of the tail.

1. Only I is correct
2. Only II is correct
3. Both I and II are correct
4. Both I and II are incorrect

115. One of the major compound of cell wall of most fungi is?

1. peptidoglycan	2. cellulose
3. hemicelluloses	4. chitin

116. Which animals are diploblastic and show radial symmetry but lack cnidoblasts?

1. Cnidarians
2. Ctenophores
3. Echinoderms
4. Hemichordates

117. Consider the given two statements:

Assertion (A):	Predators in nature are 'prudent'.
Reason (R):	Predators keep prey populations under control.

1.	Both (A) and (R) are True and (R) correctly explains (A)
2.	Both (A) and (R) are True but (R) does not correctly explain (A)
3.	(A) is True, (R) is False
4.	(A) is False, (R) is True

118. Artificial insemination means:

1.	transfer of sperms of a healthy donor to a test tube containing ova
2.	transfer of sperms of husband to a test tube containing ova
3.	artificial introduction of sperms of a healthy donor into the vagina
4.	introduction of sperms of healthy donor directly into the ovary

119. Which diagnostic technique uses X-rays and computer technology to create detailed cross-sectional images of the body?

1.	CT Scan	2.	Ultra Sound
3.	MRI	4.	Fibre optic endoscopy

120. In the last century an all-round development in various fields significantly improved the quality of life of the people. Currently in our country all the following are in decline, except:

1.	Maternal mortality	2.	Infant mortality
3.	Life expectancy	4.	Death rate

121. In the context of ecological pyramids, which of the following best describes the concept of trophic levels?

1.	Trophic levels represent only plant species, with each species occupying a different level.
2.	Each trophic level represents a functional role in an ecosystem, not necessarily specific species.
3.	Trophic levels represent a fixed position for all species within a food web.
4.	Each trophic level is determined solely by the organism's physical size.

122. During cell growth, DNA synthesis takes place in:

1.	S phase	2.	G ₁ phase
3.	G ₂ phase	4.	M phase

123. Identify the incorrectly matched pair:

1.	Ciliated epithelium	Fallopian tubes
2.	Dense irregular connective tissue	Skin
3.	Nissl's granules	Neuron
4.	Smooth muscle	Intercalated disc

124. Consider the given two statements:

Assertion (A):	Photosynthesis converts solar energy into chemical energy.
Reason (R):	Chemical energy is stored in the form of glucose molecules

1.	Both (A) and (R) are True and (R) correctly explains (A)
2.	Both (A) and (R) are True but (R) does not correctly explain (A)
3.	(A) is True but (R) is False
4.	Both (A) and (R) are False

125. Consider the given statements:

Statement 1:	Plants do not need specialised respiratory organs because each part of the plant takes care of its own gas-exchange needs.
Statement 2:	Plants require more oxygen than animals due to higher metabolic rates.
Statement 3:	The loose packing of parenchyma cells allows efficient diffusion of gases in plants.
Statement 4:	Only the green parts of plants perform respiration.

Which of the above statements are correct?

1. Statements 1, 3 and 4
2. Statements 1 and 3
3. Statements 2 and 4
4. Statements 2, 3 and 4

126. All living organisms:

I:	from the prokaryotes to the most complex eukaryotes can sense and respond to environmental cues.
II:	present, past and future, are linked to one another by the sharing of the common genetic material, but to varying degrees.

1. Only **I** is correct
2. Only **II** is correct
3. Both **I** and **II** are correct
4. Both **I** and **II** are incorrect

127. Which of the following is an example of how genetically modified (GM) crops have been designed for industrial use?

1.	GM crops that produce biofuels and starches for industrial applications.
2.	GM crops that are resistant to all types of bacterial and viral infections.
3.	GM crops that naturally produce higher amounts of nitrogen for fertilization.
4.	GM crops that produce a sweetener used in soft drinks.

128. Which of the following best illustrates genetic diversity?

1.	Different amphibian species in the Western Ghats
2.	The variety of ecosystems like deserts, rainforests, and coral reefs in India
3.	The variation in the potency of reserpine in <i>Rauwolfia vomitoria</i> across the Himalayan ranges
4.	Differences in the climate zones of the Eastern and Western Ghats

129. Which of the following does not affect Hardy-Weinberg equilibrium?

1. Genetic drift
2. Random mating
3. Natural selection
4. Mutation

130. The production of recombinant human insulin was a major breakthrough in biotechnology. How was the issue of producing functional insulin solved using genetically engineered bacteria?

1.	Proinsulin was directly inserted into <i>E. coli</i> , which automatically converted it into active insulin.
2.	Insulin genes were inserted into plant cells, which produced fully functional insulin.
3.	A single bacterial cell produced both chains of insulin simultaneously, eliminating the need for post-translational modifications.
4.	The A-chain and B-chain of insulin were synthesized separately and later joined by disulfide bonds.

131. What function do bulliform cells perform in monocot leaves?

1. Transport of nutrients
2. Photosynthesis
3. Regulation of leaf rolling and unrolling
4. Protection from herbivores

132. The first heart sound is heard during:

1.	beginning of ventricular systole
2.	end of ventricular systole
3.	atrial systole
4.	ventricular ejection

133. All the following are advantages seeds offer to angiosperms:

I:	Seed formation is more dependable.
II:	Seeds have better adaptive strategies for dispersal to new habitats.
III:	Seeds preserve genetic homogeneity and do not allow new variations in the gene pool.

1. Only **I** and **II**
2. Only **I** and **III**
3. Only **II** and **III**
4. **I, II** and **III**

134. Binding of oxygen with hemoglobin is primarily related to:

1. Partial pressure of carbon dioxide
2. Hydrogen ion concentration
3. Temperature
4. Partial pressure of oxygen

135. Physical structure of an ecosystem:

I:	is same for all types of ecosystems.
II:	is the result of interaction of biotic and abiotic components.

1. Only **I** is correct
2. Only **II** is correct
3. Both **I** and **II** are correct
4. Both **I** and **II** are incorrect

136. Which of the following disorders represents decrease in respiratory surface due to damaged alveolar walls?

1. Hypocapnia
2. Bronchitis
3. Asthma
4. Emphysema

137. The dinosaurs suddenly disappeared from the earth about:

1. 65 million years ago
2. 90 million years ago
3. 125 million years ago
4. 165 million years ago

138. Consider the given statements:

Assertion (A):	A decapitated cockroach can survive for several days.
Reason (R):	The nervous system of a cockroach is spread throughout its body, and the brain in the head region only controls the antennae and compound eyes.

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.

139. Which of the following is not an ex-situ method for conservation of biodiversity?

1. Seed banks
2. Cryopreservation
3. Botanical gardens
4. Biosphere reserves

140. Which of the following human diseases is not transmitted by faecal-oral route ?

1. Ascariasis
2. Viral Diarrhoea
3. Filariasis
4. Typhoid

141. Consider the given two statements:

Assertion(A):	Fertilisation in humans typically occurs in the uterus.
Reason(R):	The zygote undergoes cell division and blastocyst formation before implantation in the uterus.

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.

142. Which diseases given in Column I is not correctly matched with sign and symptoms in Column II?

	Column I	Column II
1.	Filariasis	Inflammation and swelling in lower limbs and scrotum
2.	Ringworm	Internal bleeding, muscular pain, fever, and anaemia
3.	Amoebiasis	Abdominal pain, stools with excess mucous, and blood clots
4.	Pneumonia	Fever, chills, cough, breathing difficulties

143. An autosomal primary non-disjunction event is the causal factor for:

1. Down's syndrome
2. Klinefelter's syndrome
3. Turner's syndrome
4. Conn's syndrome

144. Epididymis lies between:

1. Vasa efferentia and Vas deferens
2. Seminiferous tubules and rete testis
3. Vas deferens and urethra
4. Rete testis and vasa efferentia

145. Lichens is a mutualistic symbiotic relationship between:

1. An alga and a fungus
2. An alga and a blue green alga
3. A fungus and roots of vascular plants
3. Zooxanthellae and plants

146. All the following are benefits of mycorrhizal association to vascular plants except:

1. Increasing its tolerance to drought
2. Enhancing its resistance to root pathogens
3. Enhancing its phosphorus uptake capacity
4. Biological nitrogen fixation

147. Each time the sodium-potassium pump functions, it actively transports:

1.	three sodium ions to the outside and two potassium ions to the inside of a cell.
2.	two sodium ions to the outside and three potassium ions to the inside of a cell.
3.	three sodium ions to the outside and two hydrogen ions to the inside of a cell.
4.	three potassium ions to the outside and two hydrogen ions to the inside of a cell.

148. In Darwinian terms, what does 'fitness' refer to?

1.	The physical strength and size of an organism.
2.	An organism's ability to survive and reproduce in its environment.
3.	The number of mutations an organism accumulates.
4.	An organism's speed and agility.

149.

Assertion (A):	Plant cells utilize a strategy during respiration that involves catabolizing glucose in multiple small steps.
Reason (R):	Unlike animal cells plant cells do not have metabolic machinery to catabolize glucose.

1.	Both (A) and (R) are True and (R) correctly explains (A).
2.	Both (A) and (R) are True and (R) does not correctly explain (A).
3.	(A) is True; (R) is False
4.	Both (A) and (R) are False

150. The members of Kingdom Monera and Kingdom Protista in Whittaker's five kingdom classification resemble each other in:

1. Cell type	2. Body organization
3. Nature of cell wall	4. Nuclear membrane

151. In a grassland ecosystem, the energy pyramid is always upright because:

1.	The biomass of herbivores is always greater than that of primary producers.
2.	The total energy content decreases at each successive trophic level due to energy loss as heat.
3.	The number of organisms remains the same across all trophic levels.
4.	Decomposers consume more energy than all other trophic levels combined.

152. The European Federation of Biotechnology [EFB] defines biotechnology as:

1.	The use of living cells and bacteria in industrial and scientific processes.
2.	The integration of natural sciences and organisms, cells, parts thereof, and molecular analogues for products and services.
3.	The use of biology to solve problems and make useful products.
4.	The use of biology to develop new products, methods and organisms intended to improve human health and society.

153. Consider the given two statements:

Statement I:	Ethylene promotes fruit ripening and is responsible for the climacteric rise in respiration in ripening fruits like bananas and tomatoes.
Statement II:	Ethylene enhances leaf senescence and abscission, and it is used in agriculture to synchronize fruit ripening in crops such as pineapples.

Which of the following is correct?

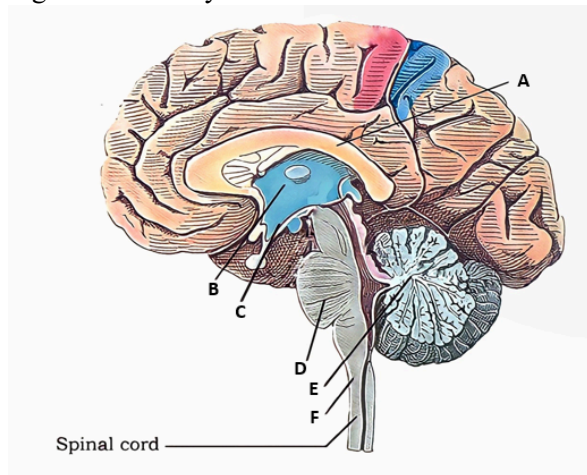
1. Only **Statement I** is correct.
2. Only **Statement II** is correct.
3. Both **Statement I** and **Statement II** are correct.
4. Both **Statement I** and **Statement II** are incorrect.

154. Consider the given two statements:

Assertion (A):	Polygenic traits are quantitative because they involve multiple genes.
Reason (R):	In such traits the genes involved have more than two alleles.

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.

155. A major coordinating center for sensory and motor signaling in the human brain is shown in the given sagittal section by the letter:



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

156. Arrange the following events of the cardiac cycle in the correct sequence:

1. Ventricular systole
2. Joint diastole (relaxation of atria and ventricles)
3. Atrial systole
4. Closure of semilunar valves

Options:

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

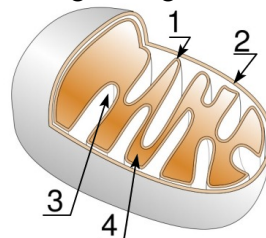
157. Tyrosine, phenylalanine and tryptophan are all:

1. Acidic amino acids
2. Sulphur containing amino acids
3. Essential amino acids
4. Aromatic amino acids

158. The autonomic nervous system innervates:

- I: cardiac muscle
 II: glands
 III: skeletal muscle
 IV: smooth muscle
1. Only I, II and III
 2. Only I, II and IV
 3. Only II, III and IV
 4. I, II, III and IV

159. Which number represents the site for Krebs' cycle in the given figure?



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

160. Consider the two statements:

Statement I:	ADH makes the collecting duct more permeable to water.
Statement II:	Aldosterone is produced by the hypothalamus in response to high levels of sodium ions in the blood.

1.	Statement I is correct; Statement II is correct
2.	Statement I is correct; Statement II is incorrect
3.	Statement I is incorrect; Statement II is correct
4.	Statement I is incorrect; Statement II is incorrect

161. Match the following stages of mitosis with their key events:

	Stages of Mitosis		Key Events
(A)	Prophase	(i)	Chromosomes align at the equator
(B)	Metaphase	(ii)	Chromosomes decondense at poles
(C)	Anaphase	(iii)	Chromosomal material condenses
(D)	Telophase	(iv)	Centromeres split and chromatids separate

1. A-(ii), B-(i), C-(iii), D-(iv)
2. A-(iii), B-(i), C-(iv), D-(ii)
3. A-(i), B-(iii), C-(ii), D-(iv)
4. A-(iv), B-(ii), C-(i), D-(iii)

162. Consider the given two statements:

Statement I:	A transcription unit in DNA is the structural gene that is flanked by the promoter and the terminator.
Statement II:	A translational unit in mRNA is the sequence of RNA that is flanked by the start codon (AUG) and the stop codon

1. Both I and II are correct
2. Only II is correct
3. Only I is correct
4. Both I and II are incorrect

163. During pregnancy, the levels of thyroxin:

1. Increase several folds in maternal blood
2. Increases several folds in fetal blood
3. Decreases several folds in maternal blood
4. Decreases several folds in fetal blood

164. Consider the given two statements:

Assertion (A):	The receptors for insulin are located inside the cell.
Reason (R):	Insulin is lipid soluble.

1.	Both (A) and (R) are True and (R) correctly explains (A).
2.	(A) is True but (R) is False
3.	Both (A) and (R) are False
4.	Both (A) and (R) are True but (R) does not correctly explain (A).

165. *Planaria* possess a high capacity of:

1. metamorphosis
2. regeneration
3. alternation of generation
4. bioluminescence

166. In order to produce concentrated urine, a large amount of water could be reabsorbed in the human kidney from:

1. PCT
2. Henle's loop
3. DCT
4. Collecting duct

167. Which cells produce and maintain cartilage matrix?

1. Osteocytes
2. Chondrocytes
3. Adipocytes
4. Fibroblasts

168. Which of the following is a measure of the substrate concentration at which the enzyme catalyzes a reaction at half its maximum velocity?

1. K_m value
2. Pk_a value
3. Q_{10}
4. $\frac{1}{2} V_{max}$

169. A non-medicated IUD amongst the following is:

1. Lippes loop
2. Multiload 375
3. Progestasert
4. LNG-20

170. A glenoid cavity is:

1.	seen in scapula and articulates with head of humerus
2.	seen in coxal bone and articulates with head of femur
3.	seen in clavicle and articulates with sternum
4.	seen in femur and articulates with patella

171. The RNA polymerase holoenzyme transcribes:

1. the promoter, structural gene and the terminator region
2. the promoter and the terminator region
3. the structural gene and the terminator region
4. the structural gene only.

172. How can tissue culture be used to produce virus-free plants from infected plants?

1.	By removing the infected leaves and growing them in sterile conditions.
2.	By isolating and growing the virus-free meristem from infected plants.
3.	By using pesticides in the growth medium to kill the virus.
4.	By exposing the infected plants to ultraviolet light to eliminate the virus.

173. The species confined to a particular region and not found elsewhere are termed as:

1. Keystone	2. Alien
3. Endemic	4. Rare

174. Identify the correct statements from the following:

I:	ANF is secreted by the right atrium of heart and causes vasodilation
II:	Erythropoietin is secreted by kidney and stimulates bone marrow to produce RBC
III:	Insulin-like growth factors are secreted by liver and play an important role in childhood growth, and has anabolic effects in adults

1. Only I and II	2. Only I and III
3. Only II and III	4. I, II and III

175. Classification system based on information like chromosome number, structure, behaviour is called as:

1. Numerical taxonomy
2. Cytotaxonomy
3. Chemotaxonomy
4. Cladistics

176. Consider the given statements:

I:	Aldosterone is secreted by the adrenal cortex.
II:	Aldosterone regulates the secretion of angiotensinogen by liver.
III:	Aldosterone is a mineralocorticoid hormone.

1. Only I and II are correct
2. Only I and III are correct
3. Only II and III are correct
4. I, II and III are correct

177. Consider the given two statements:

Assertion (A):	Sex linked recessive traits are more common in females than in males of the species.
Reason (R):	Since females have two X chromosomes, the chances of their getting affected by a recessive X linked gene are higher.

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

178. Why are the plants produced through micropropagation called somaclones?

1.	They are genetically identical to the original plant as they arise from single somatic cells.
2.	They contain genetic variations due to recombination during tissue culture.
3.	They result from hybridization between different plant species.
4.	They develop only from seeds, ensuring genetic stability.

179. Platyhelminthes, rotifers and lancelets:

1. are pseudocoelomates
2. have protonephridia as excretory structure
3. do not reproduce by sexual method
4. possess remarkable powers of true regeneration

180. Some plants such as Viola (common pansy), Oxalis, and Commelina produce two types of flowers:

Statement I:	Cleistogamous flowers which are similar to flowers of other species with exposed anthers and stigma
Statement II:	Chasmogamous flowers which do not open at all.

1.	Statement I is correct; Statement II is correct
2.	Statement I is incorrect; Statement II is correct
3.	Statement I is correct; Statement II is incorrect
4.	Statement I is incorrect; Statement II is incorrect