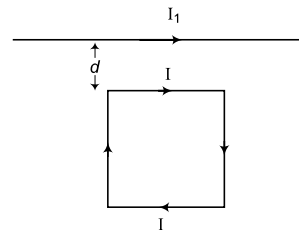


General Instructions: Same as Mock Test Paper 1

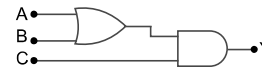
PHYSICS

Section A

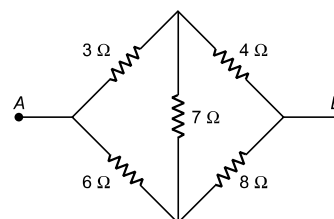
- The moment of inertia of a body about a given axis is $1.2 \text{ kg}\cdot\text{m}^2$. Initially, the body is at rest. In order to produce a rotational kinetic energy of 1500 joule, an angular acceleration of 25 rad/s^2 must be applied about that axis for a duration of:
 - 4 seconds
 - 2 seconds
 - 8 seconds
 - 10 seconds
- During the production of X-rays, if voltage is increased, then the
 - minimum wavelength decreases
 - minimum wavelength increases
 - intensity decreases
 - intensity increases
- If a small amount of antimony is added to germanium crystal:
 - it becomes a *p*-type semiconductor
 - the antimony become an acceptor atom
 - there will be more free electrons than holes in the semiconductor
 - its resistance is increased
- A planet moving along an elliptical orbit is closest to the Sun at a distance r_1 and farthest away at a distance r_2 . If v_1 and v_2 are the linear velocities at these points respectively, then the ratio v_1/v_2 is:
 - $(r_1/r_2)^2$
 - r_2/r_1
 - $(r_2/r_1)^2$
 - r_1/r_2
- The resistances of the four arms P, Q, R and S in a Wheatstone bridge are 10 ohm, 30 ohm, 30 ohm and 90 ohm, respectively. The e.m.f. and the internal resistance of the cell are 7 volt and 5 ohm respectively. If the galvanometer resistance is 50 ohm, the current drawn from the cell will be:
 - 2.0 A
 - 1.0 A
 - 0.2 A
 - 0.1 A
- 200 MeV of energy may be obtained per fission of U^{235} . A reactor is generating 1000 kW of power. The rate of nuclear fission in the reactor is:
 - 1000
 - 2×10^8
 - 3.125×10^{16}
 - 9^{31}
- The height at which the weight of a body becomes 1/16th, its weight on the surface of earth (radius R), is:
 - 5R
 - 15R
 - 3R
 - 4R
- A square loop, carrying a steady current I , is placed in a horizontal plane near a long straight conductor carrying a steady current I_1 at a distance d from the conductor as shown in figure. The loop will experience:
 - a net repulsive force away from the conductor.
 - a net torque acting upward perpendicular to the horizontal plane.
 - a net torque acting downward normal to the horizontal plane.
 - a net attractive force towards the conductor.



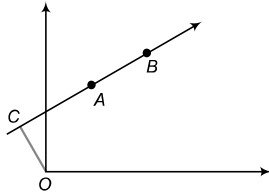
- To get output 1 for the following circuit, the correct choice for the input is:
 - $A = 0, B = 1, C = 0$
 - $A = 1, B = 0, C = 0$
 - $A = 1, B = 1, C = 0$
 - $A = 1, B = 0, C = 1$



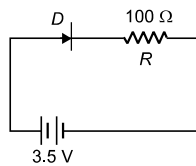
- $A = 0, B = 1, C = 0$
 - $A = 1, B = 0, C = 0$
 - $A = 1, B = 1, C = 0$
 - $A = 1, B = 0, C = 1$
- Electric field strength due to a point charge of $5 \mu\text{C}$ at a distance of 80 cm from the charge is:
 - $8 \times 10^4 \text{ N/C}$
 - $7 \times 10^4 \text{ N/C}$
 - $5 \times 10^4 \text{ N/C}$
 - $4 \times 10^4 \text{ N/C}$
 - Electromagnets are made of soft iron because soft iron has:
 - low retentivity and high coercive force
 - high retentivity and high coercive force
 - low retentivity and low coercive force
 - high retentivity and low coercive force
 - An automobile engine develops 100 kW when rotating at a speed of 1800 rev/min. What torque does it deliver?
 - 350 Nm
 - 440 Nm
 - 531 Nm
 - 628 Nm
 - In the given figure, equivalent resistance between A and B will be:
 - $\frac{14}{3} \Omega$
 - $\frac{3}{14} \Omega$
 - $\frac{9}{14} \Omega$
 - $\frac{14}{9} \Omega$



14. A second's pendulum is mounted in a rocket. Its period of oscillation decreases when the rocket
 (a) comes down with uniform acceleration
 (b) moves up with a uniform velocity.
 (c) moves around the Earth in a geostationary orbit.
 (d) moves up with uniform acceleration.
15. The energy of a hydrogen atom in the ground state is -13.6 eV. The energy of He^+ ion in the first excited state will be:
 (a) -13.6 eV (b) -27.2 eV
 (c) -54.4 eV (d) -6.8 eV
16. A fly wheel rotating about a fixed axis has a kinetic energy of 360 joule when its angular speed is 30 rad/s. The moment of inertia of the wheel about the axis of rotation is:
 (a) $0.6 \text{ kg}\cdot\text{m}^2$ (b) $0.15 \text{ kg}\cdot\text{m}^2$
 (c) $0.8 \text{ kg}\cdot\text{m}^2$ (d) $0.75 \text{ kg}\cdot\text{m}^2$
17. A particle of mass m moves in an XY plane with a velocity ' v ' along the straight line AB. If the angular momentum of the particle with respect to origin O is L_A when it is at A and L_B when it is at B then:

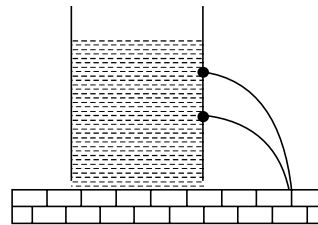


- (a) $L_A = L_B$
 (b) The relationship between L_A and L_B depends upon the slope of the line
 (c) $L_A < L_B$
 (d) $L_A > L_B$
18. Two wires are held perpendicular to the plane of paper 5 m apart. They carry currents of 2.5 A and 5 A in the same direction. Then the magnetic field strength B at a point midway between the wires will be:
 (a) $\frac{\mu_0}{4\pi} \text{ T}$ (b) $\frac{\mu_0}{2\pi} \text{ T}$ (c) $\frac{3\mu_0}{2\pi} \text{ T}$ (d) $\frac{3\mu_0}{4\pi} \text{ T}$
19. In the given figure, a diode D is connected to an external resistance $R = 100 \Omega$ and an e.m.f of 3.5 V. If the barrier potential developed across the diode is 0.5 V, the current in the circuit will be:



- (a) 35 mA (b) 30 mA (c) 40 mA (d) 20 mA
20. A parallel plate air capacitor of capacitance C is connected to a cell of emf V and then disconnected from it. A dielectric slab of dielectric constant K , which can just fill the air gap of the capacitor, is now inserted in it. Which of the following is incorrect?
 (a) The change in energy stored is $\frac{1}{2}CV^2 \left(\frac{1}{K} - 1 \right)$.
 (b) The charge on the capacitor is not conserved.
 (c) The potential difference between the plates decreases K times.
 (d) The energy stored in the capacitor decreases K times.

21. The unit of Young's modulus of elasticity is:
 (a) N/m (b) $\text{N}\cdot\text{m}$ (c) N/m^2 (d) $\text{N}\cdot\text{m}^2$
22. A long solenoid of diameter 0.1 m has 2×10^4 turns per metre. At the centre of the solenoid, a coil of 100 turns and radius 0.01 m is placed with its axis coinciding with the solenoid axis. The current in the solenoid reduces at a constant rate to 0 A from 4 A in 0.05 s. If the resistance of the coil is $10\pi^2 \Omega$, the total charge flowing through the coil during this time is:
 (a) $16 \mu\text{C}$ (b) $32 \mu\text{C}$ (c) $16 \pi \mu\text{C}$ (d) $32 \pi \mu\text{C}$
23. Two closed end pipes when sounded together produce 5 beat per second. If their length are in the ratio $100 : 101$, then fundamental notes produced by them are:
 (a) $245, 250$ (b) $250, 255$ (c) $495, 500$ (d) $500, 505$
24. The energy released in the fission of a ${}_{92}\text{U}^{235}$ nucleus is 200 MeV. The fission rate of ${}_{92}\text{U}^{235}$ fuelled reactor operating at a power level of 3.2 kW in one second is:
 (a) 10^{15} (b) 10^{14} (c) 10^{12} (d) 10^{10}
25. In a cylindrical vessel containing liquid of density ρ , there are two holes in the side walls at heights of h_1 and h_2 respectively such that the range of efflux at the bottom of the vessel is same. The height of a hole for which the range of efflux would be maximum, will be:

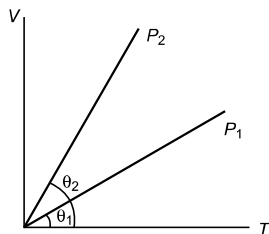


- (a) $h_2 - h_1$ (b) $h_2 + h_1$ (c) $\frac{h_2 - h_1}{2}$ (d) $\frac{h_2 + h_1}{2}$
26. You measure two quantities as $A = 1.0 m \pm 0.2 m$, $B = 2.0 m \pm 0.2 m$. You should report correct value for \sqrt{AB} as
 (a) $1.4 m \pm 0.4 m$ (b) $1.41 m \pm 0.15 m$
 (c) $1.4 m \pm 0.3 m$ (d) $1.4 m \pm 0.2 m$
27. For a crown glass prism $\eta_v = 1.523$ and $\eta_r = 1.513$ and mean $\eta = 1.518$ respectively. Dispersive power of the prism is
 (a) 1.9×10^{-4} (b) 1.9×10^{-2}
 (c) 2.6×10^{-3} (d) 2.6×10^{-2}
28. Water rises to height ' h ' in capillary tube. If the length of capillary tube above the surface of water is made less than ' h ', then:
 (a) water does not rise at all.
 (b) water rises upto the tip of capillary tube tube and then starts overflowing like a fountain.
 (c) water rises upto the top of capillary tube and stays there without overflowing.
 (d) water rises upto a point a little below the top and stays there.
29. A body dropped from a height H reaches the ground with a speed of $1.2\sqrt{gH}$. Calculate the work done by air-friction.
 (a) $2.8 mgH$ (b) $-1.3 mgH$
 (c) $1.3 mgH$ (d) $-0.28 mgH$
30. Hydrogen atom in ground state is excited by a monochromatic radiation of $\lambda = 975 \text{ \AA}$. Number of spectral lines emitted in the resulting spectrum will be:
 (a) 6 (b) 10 (c) 3 (d) 2

31. Choose the only false statement from the following:
- In conductors, the valence and conduction bands may overlap.
 - Substances with energy gap of the order of 10 eV are insulators.
 - The resistivity of semiconductor increases with increase in temperature.
 - The conductivity of semiconductor increases with increase in temperature.
32. A parachutist is in free fall before opening her parachute. The net force on her has a magnitude F and is directed downwards. This net force is somewhat less than her weight w because of air resistance. Then, she opens her parachute. At the instant after her parachute fully inflates, the net force on her would be
- Greater than F and still directed downwards
 - Less than F and still directed downwards
 - Zero
 - Directed upwards, but could be more or less than F
33. An electron of mass m and charge e initially at rest gets accelerated by a constant electric field E . The rate of change of de-Broglie wavelength of this electron at time t is:
- $\frac{2h}{eEt^2}$
 - $-\frac{2h}{eEt^2}$
 - $\frac{h}{eEt^2}$
 - $-\frac{h}{eEt^2}$
34. The angular velocity of a rotating body changes uniformly from $1/100$ rad/s to 10 rad/s without applying any torque but only by changing its radius of gyration. The ratio of radius of gyration in two cases (initial : final) will be:
- 10
 - $\sqrt{10}$
 - $10\sqrt{10}$
 - 100
35. A fish in water looking up sees the outside world, contained in a circular horizon. Given the refractive index of water is $4/3$ and the fish is 24 cm below the water surface, the radius of the circle in cm is:
- 27 cm
 - 24 cm
 - 32 cm
 - 16 cm

Section B

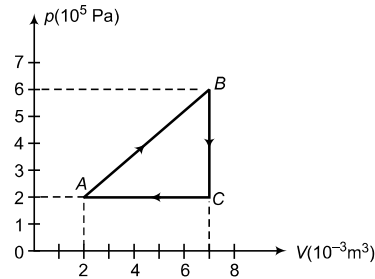
36. In the given ($V-T$) diagram, what is the relation between pressure P_1 and P_2 ?



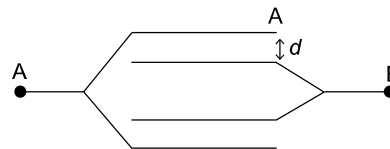
- Cannot be predicted
 - $P_2 = P_1$
 - $P_2 > P_1$
 - $P_2 < P_1$
37. An electromagnetic wave of frequency 4 MHz enters from vacuum into a medium having permittivity, $\epsilon = 9$. Then its
- Wavelength triples and the frequency remains constant
 - Wavelength triples and frequency becomes one third
 - Wavelength becomes one third and frequency remains unchanged
 - Wavelength and frequency remain unchanged
38. A simple pendulum executing small oscillations has period T . If now the length of the pendulum is made 4 times, mass of the bob doubled and amplitude made one-fourth, the new period becomes:

- $\frac{\sqrt{2}}{3}T$
- $\frac{T}{2\sqrt{2}}$
- $\frac{2\sqrt{2}}{3}T$
- $2T$

39. A gas is taken through the cycle A-B-C-A, as shown, what is the net work done by the gas?



- -2000 J
 - 2000 J
 - 1000 J
 - 0 J
40. A 220 volt input is supplied to a transformer. The output circuit draws a current of 2.0 ampere at 440 volts. If the efficiency of the transformer is 80% the current drawn by the primary windings of the transformer is:
- 3.6 ampere
 - 2.8 ampere
 - 2.5 ampere
 - 5.0 ampere
41. The work function of a metal is 1 eV. If light of wavelength 3000 \AA is incident on this metal surface, the velocity of emitted electrons will be:
- 10 m/s
 - 10^3 m/s
 - 10^4 m/s
 - 10^6 m/s
42. Two coherent monochromatic light beams of intensities I and $4I$ respectively are superimposed on each other. Then the resulting maximum and minimum intensities are:
- $5I$ and $3I$
 - $9I$ and $3I$
 - $4I$ and I
 - $9I$ and I
43. Four plates of same area of cross section are joined as shown in the figure. The distance between each plate is d . The equivalent capacity between A and B will be:

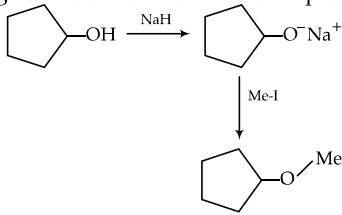


- $\frac{2\epsilon_0 A}{d}$
 - $\frac{3\epsilon_0 A}{d}$
 - $\frac{3\epsilon_0 A}{2d}$
 - $\frac{\epsilon_0 A}{d}$
44. If the electric field is given by $5\hat{i} + 4\hat{j} + 9\hat{k}$, then the electric flux through a surface area of 20 units lying in the YZ plane will be:
- 100 unit
 - 80 unit
 - 180 unit
 - 360 unit
45. A vessel contains 1 mole of O_2 gas at a temperature T . The pressure of the gas is P . An identical vessel containing one mole of He gas at temperature $2T$ has a pressure:
- $2P$
 - $P/2$
 - $8P$
 - $P/8$
46. A gas is found to obey the law $P^2V = \text{constant}$. The initial temperature and volume are T_0 and V_0 . If the gas expands to a volume $3V_0$, its final temperature becomes:
- $\frac{T_0}{3}$
 - $\frac{T_0}{\sqrt{3}}$
 - $3T_0$
 - $\sqrt{3}T_0$
47. A uniform steel bar of cross sectional area A and length L is suspended from a ceiling. If d is its density then the stress at the middle point is:
- $\frac{L}{A}dg$
 - $\frac{Ldg}{2}$
 - $\frac{LA}{2dg}$
 - Ldg

48. A stone tied to a rope is rotated in a vertical circle with uniform speed. If the difference between the maximum and minimum tension in the rope is 20 N, mass of the stone is [Take $g = 10 \text{ m/s}^2$]:
 (a) 0.75 kg (b) 1.0 kg (c) 1.5 kg (d) 0.5 kg
49. The coefficient of friction between the tyres and the road is 0.4. The minimum distance covered before attaining a speed of 72 km/hr starting from rest is [$g = 10 \text{ m/s}^2$]
 (a) 25 m (b) 50 m (c) 12.5 m (d) 100 m
50. If for same range, the two heights attained are 20 m and 80 m, the range will be
 (a) 20 m (b) 40 m (c) 120 m (d) 160 m

CHEMISTRY

Section A

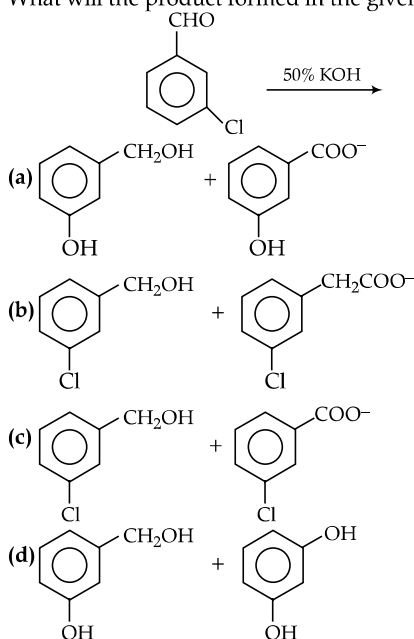
51. The correct bond order in the following species is:
 (a) $\text{O}_2^+ < \text{O}_2^- < \text{O}_2^{2+}$ (b) $\text{O}_2^- < \text{O}_2^+ < \text{O}_2^{2+}$
 (c) $\text{O}_2^{2+} < \text{O}_2^+ < \text{O}_2^-$ (d) $\text{O}_2^{2+} < \text{O}_2^- < \text{O}_2^+$
52. $\text{CH}_3 - \text{Cl} + \text{NaI} \xrightleftharpoons{\text{Acetone}} \text{CH}_3 - \text{I} + \text{NaCl}$
 Above equilibrium is more towards right because
 (a) NaI is more reactive than NaCl
 (b) CH_2I is more reactive than CH_3Cl
 (c) NaCl is less soluble than NaI in acetone
 (d) It is Finkelstein's reaction
53. Iron carbonyl, $\text{Fe}(\text{CO})_5$ is:
 (a) Trinuclear (b) Mononuclear
 (c) Tetranuclear (d) Dinuclear
54. A gas is allowed to expand in a well-insulated container against a constant external pressure of 2.5 atm from an initial volume of 2.50 L to a final volume of 4.50 L. The change in internal energy ΔU of the gas in joules will be:
 (a) 1136.25 J (b) -500 J (c) -505 J (d) 505 J
55. The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is:
 (a) 0 (b) 1 (c) 2 (d) 3
56. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order:
 (a) $\text{C}_2\text{H}_5\text{Cl}$, C_2H_6 , $\text{C}_2\text{H}_5\text{OH}$
 (b) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{Cl}$, $\text{C}_2\text{H}_5\text{ONa}$
 (c) $\text{C}_2\text{H}_5\text{OH}$, C_2H_6 , $\text{C}_2\text{H}_5\text{Cl}$
 (d) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{Cl}$
57. Reaction of *t*-butyl bromide with sodium methoxide produces
 (1) Sodium *t*-butoxide (2) *t*-butyl methyl ether
 (3) Isobutane (4) Isobutylene
58. The pair of electrons in the given carbanion, $\text{CH}_3\text{C}\equiv\text{C}^-$ is present in which of the following orbitals?
 (a) sp^2 (b) sp (c) $2p$ (d) sp^3
59. The compound C_7H_8 undergoes the following reactions:
 $\text{C}_7\text{H}_8 \xrightarrow{3\text{Cl}_2/\Delta} \text{A} \xrightarrow{\text{Br}_2/\text{Fe}} \text{B} \xrightarrow{\text{Zn}/\text{HCl}} \text{C}$
 The product 'C' is
 (a) *m*-bromotoluene (b) *o*-bromotoluene
 (c) 3-bromo-2,4,6-trichlorotoluene
 (d) *p*-bromotoluene
60. How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3 ? The concentrated acid is 70% HNO_3 .
 (a) 45.0 g conc. HNO_3 (b) 90.0 g conc. HNO_3
 (c) 70.0 g conc. HNO_3 (d) 540 g conc. HNO_3
61. In the preparation of chlorobenzene from aniline, the most suitable reagent is:
 (a) Chlorine in the presence of ultraviolet light
 (b) Chlorine in the presence of AlCl_3
 (c) Nitrous acid followed by heating with Cu_2Cl_2
 (d) HCl and Cu_2Cl_2
62. When vapours of a secondary alcohol is passed over heated copper at 573 K, the product formed is
 (a) an alkene (b) a carboxylic acid
 (c) an aldehyde (d) a ketone
63. Tautomerism is shown by:
 (a) $\text{CH}_3 - \text{O} - \text{NO}$ (b) $\text{CH}_3 - \text{CH}_2 - \text{NO}_2$
 (c) $\text{CH}_3\text{CH}_2\text{CN}$ (d) $\text{CH}_3 - \underset{\text{CH}_3}{\text{C}} - \text{OH}$
64. The heat of neutralisation for strong acid and strong base forming 2 moles of water is
 (a) $-2 \times 57.1 \text{ kJ}$ (b) -57.1 kJ
 (c) $(57.1)/2 \text{ kJ}$
 (d) Strong acid and strong base will not undergo neutralisation
65. Which one of the following is correct option for free expansion of an ideal gas under adiabatic condition?
 (a) $q \neq 0, \Delta T = 0, W = 0$ (b) $q = 0, \Delta T = 0, W = 0$
 (c) $q = 0, \Delta T < 0, W \neq 0$ (d) $q = 0, \Delta T \neq 0, W = 0$
66. The correct order of energy difference between adjacent energy levels in H atom:
 (a) $E_2 - E_1 > E_3 - E_2 > E_4 - E_3$
 (b) $E_2 - E_1 > E_4 - E_3 > E_3 - E_2$
 (c) $E_4 - E_3 > E_3 - E_2 > E_2 - E_1$
 (d) $E_3 - E_2 > E_4 - E_3 > E_2 - E_1$
67. The given below reaction is an example of

 (a) Riemann Tiemann reaction
 (b) Kolbe's reaction
 (c) Williamson ether synthesis reaction
 (d) Williamson alcohol synthesis reaction
68. Given, the mass of electron is $9.11 \times 10^{-31} \text{ kg}$, Planck's constant is $6.626 \times 10^{-34} \text{ Js}$, the uncertainty involved in the measurement of velocity within a distance of 0.1 Å is:
 (a) $5.79 \times 10^6 \text{ ms}^{-1}$ (b) $5.79 \times 10^7 \text{ ms}^{-1}$
 (c) $5.79 \times 10^8 \text{ ms}^{-1}$ (d) $5.79 \times 10^5 \text{ ms}^{-1}$
69. In Duma's method of estimation of nitrogen 0.35 g of an organic compound gave 55 mL of nitrogen collected at 300 K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound would be (Aqueous tension at 300 K = 15 mm)
 (a) 16.45 (b) 17.45 (c) 14.45 (d) 15.45
70. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be:
 (a) III > II > IV > I (b) II > III > I > IV
 (c) II > III > IV > I (d) III > IV > II > I

71. Magnetic moment 2.84 B.M. is given by:
Atomic number Ni = 28, Ti = 22, Cr = 24, Co = 27
(a) Ni⁺² (b) Ti⁺³ (c) Cr⁺³ (d) Co⁺²
72. 2, 3-dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid?
(a) (CH₃)₂CCH=CH₂
(b) (CH₃)₂C=C(CH₃)₂
(c) (CH₃)₂CHCH₂CH=CH₂
(d) (CH₃)₂CH— $\underset{\text{CH}_3}{\text{C}}$ —CH=CH₂
73. Given that bond energies of H—H and Cl—Cl are 430 kJ mol⁻¹ and 240 kJ mol⁻¹ respectively and ΔH_f for HCl is -90 kJ mol⁻¹. Bond enthalpy of HCl is:
(a) 290 kJ mol⁻¹ (b) 380 kJ mol⁻¹
(c) 425 kJ mol⁻¹ (d) 245 kJ mol⁻¹
74. The formation of the oxide ion, O²⁻(g) from oxygen atom requires first an exothermic and then an endothermic step as shown below:
O(g) + e⁻ → O⁻(g) Δ_f; H° = -141 kJ mol⁻¹
O⁻(g) + e⁻ → O²⁻(g); Δ_f; H° = + 780 kJ mol⁻¹
Thus, process of formation of O²⁻ in gas phase is unfavourable even though O²⁻ is isoelectronic with neon. It is due to the fact that:
(a) O ion has comparatively smaller size than oxygen atom.
(b) Oxygen is more electronegative.
(c) Addition of electron in oxygen results in larger size of the ion.
(d) Electron repulsion outweighs the stability gained by achieving noble gas configuration.
75. Which one of the following statements is not true regarding (+) lactose?
(a) On hydrolysis (+) lactose gives equal amount of D-(+) glucose and D-(+) galactose.
(b) (+) Lactose is a β-glucoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose.
(c) (+) Lactose is a reducing sugar and does not exhibit mutarotation.
(d) (+) Lactose, C₁₂H₂₂O₁₁ contains 8-OH groups.
76. Identify the wrong statement in the following.
(a) Atomic radius of the elements increases as one moves down the first group of the periodic table.
(b) Atomic radius of the elements decreases as one moves across from left to right in the 2nd period of the periodic table.
(c) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius.
(d) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius.
77. Activation energy of a chemical reaction can be determined by:
(a) evaluating rate constant at standard temperature.
(b) evaluating velocities of reaction at two different temperatures.
(c) evaluating rate constants at two different temperatures.
(d) changing concentration of reactants.
78. Which of the following compounds has a 3-centre-2-electron bond?
(a) Diborane (b) CO₂
(c) Boron trifluoride (d) Ammonia
79. Buffer solutions have constant acidity and alkalinity because:
(a) These give unionized acid or base on reaction with added acid or alkali.
(b) Acids and alkalies in these solutions are shielded from attack by other ions.
(c) They have large excess of H⁺ or OH⁻ ions.
(d) They have fixed value of pH.
80. In case of CH₃COOH, the oxidation number of carbon of carboxylic group is:
(a) -3 (b) Zero (c) +1 (d) +3
81. When an alkali metal is reacted with hydrogen then metallic hydride is formed. In this reaction:
(a) Hydrogen is oxidised
(b) Hydrogen is reduced
(c) Hydrogen is neither oxidised nor reduced
(d) Hydrogen is oxidised as well as reduced
82. Which of the following compounds will not undergo Friedel-Craft's reaction easily?
(a) Cumene (b) Xylene
(c) Nitrobenzene (d) Toluene
83. The correct sequence of increasing covalent character is represented by:
(a) LiCl < NaCl < BeCl₂ (b) BeCl₂ < NaCl < LiCl
(c) NaCl < LiCl < BeCl₂ (d) BeCl₂ < LiCl < NaCl
84. If the concentration of OH⁻ ions in the reaction, Fe(OH)₃(s) ⇌ Fe³⁺(aq) + 3OH⁻(aq) is decreased by ¼ times, then equilibrium concentration of Fe³⁺ will increase by:
(a) 8 times (b) 16 times (c) 64 times (d) 4 times
85. Which of the following is redox reaction?
(a) Evaporation of H₂O.
(b) Both oxidation and reduction.
(c) H₂SO₄ and NaOH.
(d) In atmosphere O₃ from O₂ by lightning.

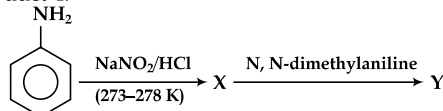
Section B

86. One litre of CO₂ is passed through red hot coke. The volume becomes 1.4 litres at same temperature and pressure. The composition of products is:
(a) 0.8 litre of CO₂ and 0.6 litre of CO
(b) 0.7 litre of CO₂ and 0.7 litre of CO
(c) 0.6 litre of CO₂ and 0.8 litre of CO
(d) 0.4 litre of CO₂ and 1.0 litre of CO
87. The straight chain polymer is formed by:
(a) Hydrolysis of (CH₃)₃SiCl followed by condensation polymerisation.
(b) Hydrolysis of CH₃SiCl₃ followed by condensation polymerisation.
(c) Hydrolysis of (CH₃)₄Si by addition polymerisation.
(d) Hydrolysis of (CH₃)₂SiCl₂ followed by condensation polymerisation.
88. What will be the ratio of the wavelengths of the first line to that of the second line of Paschen series of H atom?
(a) 256 : 175 (b) 175 : 256
(c) 15 : 16 (d) 24 : 27
89. Acidity of diprotic acids in aqueous solutions increases in the order.
(a) H₂S < H₂Se < H₂Te (b) H₂Se < H₂S < H₂Te
(c) H₂Te < H₂S < H₂Se (d) H₂Se < H₂Te < H₂S
90. Solution of 0.1N NH₄OH and 0.1N NH₄Cl has pH 9.25, then find out pK_b of NH₄OH.
(a) 9.25 (b) 4.75 (c) 3.75 (d) 8.25

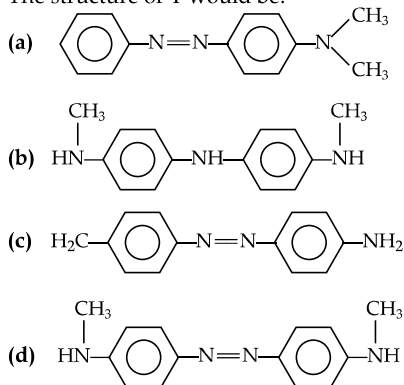
91. What will the product formed in the given reaction?



92. Aniline in a set of the following reactions yields a coloured product Y.



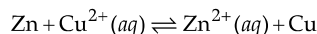
The structure of Y would be:



93. The relative lowering of vapour pressure of an aqueous solution containing a non volatile solute is 0.0125. The molality of solution is:

- (a) 0.40 (b) 0.50 (c) 0.70 (d) 0.80

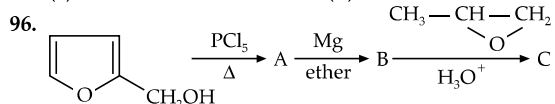
94. E°_{cell} for the given reaction is 1.10 V at 25°C. Calculate the equilibrium constant for the reaction.



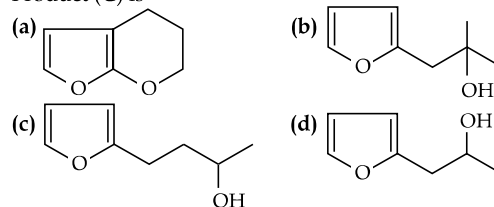
- (a) 10^{-28} (b) 10^{37} (c) 10^{19} (d) 10^{17}

95. Which of the following is the correct order of $E^\circ_{\text{M}^{2+}/\text{M}}$ values for Cr, Mn, Fe and Co?

- (a) Fe > Mn > Cr > Co (b) Cr > Mn > Fe > Co
(c) Mn > Cr > Fe > Co (d) Cr > Fe > Mn > Co



Product (C) is



97. When cis-but-2-ene is treated with Br_2 in CCl_4 , medium the product formed will be:

- (a) (2R, 3S) dibromobutane (b) (2R, 3R) dibromobutane
(c) (2S, 3S) dibromobutane (d) Mixture of (2R, 3R) and (2S, 3S) dibromobutane

98. Calculate the time required to produce 0.10 mol of chlorine gas using a current of 3 amperes during the electrolysis of molten sodium chloride.

- (a) 55.67 mins (b) 219.9 mins
(c) 330 mins (d) 107.22 mins

99. Given two statements

Statement 1: ΔH is not always equal to $c_p \Delta T$.

Statement 2: c_p is a polynomial function of temperature.

- (a) Statement 1 is incorrect but statement 2 is correct.
(b) Both statement 1 and statement 2 are correct.
(c) Both statement 1 and statement 2 are incorrect.
(d) Statement 1 is correct but statement 2 is incorrect.

100. In which of the following the central metal atom doesn't exhibit an oxidation state of +2.

- (a) $\text{K}_2[\text{Ni}(\text{CN})_4]$ (b) $\text{K}_4[\text{Fe}(\text{CN})_6]$
(c) $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ (d) $[\text{Cu}(\text{NH}_3)_4]^{2+}$

BOTANY

Section A

101. Gymnosperms are also called soft wood spermatophytes because they lack:

- (a) Thick walled tracheids (b) Xylem fibres
(c) Cambium (d) Phloem fibres

102. Basmati rice is distinct for its unique aroma and flavours. How many documented varieties of basmati rice are grown in India?

- (a) 15 (b) 27 (c) 45 (d) 35

103. Membrane-bound organelles are absent in:

- (a) *Plasmodium* (b) *Saccharomyces*
(c) *Streptococcus* (d) *Chlamydomonas*

104. Biolistics (Gene gun) is suitable for:

- (a) Disarming pathogen vectors.
(b) Transformation of plant cells.
(c) Constructing recombinant DNA by joining the vectors.
(d) DNA fingerprinting.

105. Cyanobacteria are also referred to as:

- (a) Protists (b) Golden algae
(c) Slime moulds (d) Blue green algae

106. Select the correct statement from the following regarding cell membrane:

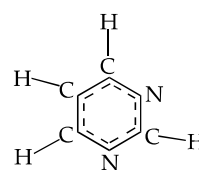
- (a) Lipids are arranged in a bilayer with polar heads towards the inner part.
(b) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson.

- (c) Na^+ And K^+ Ions move across cell membrane by passive transport.
 (d) Proteins make up 60 to 70% of the cell membrane.
107. Match the following genes of the Lac operon with their respective products:
- | | |
|-------------------|----------------------------|
| (A) <i>i</i> gene | (i) β -galactosidase |
| (B) <i>z</i> gene | (ii) Permease |
| (C) <i>a</i> gene | (iii) Repressor |
| (D) <i>y</i> gene | (iv) Transacetylase |
- Select the correct option from the following:
- | | | | |
|-----------|-------|------|------|
| (A) | (B) | (C) | (D) |
| (a) (iii) | (i) | (ii) | (iv) |
| (b) (iii) | (i) | (iv) | (ii) |
| (c) (iii) | (iv) | (i) | (ii) |
| (d) (i) | (iii) | (ii) | (iv) |
108. Choose the odd one regarding polymeric compounds:
 (a) Collagen (b) Cellulose
 (c) Chitin (d) Cholesterol
109. Which one of the following statements is correct?
 (a) Flower of tulip is a modified shoot.
 (b) In tomato, fruit is a capsule.
 (c) Seeds of orchids have oil-rich endosperm.
 (d) Placentation in Primrose is basal.
110. Synapsis occurs between:
 (a) Spindle fibres and centromeres.
 (b) *m*RNA and ribosomes.
 (c) A male and female gamete.
 (d) Two homologous chromosomes.
111. Vascular cryptogams differ from amphibians of plant kingdom as former:
 (a) Have multicellular sex organs.
 (b) Have photosynthetic gametophyte.
 (c) Have sporophyte as dominant plant body.
 (d) Show zygotic meiosis.
112. The only gaseous phytohormone:
 (a) Induces dormancy of seeds.
 (b) Increases the number of male flowers in cucumber.
 (c) Is synthesized in almost all plant parts.
 (d) Prevents abscission.
113. A test cross is carried out to:
 (a) Predict whether two traits are linked.
 (b) Assess the number of alleles of a gene.
 (c) Determine the genotype of F_2 plant.
 (d) Determine whether two species or varieties will breed successfully.
114. Select incorrect match.
 (a) Polyadelphous stamens – Lemon
 (b) Diadelphous stamens – Pea
 (c) Imbricate aestivation – Cassia
 (d) Basal placentation – Tomato
115. Seed coat is not thin, membranous in:
 (a) Coconut (b) Groundnut
 (c) Gram (d) Maize
116. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by:
 (a) Centrifugation
 (b) Polymerase Chain Reaction
 (c) Electrophoresis
 (d) Restriction mapping
117. Which of the following *r*RNAs, acts as structural RNA as well as ribozyme in cyanobacteria?
 (a) 18S *r*RNA (b) 23S *r*RNA
 (c) 5.8S *r*RNA (d) 5S *r*RNA
118. Read the following features properly:
 (i) Free living (ii) Photosynthetic
 (iii) Mostly parasitic (iv) Inconspicuous
 (v) Unicellular
- How many of the above features are correct for prothallus of pteridophytes?
 (a) Three (b) Five (c) Four (d) Two
119. The chief producers in the oceans are:
 (a) Coral reefs (b) Green algae
 (c) Diatoms (d) Dinoflagellates
120. *Trichoderma harzianum* has proved a useful microorganism for:
 (a) Biological control of soil-borne plant pathogens.
 (b) Bioremediation of contaminated soils.
 (c) Reclamation of wastelands.
 (d) Gene transfer in higher plants.
121. If gene of interest is inserted at the site of PstI in pBR322 then transformants and recombinants can be selected by:
 (a) Ampicillin; Tetracycline.
 (b) Tetracycline; Ampicillin respectively.
 (c) Ampicillin only.
 (d) Tetracycline only.
122. How many hotspots are present in India?
 (a) One (b) Three (c) Two (d) Four
123. Which of the following statement is not true for chromosome?
 (a) Isobrachial chromosomes has centromere at the centre.
 (b) Kinetochores present on either side of secondary constriction.
 (c) Humans have 5 pairs of SAT chromosomes.
 (d) Only few chromosomes have nucleolar organiser region.
124. The embryo sac of an angiosperm contains:
 (a) 3 cells and 3 nuclei. (b) 7 cells and 8 nuclei.
 (c) 8 cells and 8 nuclei. (d) 7 cells and 7 nuclei.
125. Inhibition of succinate dehydrogenase by malonate which closely resembles the substrate succinate in structure, would:
 (a) Increase V_{\max} without affecting K_m .
 (b) Decrease K_m without affecting V_{\max} .
 (c) Increase K_m without affecting V_{\max} .
 (d) Decrease both V_{\max} and K_m .
126. In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statements is true about archaea?
 (a) Archaea completely differ from prokaryotes.
 (b) Archaea resembles eukarya in all respects.
 (c) Archaea have some novel features that are absent in other prokaryotes and eukaryotes.
 (d) Archaea completely differ from both prokaryotes and eukaryotes.
127. The first genetic material was:
 (a) Protein (b) Carbohydrates
 (c) DNA (d) RNA
128. BOD of waste water is estimated by measuring the amount of:
 (a) Total inorganic matter.
 (b) Biodegradable organic matter.
 (c) Oxygen evolution by aerobic bacteria.
 (d) Oxygen consumed by aerobic bacteria while decomposing organic matter.

129. Holdfast, stipe and frond constitute the plant body in case of:
 (a) Rhodophyceae (b) Chlorophyceae
 (c) Phaeophyceae (d) Both (a) and (c)
130. In cyclic electron transport, the final electron acceptor is:
 (a) NADP⁺ (b) NAD⁺
 (c) NADPH + H⁺ (d) PS I itself
131. Which of the following is not obtained from the plant *Cannabis sativa*?
 (a) Marijuana (b) Hashish
 (c) Charas (d) Heroin
132. Who coined the term "Linkage"?
 (a) G. Mendel (b) Carl Correns
 (c) Bateson (d) T. H. Morgan
133. Match column-I and column-II and select the correct option.
- | Column-I | Column-II |
|----------------------------------|------------------------------------|
| (1) Aflatoxins | (i) <i>Neurospora crassa</i> |
| (2) Great Irish famine (1845-47) | (ii) <i>Ustilago nuda tritici</i> |
| (3) Loose smut of wheat | (iii) <i>Aspergillus flavus</i> |
| (4) Drosophila of plant kingdom | (iv) <i>Phytophthora infestans</i> |
- (a) (1)→(i), (2)→(iv), (3)→(ii), (4)→(iii)
 (b) (1)→(iii), (2)→(iv), (3)→(i), (4)→(ii)
 (c) (1)→(iii), (2)→(iv), (3)→(ii), (4)→(i)
 (d) (1)→(iv), (2)→(iii), (3)→(i), (4)→(ii)
134. During mitosis, E.R and nucleolus begin to disappear at:
 (a) Early metaphase (b) Late metaphase
 (c) Early prophase (d) Late prophase
135. Which of the following does not take part in the biosynthesis of terpenes?
 (a) Mevalonic acid
 (b) Methylerythritol phosphate
 (c) Acetyl-CoA
 (d) Phenol

Section B

136. Nitrogen content in amides is:
 (a) Equal to amino acids (b) More than amino acids
 (c) Less than amino acids (d) Absent
137. In Barley stem, the vascular bundles are:
 (a) Open and scattered (b) Closed and scattered
 (c) Closed and radial (d) Open and in a ring
138. Increase in concentration of the toxicant at successive trophic levels is known as:
 (a) Biogeochemical cycling (b) Biomagnification
 (c) Biodeterioration (d) Biotransformation
139. Cambium is also called as:
 (a) apical meristem (b) intercalary meristem
 (c) lateral meristem (d) none of these
140. The outermost layer of macromolecules in the prokaryotic cell envelope is
 (a) cell wall (b) cell membrane
 (c) glycocalyx (d) peptidoglycan
141. Of the total incident solar radiation the proportion of PAR is:
 (a) About 60% (b) Less than 50%
 (c) More than 80% (d) About 70%
142. Which one of the following statements is incorrect?
 (a) Condensation of chromatin material occurs in prophase.
 (b) Daughter chromatids are formed in anaphase.
 (c) Daughter nuclei are formed at metaphase.
 (d) Nuclear membrane reappears in telophase.
143. Which of the given tissues give rise to lateral roots in monocot root?
 (a) Pericycle (b) Vascular bundles
 (c) Cambium (d) Pith
144. Fusion of unrelated gametes is called _____.
 (a) Allogamy (b) Dichogamy
 (c) Fertilization (d) Autogamy
145. A purified DNA sample of leaf contains 20.0 mole of guanine. Calculate the approximate percentage of adenine residues:
 (a) 40% (b) 30% (c) 20% (d) 60%
146. A series of proteases responsible for initiating apoptosis (programmed cell death) and for digesting intracellular components is:
 (a) Caspases (b) Cyclins
 (c) CDKs (d) Map khase
147. Select the incorrect match regarding the chromosome number in meiocytes:
 (a) Rice – 20 (b) Onion – 16
 (c) Apple – 34 (d) Potato – 48
148. Which hormone promotes rooting in artificial method of cutting?
 (a) gibberellin (b) auxin
 (c) cytokinin (d) dormin
149. Identify the given ring structure and choose the correct option for it.



- (a) Purine (b) Pyrimidine
 (c) Coenzyme (d) Pyrrole
150. What will be the corresponding sequence of the transcribed mRNA if AGGTATCGCAT is a sequence from the coding strand of a gene?
 (a) AGGUAUCGCAU (b) UCCAUAGCGUA
 (c) ACCUAUGCGAU (d) UGGTUTCGCAT

ZOOLOGY

Section A

151. The most abundant protein in animal world is:
 (a) Collagen (b) Insulin
 (c) Trypsin (d) Haemoglobin
152. Choose the odd one regarding Urochordates:
 (a) *Ascidia* (b) *Salpa*
 (c) *Branchiostoma* (d) *Doliolum*
153. The principle of competitive exclusion was enunciated by:
 (a) Verhulst and Pearl (b) C. Darwin
 (c) G.F. Gause (d) Mac Arthur

154. Which one of the following characteristics is not shared by birds and mammals?

- (a) Breathing using lungs (b) Viviparity
(c) Warm blooded nature (d) Ossified endoskeleton

155. Excretory product of *Periplaneta*, is:

- (a) Urea (b) Ammonia
(c) Uric acid (d) Guanines

156. The exaggerated response of the immune system to certain antigens present in the environment is called:

- (a) AIDS (b) Allergy
(c) Autoimmune disease (d) SCID

157. Choose the amino-acid derivative hormone:

- (a) Hypothalamic hormone (b) Pituitary hormone
(c) Epinephrine (d) Thyroid hormone

158. Respiratory structure book lungs are present in:

- (a) Scorpion (b) *Limulus* (c) Prawn (d) Locust

159. Which one of the following formed elements of blood are not true cells?

- (a) RBCs only. (b) RBCs and platelets.
(c) Platelets only.
(d) All formed elements are cells.

160. Vestibular Apparatus consists of:

- (a) Crista (b) Macula
(c) Crista and Macula
(d) Crista, Macula and Cochlea

161. Select the mismatched option regarding tissue and their occurrence in various parts of the body.

(a)	Simple squamous epithelium	Renal capsule and PCT of nephron
(b)	Pseudostratified ciliated columnar epithelium	Trachea and large bronchi
(c)	White fibrous connective tissue	Sclera of eye and periosteum of bones
(d)	Transitional epithelium	Ureters and inner lining of urinary bladder

162. Artificial insemination means:

- (a) Transfer of sperms of a healthy donor to a test tube containing ova.
(b) Transfer of sperms of husband to a test tube containing ova.
(c) Artificial introduction of sperms of a healthy donor into the vagina.
(d) Introduction of sperms of healthy donor directly into the ovary.

163. Hinge joint is not found at:

- (a) Knee joint (b) Elbow joint
(c) Ankle joint (d) Carpo-metacarpal joint

164. Which of the following is not required for any of the techniques of DNA fingerprinting available at present?

- (a) DNA – DNA hybridization.
(b) Polymerase chain reaction.
(c) Zinc finger analysis.
(d) Restriction enzymes.

165. Select the incorrect match regarding hormone, its source gland and function.

	Hormone	Source	Function
(a)	Melatonin	Pineal gland	Regulates diurnal rhythm
(b)	Thymosin	Thyroid gland	Regulates basal metabolic rate

(c)	Insulin	Pancreas	Regulates blood glucose level
(d)	CCK	Gastro-intestinal-tract	Stimulates secretion of pancreatic enzymes and release of bile juice from gall bladder

166. Select the incorrect statement:

- (a) LH triggers ovulation in ovary.
(b) LH and FSH decrease gradually during the follicular phase.
(c) LH triggers secretion of androgens from the leydig cells.
(d) FSH stimulates the sertoli cells which help in spermiogenesis.

167. Select the mismatched pair:

- (a) Turner's syndrome – monosomy.
(b) Thalassaemia – Recessive autosomal.
(c) Christmas disease – Haemophilia – B.
(d) Polygenes – Qualitative inheritance.

168. Which one of the following is a possibility for most of us in regard to breathing, by making a conscious effort?

- (a) One can breathe out air totally without nose and mouth.
(b) One can breathe out air through Eustachian tube by closing both nose and mouth.
(c) One can consciously breathe in and breathe out by moving the diaphragm alone without moving the ribs at all.
(d) The lungs can be made fully empty by forcefully breathing out all air from them.

169. The function of copper ions in copper releasing IUD's is:

- (a) They suppress sperm motility and fertilizing capacity of sperms.
(b) They inhibit gametogenesis.
(c) They make uterus unsuitable for implantation.
(d) They inhibit ovulation.

170. Fall in GFR leads to release of:

- (a) Rennin (b) Renin (c) ANF (d) PTH

171. Identify member which has proboscis, collar and trunk as body division:

- (a) *Pila* (b) *Chiton*
(c) *Saccoglossus* (d) *Amphioxus*

172. "Mammals from colder climates generally have shorter ears and limbs to minimise heat loss". This is called:

- (a) Allen's rule (b) Jordan's rule
(c) Bergman's rule (d) Rensch's rule

173. A marine cartilaginous fish that can produce electric current is:

- (a) *Pristis* (b) *Torpedo* (c) *Trygon* (d) *Scoliodon*

174. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:

- (a) Fatigue (b) Tetanus (c) Tonus (d) Spasm

175. Vaccines are given to induce:

- (a) Natural passive immunity
(b) Artificial active immunity
(c) Natural active immunity
(d) Artificial passive immunity

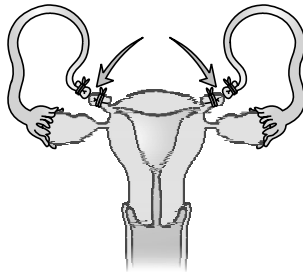
176. Which of the following represents trisomy?

- (a) $2n - 2$ (b) $2n + 1$ (c) $2n + 3$ (d) $n + 1$

177. In humans, multipolar neuron is found primarily in:

- (a) Retina
(b) Dorsal root ganglia of spinal cord
(c) Brain
(d) Olfactory membrane

178. Which antibody provides natural passive immunity to newly born baby?
 (a) IgA (b) IgG (c) IgM (d) IgE
179. Protein synthesis in an animal cell occurs:
 (a) Only on the ribosomes present in the cytosol.
 (b) On ribosomes present in cytoplasm as well as in mitochondria.
 (c) Only on ribosomes attached to the nuclear envelope and endoplasmic reticulum.
 (d) On ribosomes present in the nucleus as well as in cytoplasm.
180. What is the figure given showing in particular?



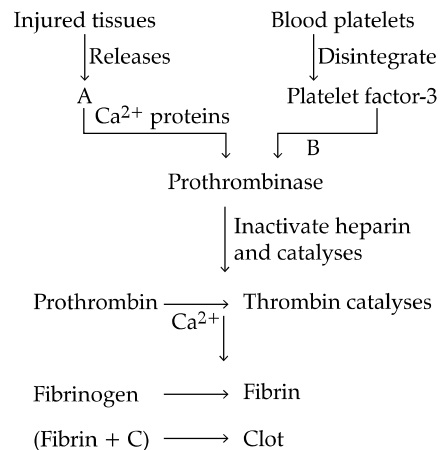
- (a) Ovarian cancer (b) Uterine cancer
 (c) Tubectomy (d) Vasectomy
181. A 27-year-old woman has excess facial and body hair. Her menstrual cycle is also infrequent, there is deepening of the voice and increased muscularity. Which one of the following disorders she may be suffering from?
 (a) Addison's disease (b) Gull's disease
 (c) Tetany (d) Adrenal virilism
182. Which of the following structures of regions is *incorrectly* paired with its function?
- | | | |
|-----------------------|---|---|
| (a) Medulla oblongata | : | controls respiration and cardiovascular reflexes. |
| (b) Corpus callosum | : | band of fibers connecting left and right cerebral hemispheres. |
| (c) Hypothalamus | : | production of releasing hormones and regulation of temperature, hunger and thirst. |
| (d) Limbic system | : | consists of fibre tracts that interconnect different regions of brain; controls movement. |
183. In earthworm, 10th and 11th segments bear loop-like broad vessels without valves, such vessels are known as:
 (a) Lateral hearts
 (b) Latero-oesophageal hearts
 (c) Anterior loops
 (d) Dorsal-blood vessel
184. Consider the following statements:
 (i) Glomerular Hydrostatic Pressure is the blood pressure in glomerular capillaries due to the narrower efferent arteriole. Its value ranges from 10 to 25 mm Hg.
 (ii) Blood colloid osmotic pressure is created in the blood of Henle's loop due to plasma proteins. Its value ranges from 60 to 75 mm Hg.
 (iii) Capsular Hydrostatic Pressure is caused by the fluid occupying the Bowman's capsule. Its value ranges from 10 to 20 mm Hg.

- Which of the above statements are true?
 (a) (ii) and (iii) (b) Only (iii)
 (c) (i) and (ii) (d) Only (i)

185. Hyperpolarization of a neuron is mainly due to:
 (a) K⁺ outflux actively. (b) K⁺ outflux passively.
 (c) Na⁺ outflux actively. (d) Na⁺ outflux passively.

Section B

186. The process by which organisms with same evolutionary history evolve different phenotypic adaptations in response to different environmental challenges is called:
 (a) Convergent evolution (b) Divergent evolution
 (c) Adaptive convergence (d) Saltation
187. Which one occupies more than one trophic level in a pond ecosystem?
 (a) Zooplankton (b) Phytoplankton
 (c) Fish (d) Frog
188. In Hardy-Weinberg equation, the frequency of homozygous recessive individual is represented by:
 (a) p² (b) pq (c) q² (d) 2pq
189. What is the partial pressure of oxygen and carbon dioxide respectively in the atmospheric air?
 (a) pO₂ 159 mmHg, pCO₂ 0.3 mmHg
 (b) pO₂ 104 mmHg, pCO₂ 40 mmHg
 (c) pO₂ 40 mmHg, pCO₂ 45 mmHg
 (d) pO₂ 95 mmHg, pCO₂ 40 mmHg
190. Two peaks are observed, as both extremes of a population is selected, in:
 (a) Directional natural selection.
 (b) Disruptive natural selection.
 (c) Balancing natural selection.
 (d) Stabilising natural selection.
191. In the given diagram, role of thrombocytes in blood coagulation is shown. Select the correct option for A, B and C.



- (a) A - Thrombokinase, B - Ca²⁺ proteins, C - coagulum
 (b) A - Thrombocytin, B - Mg²⁺ proteins, C - Scum
 (c) A - Thromboplastin, B - Ca²⁺ proteins, C - Blood cells
 (d) A - Thrombocytes, B - K⁺ ions, C - Blood cells
192. Which of the following is the correct recognition sequence of restriction enzyme Hind III?
 (a) 5' ---A-A-G-C-T-T---3' (b) 5' ---G-A-A-T-T-C---3'
 3' ---T-T-C-G-A-A---5' 3' ---C-T-T-A-A-G---5'
 (c) 5' ---C-G-A-T-T-C---3' (d) 5' ---G-G-C-C---3'
 3' ---G-C-T-A-A-G---5' 3' ---C-C-G-G---5'

193. What is the role of NAD^+ in cellular respiration?

- (a) It functions as an enzyme.
 (b) It is the final electron acceptor for anaerobic respiration.
 (c) It is a nucleotide source for ATP synthesis.
 (d) It functions as an electron carrier.

194. Tetany can be caused due to reduced:

- (a) thyroid (b) parathyroid
 (c) pituitary (d) liver

195. Match the column I with column II

Column I	Column II
(A) Chorion	(i) Small and non-functional in humans except for furnishing blood to the placenta.
(B) Amnion	(ii) Completely surround the embryo, provides protection and takes part in the formation of placenta.
(C) Allantois	(iii) Contains amniotic fluid which prevents embryo from desiccation and shocks.
(D) Yolk Sac	(iv) Non-functional in humans except functions as the site of early blood cell formation.

Choose the correct option.

- (a) A - (ii), B - (iii), C - (i), D - (iv)
 (b) A - (iv), B - (iii), C - (i), D - (ii)
 (c) A - (iii), B - (iv), C - (i), D - (ii)
 (d) A - (ii), B - (iii), C - (iv), D - (i)

196. Read the following statements and select the correct option.

Statement A: Substitution mutation often caused by chemicals or malfunction of DNA replication, substitution of single nucleotide for another. These changes are classified as, transitions or transversions.

Statement B: In transition, the purine base is replaced by pyrimidine and vice-versa.

- (a) Only statement A is incorrect.
 (b) Only statement B is incorrect.
 (c) Both statements A and B are incorrect.
 (d) Both statements A and B are correct.

197. Which one of the following pair is mismatched?

- (a) Down's syndrome = $44+XY$
 (b) Turner's syndrome = $44+X0$
 (c) Klinefelter's syndrome = $44+XXY$
 (d) Super female = $44+XXX$

198. Select the incorrect match regarding the names of human ancestors, synonymal names and the epoch in which they reside.

	Human ancestors	Also known as	Epochs
(a)	<i>Ramapithecus</i>	Sivapithecus	Middle and late Miocene
(b)	<i>Australopithecus</i>	Southern ape	Late Pliocene and Early Pleistocene
(c)	<i>Homo habilis</i>	Handy man	Gelasian Pleistocene
(d)	<i>Homo erectus</i>	Tool maker	Holocene

199. Out of the following given mRNAs, two are unable to translate. Find those two and accordingly choose the correct option.

- (1) AUG GUG UUU (2) UAA UAG UGA
 (3) UGA CCU GGA (4) AUG GGC ACA
 (a) (1) and (4) only (b) (1) only
 (c) (1) and (2) only (d) (2) and (3) only.

200. Which one of the following is not a part of human kidney?

- (a) Malpighian body (b) Malpighian tubule
 (c) Glomerulus (d) Loop of Henle