



TECHNO INDIA GROUP PUBLIC SCHOOL

Dt. 07-04-2025

NEET Mock Test -4 (2025)

Time Allowed: **3 hours**

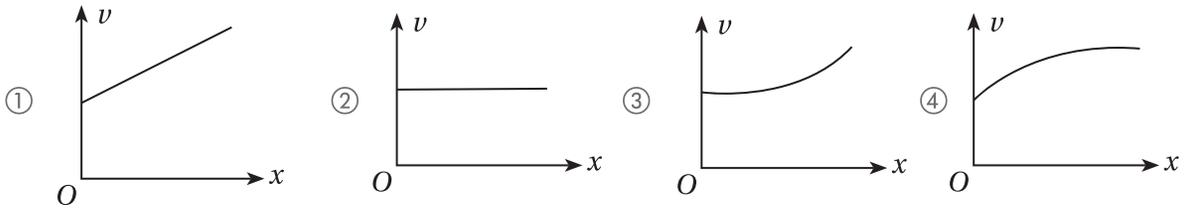
Maximum Marks: **720**

General Instructions:

1. This test will be 3 hours Test, Maximum Marks 720.
2. This test consists of 180 questions of Physics, Chemistry and Biology. All questions are COMPULSORY to attempt.
3. Each question is of 4 marks.
4. There are three parts in the question paper, consisting Part-I Physics (Q. No. 1 to 45), Part-II Chemistry (Q. no. 46 to 90), Part-III Biology (Q. no. 91 to 180).
5. There will be only one correct choice in the given four choices for each question. For each question 4 marks will be awarded for correct choice, 1 mark will be deducted for incorrect choice and zero mark will be awarded for unattempted question.
6. Any textual, printed or written material, mobile phones, calculator, etc. is not allowed for the students appearing for the test.
7. All calculations / written work should be done in the rough sheet provided.

PHYSICS

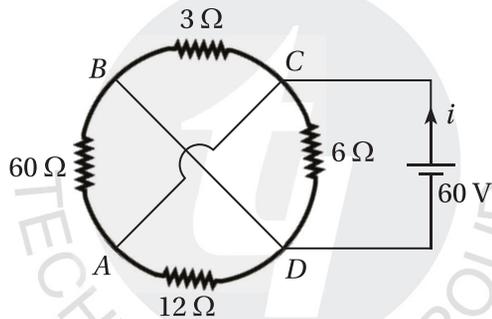
1. The space between plates of a parallel plate capacitor is filled by a dielectric and it is charged and then battery is removed. Now dielectric slab is slowly drawn out of the capacitor parallel to the plates. The variation of potential of capacitor with respect to the length of the dielectric plate drawn out is



2. The electric field due to a uniformly charged infinite conducting cylinder of radius R , at a distance $r (> R)$, from its axis is proportional to

- ① r^2 ② r^3 ③ r^{-1} ④ r^{-2}

3.

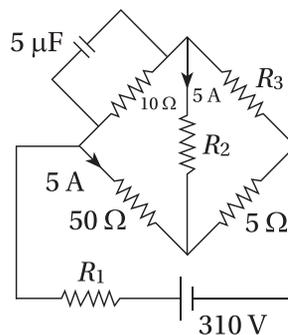


- ① 20 A ② 36 A ③ 30 A ④ 25 A

4. The current through a wire depends on time as $i = 4 + 3t + 2t^2$. Then, the charge crossed through a section of wire in 6 s is

- ① 200 C ② 100 C ③ 222 C ④ 150 C

5. As shown, the circuit is in steady state, if the charge on capacitor is $1000 \mu\text{C}$, then battery current is ($i =$)



- ① 20 A ② 5 A ③ 15 A ④ 25 A

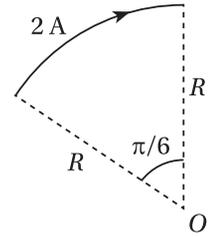
6. The magnetic field at the centre of circular arc of $\pi/6$ is (\otimes)

① $\frac{\mu_0}{12R}$

② $\frac{\mu_0}{4R}$

③ $\frac{\mu_0}{8R}$

④ $\frac{\mu_0}{6R}$



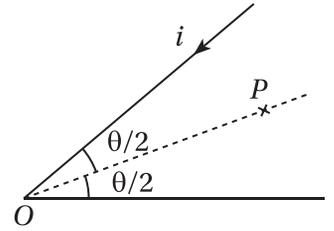
7. A long wire carrying a current i is bent to form a plane angle θ . The magnetic field at a point on the bisector of this angle situated at a distance d from vertex O is

① $\frac{\mu_0 i}{2\pi d} \cot\left(\frac{\theta}{4}\right) \odot$

② $\frac{\mu_0 i}{2\pi d} \cot\left(\frac{\theta}{2}\right) \odot$

③ $\frac{\mu_0 i}{4\pi d} \cot\theta \odot$

④ $\frac{\mu_0 i}{2\pi d} \cot\theta \otimes$



8. Two long straight wires, each carrying a current I , are separated by a distance r . If the currents are in opposite directions, then the strength of the magnetic field at any point midway between the two wires is

① $\frac{\mu_0 I}{\pi r}$

② $\frac{2\mu_0 I}{\pi r}$

③ $\frac{\mu_0 I}{2\pi r}$

④ Zero

9. A particle of mass 1 mg and having $1 \mu\text{C}$ is moving in a magnetic field $\vec{B} = (2\hat{i} + 3\hat{j} + \hat{k})T$, with velocity $\vec{v} = (2\hat{i} + \hat{j} - \hat{k})\text{m/s}$. The magnitude of acceleration of particle is (m/s^2)

① $2\sqrt{3}$

② $4\sqrt{3}$

③ 3

④ $3\sqrt{3}$

10. To express magnetic moment in vector form, area vector can be expressed as

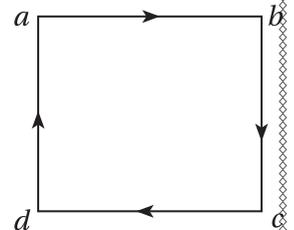
$\vec{A} =$

① $(\vec{ab} \times \vec{bc})$

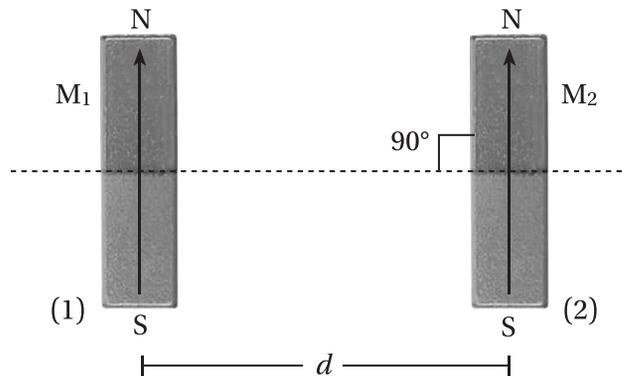
② $(\vec{bc} \times \vec{cd})$

③ $(\vec{cd} \times \vec{da})$

④ All of the above



11.



The torque experienced by magnet (2) due to (1) is

① 0

② > 0

③ < 0

④ data insufficient

12. Gauss's law for magnetism $\oint \vec{B} \cdot d\vec{s}$

- ① > 0 ② < 0 ③ $= 0$ ④ All of the above

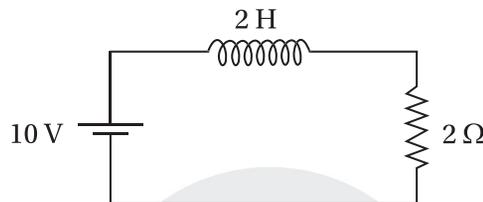
13. A thin rectangular magnet suspended freely has a period of oscillation T . What will be the period of oscillation if the magnet is broken into two halves perpendicular of length.

- ① $T/2$ ② T ③ $2T$ ④ $T/3$

14. In an oscillation of L-C circuit, the maximum charge on the capacitor is Q . The charge on the capacitor, when the energy is stored equally between the electric and magnetic field is

- ① $Q/2$ ② $Q/\sqrt{2}$ ③ $Q/\sqrt{3}$ ④ $Q/3$

15.

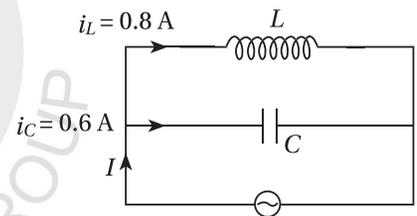


The magnetic energy stored in the coil is

- ① zero ② ∞ ③ 25 J ④ none of the above

16. Determine the current drawn from the source

- ① 0.2 A ② 0.1 A
③ 1.4 A ④ 1 A



17. The energy of a photon in eV of wavelength λ (nm) will be

- ① $E(\text{eV}) = \frac{1242}{\lambda(\text{nm})}$ ② $E(\text{eV}) = \frac{1000}{\lambda(\text{nm})}$ ③ $E(\text{eV}) = \frac{500}{\lambda(\text{nm})}$ ④ $E(\text{eV}) = \frac{250}{\lambda(\text{nm})}$

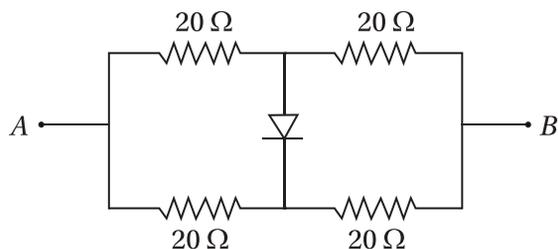
18. The maximum wavelength of light which can ionise a hydrogen atom in its ground state

- ① 80 nm ② 91.3 nm ③ 99 nm ④ 120 nm

19. A radioactive sample has 6×10^{18} active nuclei at a certain instant. How many of these nuclei will still be the same active state after two half-lives?

- ① 10^{17} ② 15×10^{17} ③ 5×10^{17} ④ 10^{16}

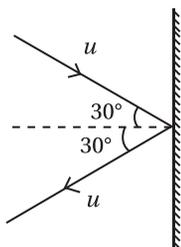
20.



The equivalent resistance across AB is

- ① 10 Ω ② 40 Ω ③ 20 Ω ④ 15 Ω

21. A car moving along a straight road with speed of 144 km h^{-1} is brought to a stop within a distance of 200 m. How long does it take for the car to stop?
- ① 5s ② 10s ③ 15s ④ 20s
22. The motion of a body is given by the equation $\frac{dv}{dt} = 6 - 3v$ where v is the speed in m s^{-1} and t is time in s. The body is at rest at $t = 0$. The speed varies with time as
- ① $v = (1 - e^{-3t})$ ② $v = 2(1 - e^{-3t})$ ③ $v = (1 + e^{-2t})$ ④ $v = 2(1 + e^{-3t})$
23. A body falling freely under gravity passes two points 30 m apart in 1 s. From what point above the upper point it began to fall? (Take $g = 9.8 \text{ m s}^{-2}$)
- ① 32.1 m ② 16.0 m ③ 8.6 m ④ 4.0 m
24. A bullet fired into a wooden block loses half of its velocity after penetrating 40 cm. It comes to rest after penetrating a further distance of
- ① $\frac{22}{3} \text{ cm}$ ② $\frac{40}{3} \text{ cm}$ ③ $\frac{20}{3} \text{ cm}$ ④ $\frac{22}{5} \text{ cm}$
25. A ball A is thrown vertically upwards with speed u . At the same instant another ball B is released from rest at height h . At time t , the speed of A relative to B is
- ① u ② $u - 2gt$ ③ $\sqrt{u^2 - 2gh}$ ④ $u - gt$
26. A unit vector is represented as $(0.8\hat{i} + b\hat{j} + 0.4\hat{k})$. Hence the value of 'b' must be
- ① 0.4 ② $\sqrt{0.6}$ ③ 0.2 ④ $\sqrt{0.2}$
27. The equations of motion of a projectile are given by $x = 36t \text{ m}$ and $2y = 96t - 9.8 t^2 \text{ m}$. The angle of projection is
- 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 $\sin^{-1}\left(\frac{3}{4}\right)$
28. A stone of mass 1 kg is lying on the floor of a train which is accelerating with 1 m s^{-2} . The net force acting on the stone is
- ① zero ② 1 N ③ 5 N ④ 10 N
29. A rocket with a lift-off mass $2 \times 10^4 \text{ kg}$ is blasted upwards with an initial acceleration of 5 m s^{-2} . The initial thrust of the blast is (Take $g = 10 \text{ s}^{-2}$)
- ① $2 \times 10^5 \text{ N}$ ② $3 \times 10^5 \text{ N}$ ③ $4 \times 10^3 \text{ N}$ ④ $5 \times 10^3 \text{ N}$
30. A ball of mass m strikes a rigid wall with speed u at an angle of 30° and get reflected with the same speed and at the same angle as shown in the figure. If the ball is in contact with the wall for time t , then the force acting on the wall is



- ① $\frac{\mu u \sin 30^\circ}{t}$ ② $\frac{2\mu u \sin 30^\circ}{t}$ ③ $\frac{\mu u \cos 30^\circ}{t}$ ④ $\frac{2\mu u \cos 30^\circ}{t}$

31. A ball of mass m is dropped from a cliff of height H . The ratio of its kinetic energy to the potential energy when it is fallen through a height $3/4 H$ is
- ① 3 : 4 ② 4 : 3 ③ 1 : 3 ④ 3 : 1
32. A block of mass 2 kg is dropped from a height of 40 cm on a spring whose force-constant is 1960 N m^{-1} . The maximum distance through which the spring is compressed by
- ① 5 cm ② 15 cm ③ 20 cm ④ 10 cm
33. A body of mass 0.5 kg travels in a straight line with velocity $v = kx^{3/2}$ where $k = 5 \text{ m}^{-1/2} \text{ s}^{-1}$. The work done by the net force during its displacement from $x = 0$ to $x = 2 \text{ m}$ is
- ① 1.5 j ② 50 j ③ 10 j ④ 100 j
34. A spherical ball A of mass 4 kg, moving along a straight line strikes another spherical ball B of mass 1 kg at rest. After the collision, A and B move with velocities $v_1 \text{ m s}^{-1}$ and $v_2 \text{ m s}^{-1}$ respectively making angles of 30° and 60° with respect to the original direction of motion of A. The ratio $\frac{v_1}{v_2}$ will be
- ① $\frac{\sqrt{3}}{4}$ ② $\frac{4}{\sqrt{3}}$
 ③ $\frac{1}{\sqrt{3}}$ ④ $\sqrt{3}$
35. A geostationary satellite is orbiting the Earth at a height $6R$ above the surface of Earth, where R is the radius of the Earth. The time period of another satellite at a height of $2.5R$ from the surface of Earth in hours is
- ① $3\sqrt{2}$ ② $1.5\sqrt{2}$
 ③ $6\sqrt{2}$ ④ $12\sqrt{2}$
36. If a graph is plotted between T^2 and r^3 for a planet, then its slope will be (where M_s is the mass of the Sun)
- ① $\frac{4\pi^2}{GM_s}$ ② $\frac{GM_s}{4\pi}$ ③ $4\pi GM_s$ ④ GM_s
37. The radius of gyration of a uniform rod of length l about an axis passing through one of its ends and perpendicular to its length is
- ① $\frac{l}{\sqrt{2}}$ ② $\frac{l}{3}$
 ③ $\frac{l}{\sqrt{3}}$ ④ $\frac{l}{2}$
38. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio
- ① 1 : 2 ② $\sqrt{2} : 1$ ③ $1 : \sqrt{2}$ ④ 2 : 1

39. One end of a long metallic wire of length L is tied to the ceiling. The other end is tied to a massless spring of spring constant k . A mass m hangs freely from the free end of the spring. The area of cross-section and the Young's modulus of the wire are A and Y respectively. If the mass is slightly pulled down and released, it will oscillate. Find the time period of oscillation.

① $2\pi\sqrt{\frac{m(YA + kL)}{YAk}}$ ② $\frac{1}{2\pi}\sqrt{\frac{mYA + kL}{YAk}}$ ③ $2\pi\sqrt{\frac{YAk}{mYA + kL}}$ ④ $2\pi\sqrt{\frac{kL}{YAk + mYA}}$

40. If the radius of the opening of the dropper is r , the vertical force due to the surface tension on the drop of radius R is (assuming $r \ll R$)

① $2\pi rT$ ② $2\pi RT$ ③ $\frac{2\pi r^2 T}{R}$ ④ $\frac{2\pi R^2 T}{R}$

41. The velocity of a small ball of mass M and density d , when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is $\frac{d}{2}$, then the viscous force acting on the ball will be

① $2Mg$ ② $\frac{Mg}{2}$ ③ Mg ④ $\frac{3}{2}Mg$

■ Assertion Reason based Questions:

Directions: Read the following questions and choose any one of the following four responses.

- A: Assertion and Reason both are correct and Reason is the correct explanation of Assertion.
 B: Assertion and Reason both are correct and Reason is not the correct explanation of Assertion.
 C: Assertion is correct but Reason is wrong.
 D: Assertion is wrong but Reason is correct.

42. **Assertion:** The speed of sound in solids is maximum though their density is large.

Reason: The coefficient of elasticity of solids is large.

- ① A ② B ③ C ④ D

43. **Assertion:** Intensity of sound wave does not change when the listener moves towards or away from stationary source.

Reason: The motion of listener causes the apparent change in wavelength.

- ① A ② B ③ C ④ D

44. **Assertion:** Variation in air pressure do not affect the speed of sound when temperature remains constant.

Reason: Speed of sound is directly proportional to square root of pressure.

- ① A ② B ③ C ④ D

45. **Assertion:** The fundamental frequency of an open organ pipe increases as the temperature is increased.

Reason: As the temperature increases the velocity of sound increases more rapidly than length of pipe.

- ① A ② B ③ C ④ D

CHEMISTRY

46. Match List I with List II.

List I (Molecule)		List II (Number and types of bonds/ between two carbon atoms)	
A.	ethane	I.	one σ -bond and two π -bonds
B.	ethene	II.	two π -bonds
C.	carbon molecule, C_2	III.	one σ -bonds
D.	ethyne	IV.	one σ -bond and one π -bond

Choose the correct answer from the options given below:

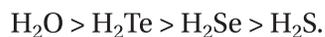
- ① A-I, B-IV, C-II, D-III ② A-IV, B-III, C-II, D-I
 ③ A-III, B-IV, C-II, D-I ④ A-III, B-IV, C-I, D-II

47. The Henry's law constant (K_H) values of three gases (A, B, C) in water are 145, 2×10^{-5} and 35 Kbar, respectively. The solubility of these gases in water follow the order:

- ① $B > A > C$ ② $B > C > A$ ③ $A > C > B$ ④ $A > B > C$

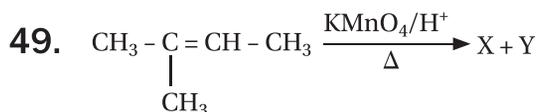
48. Given below are two statements:

Statement I: The boiling point of hydrides of Group 16 elements follow the order



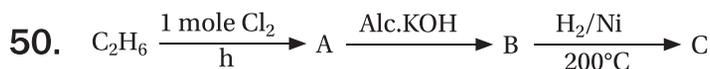
Statement II: On the basis of molecular mass, H_2O is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in H_2O , it has higher boiling point. In the light of the above statements, choose the correct answer from the options given below:

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



'X' and 'Y' in this reaction are

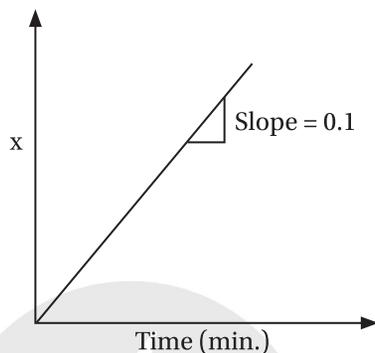
- ① Acetone; Acetic acid ② Acetone; Acetaldehyde
 ③ Acetaldehyde; Acetaldehyde ④ Acetaldehyde; Acetic acid



Here product C is

- ① C_2H_6 ② C_2H_5Cl ③ C_2H_4 ④ C_4H_{10}

51. Which of the following order reactions will have same units for reaction rate and rate constant?
 ① 2nd ② 1st ③ 3rd ④ zero
52. Which transition in the hydrogen spectrum would have the same wavelength as the Balmer type transition from $n = 4$ to $n = 2$ of He^+ spectrum
 ① $n = 2$ to $n = 1$ ② $n = 3$ to $n = 4$ ③ $n = 1$ to $n = 4$ ④ $n = 1$ to $n = 3$
53. The reaction, $A \rightarrow \text{products}$ follows zero order kinetics initial concentration of 'A' is 1M ('x' moles/litre of 'A' react in time 't').

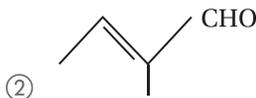


From the above graph, half-life of the reaction is

- ① 15 minutes ② 10 minutes ③ 18 minutes ④ 5 minutes
54. At 298K, molar conductance of 0.1M weak monoacidic base, BOH is $39.6 \text{ mho. cm}^2 \cdot \text{mole}^{-1}$. Molar conductance of BOH at infinite dilution is $396 \text{ mho.cm}^2 \cdot \text{mole}^{-1}$. pH of centi molar solution of BOH is
 ① 11 ② 10.699 ③ 12 ④ 9.301
55. Given below are two statements:
Statement I: For the same amount of heat absorbed reversibly and isothermally, the increase in randomness at low temperature is more than at higher temperature.
Statement II: ΔS_{system} for a spontaneous process is always negative.
 ① Both Statement I and Statement II are true
 ② Both Statement I and Statement II are false
 ③ Statement I is true but Statement II is false
 ④ Statement I is false but Statement II is true
56. Weight of 50% pure Potassium chlorate required to liberate 33.6 litres of oxygen at STP is
 ① 245 g ② 122.5 g ③ 61.25 g ④ 183.75 g
57. Consider the following reaction:
 $3\text{PbCl}_2 + 2(\text{NH}_4)_3\text{PO}_4 \rightarrow \text{Pb}_3(\text{PO}_4)_2 + 6\text{NH}_4\text{Cl}$
 If 72 milli mol of PbCl_2 is mixed with 50 milli mol of $(\text{NH}_4)_3\text{PO}_4$, then the amount of $\text{Pb}_3(\text{PO}_4)_2$ formed is _____ milli mol (nearest integer)
 ① 15 ② 24 ③ 8 ④ 32



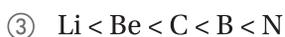
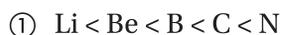
The product in this reaction cannot be



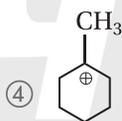
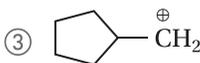
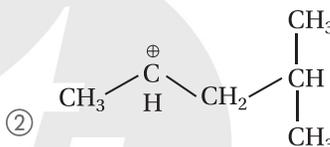
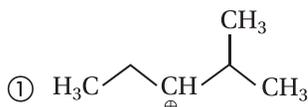
59. Arrange the following elements in increasing order of first ionization enthalpy:

Li, Be, B, C, N

Choose the correct answer from the options given below:



60. The most stable carbocation among the following is:



61. Activation energy of any chemical reaction can be calculated if one knows the value of

① rate constant at standard temperature

② probability of collision

③ orientation of reactant molecules during collision

④ rate constant at two different temperatures

62. 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 true

② Both Statement I and Statement II are false

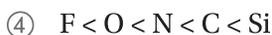
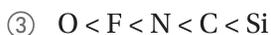
③ Statement I is true but Statement II is false

④ Statement I is false but Statement II is true

63. Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:



64. Match List I with List II.

List I (Conversion)		List II (Number of Faraday required)	
A.	1 mol of H_2O to O_2	I.	3F
B.	1 mol of MnO_4^- to Mn^{2+}	II.	2F
C.	1.5 mol of Ca from molten CaCl_2	III.	1F
D.	1 mol of FeO to Fe_2O_3	IV.	5F

Choose the correct answer from the options given below:

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

65. Match List I with List II.

List I (Complex)		List II (Type of isomerism)	
A.	$[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$	I.	Solvate isomerism
B.	$[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Br}$	II.	Linkage isomerism
C.	$[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$	III.	Ionization isomerism
D.	$[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$	IV.	Coordination isomerism

Choose the correct answer from the options given below:

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

66. Match List I with List II.

List I (Compound)		List II (Shape/geometry)	
A.	NH_3	I.	Trigonal Pyramidal
B.	BrF_5	II.	Square Planar
C.	XeF_4	III.	Octahedral
D.	SF_6	IV.	Square Pyramidal

Choose the correct answer from the options given below:

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

67. Which plot of $\ln k$ vs $\frac{1}{T}$ is consistent with Arrhenius equation?



68. The energy of an electron in the ground state ($n = 1$) for He^+ ion is $-x$ J, then that for an electron in $n = 2$ state for Be^{3+} ion in J is

- ① $-x$ ② $-\frac{x}{9}$ ③ $-4x$ ④ $-\frac{4}{9}x$

69. In which of the following processes entropy increases?

- A. A liquid evaporates to vapour
 B. Temperature of a crystalline solid lowered from 130 K to 0K
 C. $2\text{NaHCO}_3(\text{s}) \rightarrow \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
 D. $\text{Cl}_2(\text{g}) \rightarrow 2\text{Cl}(\text{g})$

Choose the correct answer from the options given below:

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

70. Which reaction is NOT a redox reaction?

- ① $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$ ② $2\text{KClO}_3 + \text{I}_2 \rightarrow 2\text{KIO}_3 + \text{Cl}_2$
 ③ $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$ ④ $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$

71. Match List I with List II.

List I (Quantum Number)		List II (Information provided)	
A.	m_l	I.	Shape of orbital
B.	m_s	II.	Size of orbital
C.	l	III.	Orientation of orbital
D.	n	IV.	Orientation of spin of electron

Choose the correct answer from the options given below:

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

72. 'Spin only' magnetic moment is same for which of the following ions?

A. Ti^{3+} B. Cr^{2+} C. Mn^{2+} D. Fe^{2+} E. Sc^{3+}

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

73. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

① 750 mg ② 250 mg ③ Zero mg ④ 200 mg

74. Among Group 16 elements, which one does NOT show -2 oxidation state?

① O ② We ③ Te ④ Po

75. Which one of the following alcohols reacts instantaneously with Lucas reagent?

① $CH_3 - CH_2 - CH_2 - CH_2OH$ ② $CH_3 - CH_2 - \underset{\substack{| \\ CH_3}}{CH} - OH$

③ $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - CH_2OH$ ④ $CH_3 - \underset{\substack{| \\ CH_3}}{\overset{\substack{CH_3 \\ |}}{C}} - OH$

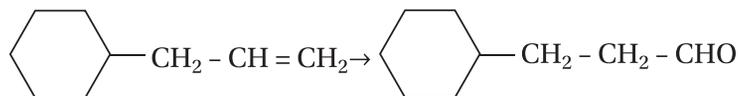
76. The reagents with which glucose does **not** react to give the corresponding tests/products are

- A. Tollen's reagent
 B. Temperature of a crystalline solid lowered from 130 K to 0K
 C. HCN
 D. NH_2OH
 E. $NaHSO_3$

Choose the correct answer from the options given below:

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

77. Identify the correct reagents that would bring about the following transformation.

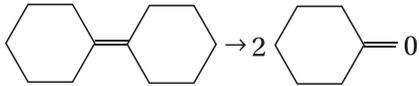
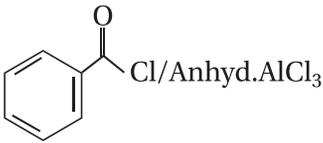
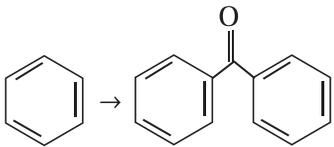
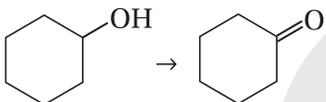
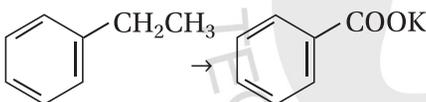


- ① (i) H_2O/H^+ (ii) CrO_3
 ② (i) BH_3 (ii) $H_2O_2/\overset{\ominus}{OH}$ (iii) PCC
 ③ BH_3 (ii) $H_2O_2/\overset{\ominus}{OH}$ (iii) alk. $KMnO_4$ (iv) H_3O^{\oplus}
 ④ (i) H_2O/H^+ (ii) PCC

78. In which of the following equilibria, K_p and K_c are NOT equal?

- ① $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ ② $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
 ③ $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ ④ $2BrCl(g) \rightleftharpoons Br_2(g) + Cl_2(g)$

84. Match List I with List II.

List I (Reaction)		List II (Reagents/Condition)	
A.		I.	 Cl/Anhyd. AlCl ₃
B.		II.	CrO ₃
C.		III.	KMnO ₄ /KOH, Δ
D.		IV.	(i) O ₃ (ii) Zn-H ₂ O

Choose the correct answer from the options given below:

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

85. Correct statements are

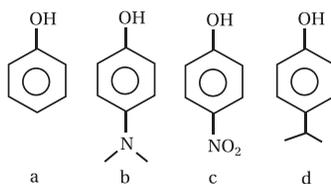
(A) MnF₇ cannot exist (B) Mn₂O₂ cannot exist (C) CrO₃ is acidic (D) CrO is amphoteric

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

86. Baeyer's test is not given by

- ① Benzene ② Ethene ③ Ethyne ④ Propene

87. The correct order of pK_a values for the following compound is



- ① c > a > d > b ② b > a > d > c ③ a > b > c > d ④ b > d > a > c

88. Match the following Column-I and Column-II:

Column-I (Reaction)		Column-II (Reagents)	
A.	Hoffmann Degradation	I.	Conc.KOH
B.	Clemenson reduction	II.	$\text{CHCl}_3, \text{NaOH}/\text{H}_3\text{O}^+$
C.	Cannizaro reaction	III.	Br_2, NaOH
D.	Reimer-Tiemann Reaction	IV.	$\text{Zn-Hg}/\text{HCl}$

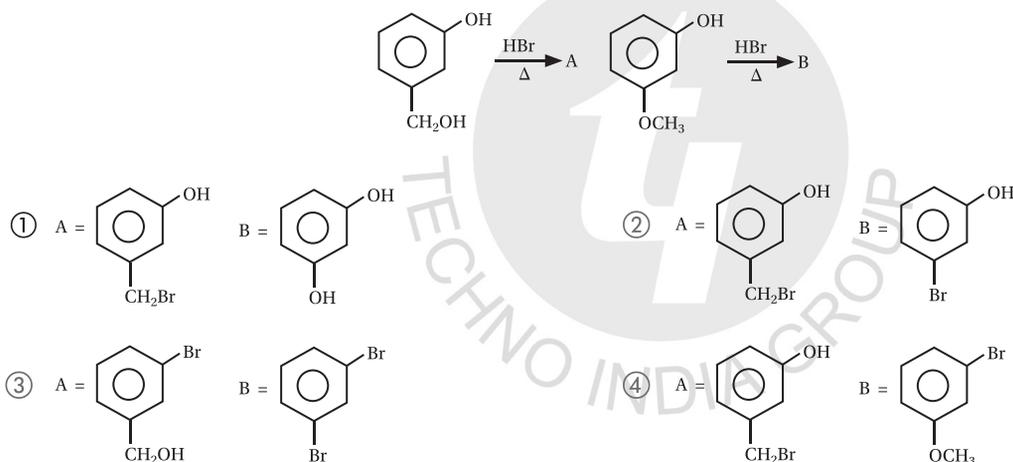
Choose the correct answer from the options given below:

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

89. Most reactive towards $\text{S}_{\text{N}}1$ reaction is

- ① $(\text{C}_6\text{H}_5)_2\text{CHBr}$ ② $(\text{C}_6\text{H}_5)_2\text{C}(\text{CH}_3)\text{Br}$ ③ $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$ ④ $(\text{C}_6\text{H}_5)_3\text{CBr}$

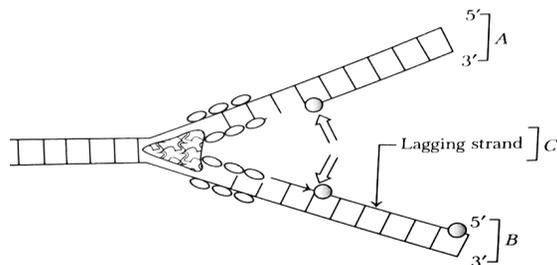
90. 'A' and 'B' formed in the following set of reactions are:



BIOLOGY

Botany

91. Which option shows correctly labelled region in the given diagram of DNA replication?



- ① A and C ② Only C ③ A and B ④ B and C

92. If the codon GGU is reversed, the resulting codon will code for which amino acid?

- ① Tyr ② Trp ③ Leu ④ Thr

93. Study the following Columns :

	Column - I		Column - II
A.	Exon	1.	Site for binding of RNA polymers
B.	Capping	2.	Coding sequence
C.	Tailing	3.	Lagging strand
D.	Promoter	4.	Methyl guanosine Triphosphate
		5.	Adenylate residues

- ① A B C D
2 4 5 1

- ② A B C D
2 4 1 5

- ③ A B C D
3 1 2 4

- ④ A B C D
4 2 3 1

94. Identify the correct pair of combinations :

- I. ^{14}C - Distinction between PS-I and PS-II.
 II. ^{15}N - Semiconservative replication of DNA.
 III. ^{35}S - Polypeptide synthesis.
 IV. ^{32}C - Identification of chemical nature of genetic material.

- ① II and III ② II and IV ③ I and II ④ I and III

95. Analogous structures are a result of

- ① convergent evolution ② shared ancestry
 ③ stabilising selection ④ divergent evolution

96. Which of the following structures is homologous to the wing of a bird?

- ① Wing of a moth ② Hindlimb of rabbit
 ③ Flipper of whale ④ Dorsal fin of shark

97. The formation of two species from one ancestral species is called

- ① convergent evolution ② phyletic evolution
 ③ allopatry ④ divergent evolution

98. Connecting link between fish and amphibians :

- ① Lungfish *Protopterus* ② *Latimeria*
 ③ *Seymouria* ④ *Sphenodon*

99. The highest DDT concentration in aquatic food chain shall occur in

- ① phytoplankton ② seagull ③ crab ④ eel

107. During respiration _____ .
- ① 2 PGAL are evolved during glycolysis and none in Krebs' cycle
 - ② 2 PGAL are evolved during glycolysis and two pyruvic acid in Krebs' cycle
 - ③ 2 PGAL are evolved during glycolysis and 4 pyruvic acid in Krebs' cycle
 - ④ 2 PGAL is not produced during respiratory events.
108. Enzyme enolase catalyses the conversion of 2PGA to PEP in the presence of _____ which is a cofactor.
- ① Mn^{+2}
 - ② Fe^{+2}
 - ③ Mg^{+2}
 - ④ Zn^{+2}
109. In a chloroplast, the highest number of protons are found in
- ① lumen of thylakoids
 - ② inter membrane space
 - ③ antennae complex
 - ④ stroma
110. The enzyme responsible for the primary carboxylation in C₃ plants is
- ① Pyruvate carboxylase
 - ② Succinic dehydrogenase
 - ③ Hexokinase
 - ④ RUBP carboxylase
111. The plants having vascular tissue, but lacking seeds, are placed under
- ① algae
 - ② bryophytes
 - ③ pteridophytes
 - ④ gymnosperms
112. In Funaria capsule, dispersal of spores occurs through
- ① peristomial teeth
 - ② annulus
 - ③ calyptras
 - ④ operculum
113. Karyotype is
- ① division of nucleus
 - ② chromosomes complement specific for each species
 - ③ all organisms possessing the same type of chromosome
 - ④ None of the above.
114. Puffs of polytene chromosome are specially concentrated with
- ① DNA polymerase
 - ② ligase
 - ③ ecdysone
 - ④ RNA polymerase
115. The two subunits of ribosome remain united at a critical ion level of
- ① Cu
 - ② Mn
 - ③ Mg
 - ④ Ca
116. Mesogamy is
- ① fusion of male and female gametes
 - ② fusion of physiologically similar but morphologically different gametes
 - ③ entry of pollen tube through integuments
 - ④ None of the above

124. A typical fat molecule is made up of

- ① one glycerol and three fatty acid molecules
- ② one glycerol and one fatty acid molecule
- ③ three glycerol and three fatty acid molecules
- ④ three glycerol and one fatty acid molecule

125. Which one of the following natural polymers is found in both insects and fungi?

- ① Pectin
- ② Chitin
- ③ Cellulose
- ④ Suberin

126. When a segment of chromosome breaks and later rejoins after 180° rotation, it is called

- ① deletion
- ② duplication
- ③ inversion
- ④ interstitial translocation

127. Match the following Columns :

	Column - I		Column - II
A.	Monoploidy	1.	$2n - 1$
B.	Monosomy	2.	$2n + 1$
C.	Nullisomy	3.	$2n + 2$
D.	Trisomy	4.	$2n - 2$
E.	Tetrasomy	5.	n
		6.	$3n$

- | | |
|--|--|
| <ul style="list-style-type: none"> ① A B C D E
5 1 4 2 3 ③ A B C D E
6 5 3 4 2 | <ul style="list-style-type: none"> ② A B C D E
5 2 4 1 3 ④ A B C D E
2 1 3 6 5 |
|--|--|

128. Why do scientists think that RNA, and not DNA, was the first gene?

- ① RNA can store information and act as an enzyme
- ② DNA copies itself but cannot store information
- ③ DNA did not exist in early cells
- ④ RNA sometimes forms a double helix.

129. **Assertion :** Coacervates are believed to be precursors of life.

Reason : Coacervates were self duplicating aggregates of proteins, surrounded by lipid molecules.

- ① A
- ② B
- ③ C
- ④ 4

130. The mass of living material at a trophic level at a particular time is called

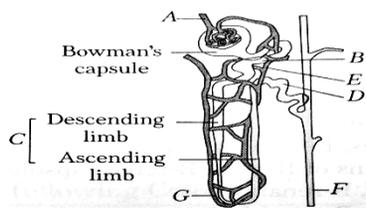
- ① net primary productivity
- ② gross primary productivity
- ③ standing state
- ④ standing crop

131. In an ecosystem, the rate of production of organic matter, during photosynthesis, is termed as
- ① net primary productivity ② gross primary productivity
 ③ net productivity ④ secondary productivity
132. The ovary is half inferior in flowers of
- ① cucumber ② cotton ③ guava ④ peach
133. Pome fruit is found in
- ① mango ② apple ③ litchi ④ peach
134. Which one of the following reactions is an example of oxidative decarboxylation?
- ① Conversion of succinate to fumarate ② Conversion of fumarate to malate
 ③ Conversion of pyruvate to Acetyl Co-A ④ Conversion of citrate to isocitrate
135. Oxygen content reduction makes glycolysis (glycolysis) intensity increased due to
- ① increase of ADP concentration in cell
 ② increase of NAD⁺ concentration in cell
 ③ increase of ATP concentration in cell
 ④ increase of concentration of peroxides and free radicals

Zoology

136. The pneumotaxic and respiratory rhythm centres are respectively, present in
- ① pons and medulla oblongata ② corpus callosum and pons
 ③ medulla oblongata and hypothalamus ④ diencephalon and pons
137. Which of the following sets of conditions promotes the dissociation of oxygen from haemoglobin?
- ① Low pO₂, high pCO₂, high H⁺ ② High pO₂, high pCO₂, low H⁺
 ③ High pO₂, low pCO₂, low H⁺ ④ Low pO₂, low pCO₂, low H⁺
138. Which one of the following animals have two separate circulatory pathways?
- ① Frog ② Lizard ③ Whale ④ Shark
139. In which of the following does blood circulation start and end with capillaries?
- ① Portal system ② Arterial system
 ③ Capillary system ④ Lymphatic system
140. If the systolic pressure is 120 mm Hg and diastolic pressure is 80 mm Hg, then pulse pressure is
- ① $120 \div 80 = 1.5$ mm Hg ② $120 + 80 = 200$ mm Hg
 ③ $120 \times 80 = 9600$ mm Hg ④ $120 - 80 = 40$ mm Hg

141. Study the given structure and match A B C D E F and G with correct option



- ① A-Afferent arteriole, B-Promimal convoluted tubule,
C-Henle's loop, D-Distal convoluted tubule
E-Peritubular capillaries, F-Collecting duct, G-Vasa recta
- ② A-Efferent arteriole, B-PCT, C-Henle's loop, D-DCT
E-Peritubular capillaries, F-Collecting duct, G-Vasa recta
- ③ A-Afferent arteriole, B-Peritubular capillaries
C-Henle's loop, D-DCT, E-PCT, F-Collecting duct, G-Vasa recta
- ④ A-Afferent arteriole, B-Henles loop, C-Collecting duct,
D-PCT, E-DCT, F-Peritubular capillaries, G-Vasa recta
142. In the CNS, myelinated fibres form _____ while the non myelinated fibres form the _____
- ① grey matter, white matter ② white matter, grey matter
③ ependymal cells, neurosecretory cells ④ neurosecretory cells, ependymal cells
143. Synaptic vesicle is found in
- ① pre synaptic neuron ② post synaptic neuron
③ synaptic cleft ④ none of these
144. With respect to its body mass, which of the following will have the highest metabolic rate?
- ① Rat ② Rabbit ③ Horse ④ Elephant
145. Atrial Natriuretic Factor decreases
- ① blood pressure ② secretion of rennin ③ Na^+ secretion ④ vasodilation.
146. Which of the following is incorrect regarding vasectomy?
- ① No sperm occurs in seminal fluid ② No sperm occurs in epididymis
③ Vas deferentia is cut and tied ④ Irreversible sterility
147. Embryo with more than 16 blastomeres, formed due to in vitro fertilisation, is transferred into
- ① uterus ② fallopian tube ③ fimbriae ④ cervix
148. Which of the following approaches does not give the defined action of contraceptive?
- ① Intrauterine devices — Increase phagocytosis of sperms, suppress sperm motility and fertilising capacity of sperms

156. Common characters of all vertebrates without exception, is
- ① body divided into head, trunk and tail
 - ② two pairs of limbs
 - ③ exoskeleton
 - ④ the presence of skull
157. Retrogressive metamorphosis occurs in
- ① Hemichordata
 - ② Cephalochordata
 - ③ Urochordata
 - ④ Vertebrata
158. Which one of the following is unique to Mollusca?
- ① Nacre and radula
 - ② Ommatophores
 - ③ Mantle and unsegmented soft body
 - ④ All of the above
159. Young one of mosquito formed by metamorphosis of pupa is called
- ① nymph
 - ② maggot
 - ③ imago
 - ④ caterpillar
160. Frogs
- ① are uricotelic
 - ② have olfactory lobes in midbrain
 - ③ do not have renal portal system
 - ④ have lymphatic system
161. In cockroach, the common duct of salivary reservoir opens at the base of
- ① pharynx
 - ② hypopharynx
 - ③ maxilla
 - ④ mandible
162. Choose the correct set of disease transmitting arthropods.
- ① Tse-tse, housefly, rat flea, sandfly
 - ② Anopheles, louse, housefly, termite
 - ③ Cockroach, louse, termite, housefly
 - ④ Rat flea, butterfly, housefly, tse-tse fly
163. Which one of the following is not property of cancerous cells?
- ① They compete with normal cells for vital nutrients
 - ② They may not remain confined in the area of formation
 - ③ They divide in an uncontrolled manner
 - ④ They show contact inhibition
164. In human beings, retrovirus is considered as a cause of cancer because
- ① in their genome oncogene is present
 - ② their hereditary material is made up of single stranded RNA
 - ③ they have a gene for reverse transcriptase
 - ④ in their genome there may be cellular proto-oncogene
165. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?
- ① Difficulty in respiration, fever, chills, cough, headache
 - ② Constipation, abdominal pain, cramps, blood clots
 - ③ Nasal congestion and discharge, cough, sorethroat, headache
 - ④ High fever, weakness, stomach pain, loss of appetite and constipation

176. Which one of the following factors contributed most to rapid rise in human population?

- ① Increase in birth rate
- ② Decrease in death rate of old people
- ③ Polygamy
- ④ Decrease in infant mortality

177. What is true related to sexual reproduction in plants?

- ① Size of embryo increases
- ② Size of cells decreases
- ③ Size of cells increases
- ④ Size of embryo decreases

178. In meiosis, crossing over is initiated at

- ① leptotene
- ② zygotene
- ③ diplotene
- ④ pachytene

179. Which one of the following is not a characteristic feature during mitosis in somatic cells?

- ① Disappearance of nucleolus
- ② Chromosome movement
- ③ Synapsis
- ④ Spindle fibres

180. Which one is a mismatch?

- ① Sternum and ribs - Axial skeleton
- ② Clavicle and glenoid cavity - Pelvic girdle
- ③ Humerus and ulna - Appendicular skeleton
- ④ Malleus and stapes - Ear ossicles

