

AIPMT - 2005

Q.1 The work functions for metals A, B and C are respectively 1.92 eV, 2.0 eV and 5eV. According to Einstein's equation, the metals which will emit photo electrons for a radiation of wavelength 4100\AA is/are-

- (1) None (2) A only
(3) A and B only (4) All the three metals

Q.2 Zener diode is used for:-

- (1) Rectification
(2) Stabilisation
(3) Amplification
(4) Producing oscillations in an oscillator

Q.3 In the reaction ${}^2_1\text{H} + {}^3_1\text{H} \rightarrow {}^4_2\text{He} + {}^1_0\text{n}$. If the binding energies of ${}^2_1\text{H}$, ${}^3_1\text{H}$ and ${}^4_2\text{He}$ are respectively a, b and c (in MeV), then the energy (in MeV) released in this reaction is

- (1) $a + b + c$ (2) $c + a - b$
(3) $c - a - b$ (4) $a + b - c$

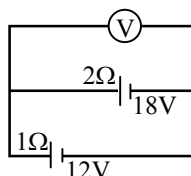
Q.4 In a circuit L, C and R are connected in series with an alternating voltage source of frequency f. The current leads the voltage by 45° . The value of C is -

- (1) $\frac{1}{2\pi f(2\pi f L - R)}$ (2) $\frac{1}{2\pi f(2\pi f L + R)}$
(3) $\frac{1}{\pi f(2\pi f L - R)}$ (4) $\frac{1}{\pi f(2\pi f L + R)}$

Q.5 Which of the following processes is reversible

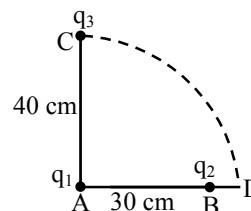
- (1) Transfer of heat by radiation
(2) Transfer of heat by conduction
(3) Isothermal compression
(4) Electrical heating of a nichrome wire

Q.6 Two batteries, one of emf 18 volts and internal resistance 2Ω and the other of emf 12 volt and internal resistance 1Ω , are connected as shown. The voltmeter V will record a reading of.



- (1) 18 volt (2) 30 volt
(3) 14 volt (4) 15 volt

Q.7 Two charges q_1 and q_2 are placed 30 cm apart, as shown in the figure. A third charge q_3 is moved along the arc of a circle of radius 40 cm from C to D. The change in the potential energy of the system is $\frac{q_3}{4\pi\epsilon_0} k$, where k is -



- (1) $8q_2$ (2) $6q_2$ (3) $8q_1$ (4) $6q_1$

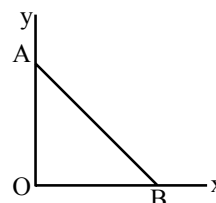
Q.8 An electron moves in a circular orbit with a uniform speed v. It produces a magnetic field B at the centre of the circle. The radius of the circle is proportional to :

- (1) $\sqrt{\frac{v}{B}}$ (2) $\frac{v}{B}$
(3) $\frac{B}{v}$ (4) $\sqrt{\frac{B}{v}}$

Q.9 A 5-ampere fuse wire can withstand a maximum power of 1 watt in the circuit. The resistance of the fuse wire is :

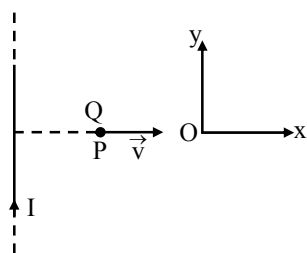
- (1) 5 ohm (2) 0.04 ohm
(3) 0.2 ohm (4) 0.4 ohm

Q.10 As per this diagram a point charge $+q$ is placed at the origin O. Work done in taking another point charge $-Q$ from the point A coordinates (0, a) to another point B coordinates (a, 0) along the straight path AB is



- (1) $\left(\frac{-qQ}{4\pi\epsilon_0} \frac{1}{a^2}\right) \sqrt{2}a$ (2) zero
(3) $\left(\frac{qQ}{4\pi\epsilon_0} \frac{1}{a^2}\right) \frac{1}{\sqrt{2}}$ (4) $\left(\frac{qQ}{4\pi\epsilon_0} \frac{1}{a^2}\right) \sqrt{2}a$

- Q.11** A very long straight wire carries a current I . At the instant when a charge $+Q$ at point P has velocity \vec{V} , as shown, the force on the charge is-



- (1) Along ox (2) Opposite to oy
(3) Along oy (4) Opposite to ox
- Q.12** If the magnetic dipole moment of an atom of diamagnetic material, paramagnetic material and ferromagnetic material are denoted by μ_d , μ_p and μ_f respectively, then
(1) $\mu_p = 0$ and $\mu_f \neq 0$ (2) $\mu_d \neq 0$ and $\mu_p = 0$
(3) $\mu_d \neq 0$ and $\mu_f \neq 0$ (4) $\mu_d = 0$ and $\mu_p \neq 0$
- Q.13** Two vibrating tuning forks produce progressive waves given by $Y_1 = 4 \sin 500 \pi t$ and $Y_2 = 2 \sin 506 \pi t$. Number of beats produced per minute is
(1) 3 (2) 360 (3) 180 (4) 60
- Q.14** When a wire of uniform cross-section a , length ℓ and resistance R is bent into a complete circle, resistance between any two of diametrically opposite points will be -
(1) $R/2$ (2) $R/4$ (3) $R/8$ (4) $4R$
- Q.15** A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of 31.4 cm/s. The frequency of its oscillation is :
(1) 1Hz (2) 3Hz (3) 2Hz (4) 4Hz
- Q.16** The temperature of inversion of a thermocouple is 620°C and the neutral temperature is 300°C . What is the temperature of cold junction :
(1) 40°C (2) 20°C (3) 320°C (4) -20°C
- Q.17** The ratio of the dimension of Planck's constant and that of the moment of inertia is the dimension of :
(1) Velocity (2) Angular momentum
(3) Time (4) Frequency

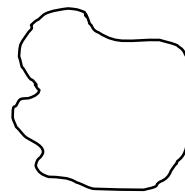
- Q.18** A bomb of mass 30kg at rest explodes into two pieces of masses 18 kg and 12 kg. The velocity of 18kg mass is 6ms^{-1} . The kinetic energy of the other mass is :
(1) 524 J (2) 256 J (3) 486 J (4) 324 J

- Q.19** The nuclei of which one of the following pairs of nuclei are isotones :

- (1) ${}_{34}\text{Se}^{74}$, ${}_{31}\text{Ga}^{71}$ (2) ${}_{38}\text{Sr}^{84}$, ${}_{38}\text{Sr}^{86}$
(3) ${}_{42}\text{Mo}^{92}$, ${}_{40}\text{Zr}^{92}$ (4) ${}_{20}\text{Ca}^{40}$, ${}_{16}\text{S}^{32}$

- Q.20** A photosensitive metallic surface has work function, $h\nu_0$. If photons of energy $2h\nu_0$ fall on this surface, the electrons come out with a maximum velocity of 4×10^6 m/s. When the photon energy is increased to $5h\nu_0$, then maximum velocity of photo electrons will be
(1) 2×10^7 m/s (2) 2×10^6 m/s
(3) 8×10^5 m/s (4) 8×10^6 m/s

- Q.21** As a result of change in the magnetic flux linked to the closed loop shown in the figure, an e.m.f. V volt is induced in the loop. The work done (joules) in taking a charge Q coulomb once along the loop is-



- (1) QV (2) $QV/2$
(3) $2QV$ (4) Zero

- Q.22** An ideal gas heat engine operates in Carnot cycle between 227°C and 127°C . It absorbs 6×10^4 cal of heat at higher temperature. Amount of heat converted to work is:-
(1) 4.8×10^4 cal (2) 2.4×10^4 cal
(3) 1.2×10^4 cal (4) 6×10^4 cal

- Q.23** A coil in the shape of an equilateral triangle of side ℓ is suspended between the pole pieces of a permanent magnet such that \vec{B} is in place of the coil. If due to a current i in the triangle a torque τ acts on it, the side ℓ of the triangle is-

- (1) $\frac{2}{\sqrt{3}} \left(\frac{\tau}{Bi} \right)$ (2) $\frac{1}{\sqrt{3}} \frac{\tau}{Bi}$
(3) $2 \left(\frac{\tau}{\sqrt{3}Bi} \right)^{\frac{1}{2}}$ (4) $\frac{2}{\sqrt{3}} \left(\frac{\tau}{Bi} \right)^{\frac{1}{2}}$

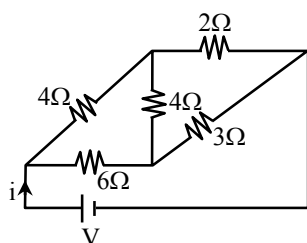
Q.24 If λ_v , λ_x and λ_m represent the wavelengths of visible light, x-rays and microwaves respectively, then-

- (1) $\lambda_m > \lambda_x > \lambda_v$ (2) $\lambda_v > \lambda_m > \lambda_x$
 (3) $\lambda_v > \lambda_x > \lambda_m$ (4) $\lambda_m > \lambda_v > \lambda_x$

Q.25 For a satellite moving in an orbit around the earth, the ratio of kinetic energy to potential energy is -

- (1) $\frac{1}{\sqrt{2}}$ (2) 2 (3) $\sqrt{2}$ (4) $\frac{1}{2}$

Q.26 For the network shown in the figure the value of the current i is -



- (1) $\frac{18V}{5}$ (2) $\frac{5V}{9}$
 (3) $\frac{9V}{35}$ (4) $\frac{5V}{18}$

Q.27 The moment of inertia of a uniform circular disc of radius 'R' and mass 'M' about an axis passing from the edge of the disc and normal to the disc is-

- (1) $\frac{1}{2} MR^2$ (2) $\frac{7}{2} MR^2$
 (3) $\frac{3}{2} MR^2$ (4) MR^2

Q.28 In any fission process the ratio $\frac{\text{mass of fission products}}{\text{mass of parent nucleus}}$ is-

- (1) Greater than 1
 (2) Depends on the mass of the parent nucleus
 (3) Equal to 1
 (4) Less than 1

Q.29 Copper has face centered cubic (fcc) lattice with interatomic spacing equal to 2.54\AA . The value of lattice constant for this lattice is-

- (1) 3.59\AA (2) 2.54\AA
 (3) 1.27\AA (4) 5.08\AA

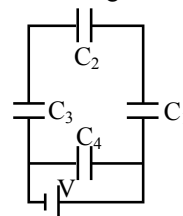
Q.30 Fission of nuclei is possible because the binding energy per nucleon in them-

- (1) Decreases with mass number at low mass numbers
 (2) Increases with mass number at low mass numbers
 (3) Decreases with mass number at high mass numbers
 (4) Increases with mass number at high mass numbers

Q.31 The angular resolution of a 10cm diameter telescope at a wavelength of 5000\AA is of the order of -

- (1) 10^{-4} rad (2) 10^{-6} rad
 (3) 10^6 rad (4) 10^{-2} rad

Q.32 A network of four capacitors of capacity equal to $C_1 = C$, $C_2 = 2C$, $C_3 = 3C$ and $C_4 = 4C$ are conducted to a battery as shown in the figure. The ratio of the charges on C_2 and C_4 is -



- (1) $\frac{7}{4}$ (2) $\frac{22}{3}$ (3) $\frac{3}{22}$ (4) $\frac{4}{7}$

Q.33 A drum of radius R and mass M, rolls down without slipping along an inclined plane of angle θ . The frictional force-

- (1) Decreases the rotational and translational motion
 (2) Dissipates energy as heat
 (3) Decreases the rotational motion
 (4) Converts translational energy to rotational energy

Q.34 A stone tied to the end of a string of 1 m long is whirled in a horizontal circle with a constant speed. If the stone makes 22 revolution in 44 seconds, what is the magnitude and direction of acceleration of the stone-

- (1) $\pi^2 \text{ms}^{-2}$ and direction along the tangent to the circle
 (2) $\pi^2 \text{ms}^{-2}$ and direction along the radius towards the centre.
 (3) $\frac{\pi^2}{4} \text{ms}^{-2}$ and direction along the radius towards the centre.
 (4) $\pi^2 \text{ms}^{-2}$ and direction along the radius away from the centre.

Q.35 Choose the only false statement from the following-

- (1) The resistivity of a semiconductor increases with increase in temperature
- (2) Substances with energy gap of the order of 10eV are insulators.
- (3) In conductors the valence and conduction bands may overlap
- (4) The conductivity of a semiconductor increases with increases in temperature.

Q.36 The circular motion of a particle with constant speed is-

- (1) Periodic and simple harmonic
- (2) Simple harmonic but not periodic
- (3) Neither periodic nor simple harmonic
- (4) Periodic but not simple harmonic

Q.37 The total energy of an electron in the first excited state of hydrogen atom is about -3.4eV . Its kinetic energy in this state is-

- (1) -6.8 eV (2) 3.4 eV
- (3) 6.8 eV (4) -3.4 eV

Q.38 Carbon, Silicon and Germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true in their case

- (1) $(E_g)_C < (E_g)_{Ge}$ (2) $(E_g)_C > (E_g)_{Si}$
- (3) $(E_g)_C = (E_g)_{Si}$ (4) $(E_g)_C < (E_g)_{Si}$

Q.39 Which of the following circular rods, (given radius r and length ℓ) each made of the same energy material and whose ends are maintained at the same temperature will conduct most heat

- (1) $r = 2r_0$; $\ell = 2\ell_0$ (2) $r = 2r_0$; $\ell = \ell_0$
- (3) $r = r_0$; $\ell = 2\ell_0$ (4) $r = r_0$; $\ell = \ell_0$

Q.40 If a vector $2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to the vector $4\hat{j} - 4\hat{i} + \alpha\hat{k}$, then the value of α

- (1) -1 (2) $-\frac{1}{2}$
- (3) $\frac{1}{2}$ (4) 1

Q.41 Imagine a new planet having the same density as that of earth but it is 3 times bigger than the earth in size. If the acceleration due to gravity on the surface of earth is g and that on the surface of the new planet is g' , then -

- (1) $g' = 3g$ (2) $g' = 9g$
- (3) $g' = g/9$ (4) $g' = 27g$

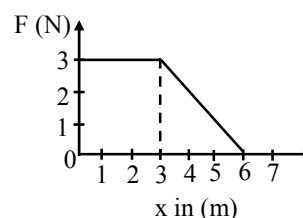
Q.42 If the angle between the vector \vec{A} and \vec{B} is θ , the value of the product $(\vec{B} \times \vec{A}) \cdot \vec{A}$ is equal to -

- (1) Zero (2) $BA^2 \sin \theta \cos \theta$
- (3) $BA^2 \cos \theta$ (4) $BA^2 \sin \theta$

Q.43 A point source emits sound equally in all directions in a non-absorbent medium. Two points P and Q are at distance of 2m and 3m respectively from the source. The ratio of the intensities of the waves at P and Q is -

- (1) 3 : 2 (2) 2 : 3
- (3) 9 : 4 (4) 4 : 9

Q.44 A force F acting on an object varies with distance x as shown here.



The force is in N and x in m. The work done by the force in moving the object from $x = 0$ to $x = 6\text{ m}$ is

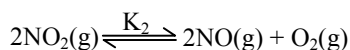
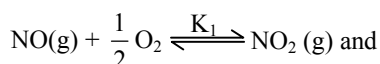
- (1) 18.0 J (2) 13.5 J
- (3) 4.5 J (4) 9.0 J

Q.45 Application of a forward bias to a p-n junction -

- (1) Widens the depletion zone
- (2) Increases the number of donors on the n side
- (3) Increases the potential difference across the depletion zone
- (4) Increases the electric field in the depletion zone

- Q.46** Energy levels A, B and C of a certain atom correspond to increasing values of energy i.e. $E_A < E_B < E_C$. If λ_1 , λ_2 and λ_3 are wave lengths of radiations corresponding to transitions C to B, B to A and C to A respectively, which of the following relations is correct -
- (1) $\lambda_3 = \lambda_1 + \lambda_2$ (2) $\lambda_1 + \lambda_2 + \lambda_3 = 0$
 (3) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$ (4) $\lambda_3 = \frac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$
- Q.47** The displacement x of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$, where a , b , α and β are positive constants. The velocity of the particle will -
- (1) Be independent of α and β
 (2) Go on increasing with time
 (3) Drop to zero when $\alpha = \beta$
 (4) Go on decreasing with time
- Q.48** Two boys are standing at the ends A and B of a ground where $AB = a$. The boy at B starts running in a direction perpendicular to AB with velocity v_1 . The boy at A starts running simultaneously with velocity v and catches the other boy in a time t , where t is -
- (1) $\frac{a}{\sqrt{v^2 + v_1^2}}$ (2) $\frac{a^2}{\sqrt{v^2 - v_1^2}}$
 (3) $\frac{a}{(v - v_1)}$ (4) $\frac{a}{(v + v_1)}$
- Q.49** 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 momentum will be in the ratio -
- (1) 1 : 2 (2) $\sqrt{2}$: 1
 (3) 1 : $\sqrt{2}$ (4) 2 : 1
- Q.50** A ball is thrown vertically up ward. It has a speed of 10m/sec when it has reached one half of its maximum height. How high does the ball rise? Take $g = 10 \text{ m/s}^2$ -
- (1) 5m (2) 15m
 (3) 10 m (4) 20 m
- Q.51** Which one of the following is an inner orbital complex as well as diamagnetic in behaviour -
- (1) $[\text{Zn}(\text{NH}_3)_6]^{2+}$ (2) $[\text{Ni}(\text{NH}_3)_6]^{2+}$
 (3) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ (4) $[\text{Co}(\text{NH}_3)_6]^{3+}$
- Q.52** Which one of the following oxides is expected to exhibit paramagnetic behaviour -
- (1) CO_2 (2) ClO_2 (3) SO_2 (4) SiO_2
- Q.53** The best method for the separation of naphthalene and benzoic acid from their mixture is -
- (1) Sublimation
 (2) Chromatography
 (3) Crystallisation
 (4) Distillation
- Q.54** Which one of the following forms micelles in aqueous solution above certain concentration -
- (1) Glucose
 (2) Urea
 (3) Dodecyl trimethyl ammonium chloride
 (4) Pyridinium chloride
- Q.55** The aqueous solution containing which one of the following ions will be colourless -
- (1) Fe^{2+} (2) Mn^{2+} (3) Ti^{3+} (4) Sc^{3+}
 [Atomic number : Sc = 21, Fe = 26, Ti = 24, Mn = 25]
- Q.56** A reaction occurs spontaneously if -
- (1) $T\Delta S > \Delta H$ and ΔH is +ve and ΔS are -ve
 (2) $T\Delta S = \Delta H$ and both ΔH and ΔS are +ve
 (3) $T\Delta S < \Delta H$ and both ΔH and ΔS are +ve
 (4) $T\Delta S > \Delta H$ and both ΔH and ΔS are +ve
- Q.57** In a face -centered cubic lattice, a unit cell is shared equally by how many unit cells :-
- (1) 4 (2) 2 (3) 6 (4) 8
- Q.58** Which amongst the following is the most stable carbocation :-
- (1) $\text{CH}_3 \dot{\text{C}}\text{H}_2$ (2) $\dot{\text{C}}\text{H}_3$
 (3) $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}^+$ (4) $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{CH}}}^+$

Q.59 Equilibrium constants K_1 and K_2 for the following equilibria :



are related as -

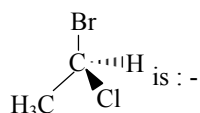
$$(1) K_2 = \frac{1}{K_1} \quad (2) K_2 = \frac{K_1}{2}$$

$$(3) K_2 = \frac{1}{K_1^2} \quad (4) K_2 = K_1^2$$

Q.60 The mole fraction of the solute in one molal aqueous solution is :-

- (1) 0.027 (2) 0.036
(3) 0.018 (4) 0.009

Q.61 The chirality of the compound



- (1) E (2) R (3) S (4) Z

Q.62 Which one of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species :-

- (1) $\text{F} < \text{Cl} < \text{O} < \text{S}$ (2) $\text{S} < \text{O} < \text{Cl} < \text{F}$
(3) $\text{O} < \text{S} < \text{F} < \text{Cl}$ (4) $\text{Cl} < \text{F} < \text{S} < \text{O}$

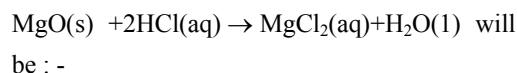
Q.63 The vapour pressure of two liquids 'P' and 'Q' are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 mole of P and 2 mole of Q would be :-

- (1) 68 torr (2) 140 torr
(3) 72 torr (4) 20 torr

Q.64 The mass of carbon anode consumed (giving only carbondioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is :-

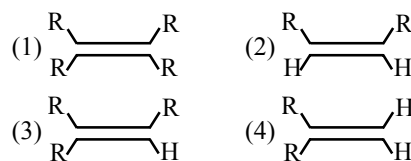
- (1) 90 kg (2) 540 kg
(3) 180 kg (4) 270 kg
(Atomic mass : Al = 27)

Q.65 The absolute enthalpy of neutralisation of the reaction :



- (1) 57.33 kJ mol^{-1}
(2) -57.33 kJ mol^{-1}
(3) Greater than -57.33 kJ mol^{-1}
(4) Less than -57.33 kJ mol^{-1}

Q.66 Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions :-



[R = Alkyl substituent]

Q.67 A solution of urea (mol. mass 56 g mol^{-1}) boils at 100.18°C at the atmospheric pressure. If K_f and K_b for water are 1.86 and 0.512 K kg mol^{-1} respectively, the above solution will freeze at :-

- (1) -6.54°C (2) -0.654°C
(3) 6.54°C (4) 0.654°C

Q.68 The energy of second Bohr orbit of the hydrogen atom is -328 kJ mol^{-1} ; hence the energy of fourth Bohr orbit would be :-

- (1) -1312 kJ mol^{-1} (2) -82 kJ mol^{-1}
(3) -41 kJ mol^{-1} (4) -164 kJ mol^{-1}

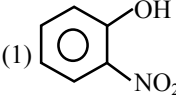
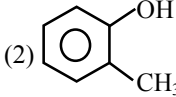
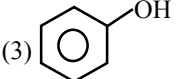
Q.69 The surface tension of which of the following liquid is maximum :-

- (1) C_6H_6 (2) H_2O
(3) $\text{C}_2\text{H}_5\text{OH}$ (4) CH_3OH

Q.70 Which one of the following pair represents stereo isomerism :-

- (1) Linkage isomerism and Geometrical isomerism
(2) Chain isomerism and Rotational isomerism
(3) Optical isomerism and Geometrical isomerism
(4) Structural isomerism and Geometrical isomerism

- Q.71** The number of moles of KMnO_4 reduced by one mole of KI in alkaline medium is :-
 (1) One (2) Two (3) Five (4) One fifth
- Q.72** Which of the following undergoes nucleophilic substitution exclusively by $\text{S}_\text{N}1$ mechanism :
 (1) Ethyl chloride (2) Isopropyl chloride
 (3) Benzyl chloride (4) Chlorobenzene
- Q.73** Four successive members of the first row transition elements are listed below with their atomic numbers. which one of them is expected to have the highest third ionization enthalpy :-
 (1) Vanadium ($Z = 23$)
 (2) Manganese ($Z = 25$)
 (3) Chromium ($Z = 24$)
 (4) Iron ($Z = 26$)
- Q.74** Which one of the following is expected to exhibit optical isomerism ?
 (en = ethylenediamine)
 (1) *cis* - $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 (2) *cis* - $[\text{Co}(\text{en})_2\text{Cl}_2]$
 (3) *trans* - $[\text{Co}(\text{en})_2\text{Cl}_2]$
 (4) *trans* - $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- Q.75** A solution has a 1 :4 mole ratio of pentane to hexane. The vapour pressures of the pure hydrocarbons at 20°C are 440 mm Hg for pentane and 120 mm Hg for hexane. The mole fraction of pentane in the vapour phase would be-
 (1) 0.200 (2) 0.478 (3) 0.549 (4) 0.786
- Q.76** The rate of reaction between two reactants A and B decreases by a factor of 4 if the concentration of reactant B is doubled. The order of this reaction with respect to reactant B is :-
 (1) 2 (2) -1 (3) 1 (4) -2
- Q.77** The monomer of the polymer :

$$\sim\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}^\oplus$$
 is :-
 (1) $\text{CH}_3\text{CH}=\text{CH}.\text{CH}_3$
 (2) $\text{CH}_3\text{CH}=\text{CH}_2$
 (3) $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$
 (4) $\text{H}_2\text{C}=\text{C}(\text{CH}_3)_2$
- Q.78** Which functional group participates in disulphide bond formation in proteins :-
 (1) Thioether (2) Thiol
 (3) Thioester (4) Thiolactone
- Q.79** At 25°C , the dissociation constant of a base, BOH , is 1.0×10^{-12} . The concentration of hydroxyl ions in 0.01M aqueous solution of the base would be :-
 (1) $1.0 \times 10^{-6} \text{ mole L}^{-1}$
 (2) $1.0 \times 10^{-7} \text{ mole L}^{-1}$
 (3) $2.0 \times 10^{-6} \text{ mole L}^{-1}$
 (4) $1.0 \times 10^{-5} \text{ mole L}^{-1}$
- Q.80** The correct order in which the O-O bond length increases in the following is :-
 (1) $\text{O}_3 < \text{H}_2\text{O}_2 < \text{O}_2$ (2) $\text{O}_2 < \text{O}_3 < \text{H}_2\text{O}_2$
 (3) $\text{O}_2 < \text{H}_2\text{O}_2 < \text{O}_3$ (4) $\text{H}_2\text{O}_2 < \text{O}_2 < \text{O}_3$
- Q.81** Which of the following molecules has trigonal planner geometry ;
 (1) NH_3 (2) BF_3 (3) PCl_3 (4) IF_3
- Q.82** The main reason for larger number of oxidation states exhibited by the actinoids than the corresponding lanthanoids, is :-
 (1) Lesser energy difference between 5f and 6d orbitals than between 4f and 5d orbitals
 (2) More energy difference between 5f and 6d orbitals than between 4f and 5d orbitals
 (3) Greater reactive nature of the actinoids than the lanthanoids
 (4) Larger atomic size of actinoids than the lanthanoids
- Q.83** Electrolytic reduction of nitrobenzene in weakly acidic medium gives :-
 (1) Aniline
 (2) p-Hydroxy aniline
 (3) N-Phenyl hydroxyl amine
 (4) Nitroso benzene
- Q.84** Which one of the following compounds is most acidic :-
 (1)  (2) 
 (3)  (4) $\text{Cl}-\text{CH}_2-\text{CH}_2-\text{OH}$

Q.85 For a first order reaction $A \rightarrow B$ the reaction rate at reactant concentration of $0.01M$ is found to be $2.0 \times 10^{-5} \text{ mole L}^{-1}\text{s}^{-1}$. The half life period of the reaction is :-

- (1) 300s (2) 30s
(3) 220s (4) 347s

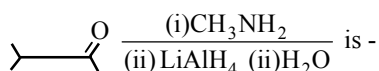
Q.86 What is the correct relationship between the pHs of isomolar solutions of sodium oxide (pH_1), sodium sulphide (pH_2), sodium selenide (pH_3) and sodium telluride (pH_4) ?

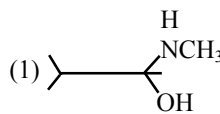
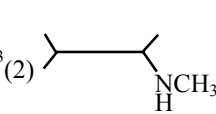
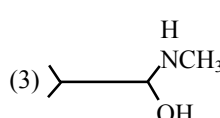
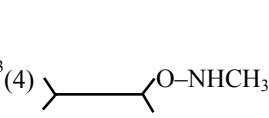
- (1) $pH_1 < pH_2 < pH_3 < pH_4$
(2) $pH_1 > pH_2 > pH_3 > pH_4$
(3) $pH_1 < pH_2 < pH_3 \approx pH_4$
(4) $pH_1 > pH_2 \approx pH_3 > pH_4$

Q.87 The cell membranes are mainly composed of :-

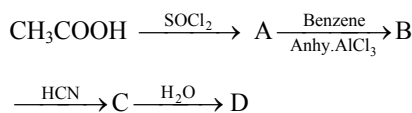
- (1) Phospholipids (2) Proteins
(3) Fats (4) Carbohydrates

Q.88 The major organic product formed from the following reaction

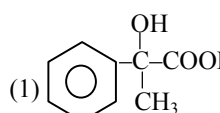
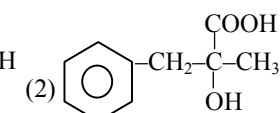
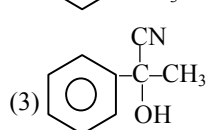
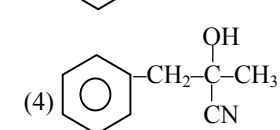


- (1)  (2) 
(3)  (4) 

Q.89 In a set of reactions acetic acid yielded a product D



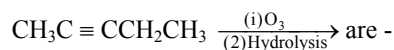
The structure of D would be -

- (1)  (2) 
(3)  (4) 

Q.90 Which of the following pairs of a chemical reaction is certain to result in a spontaneous reaction -

- (1) Endothermic and decreasing disorder
(2) Exothermic and increasing disorder
(3) Endothermic and increasing disorder
(4) Exothermic and decreasing disorder

Q.91 Products of the following reaction :

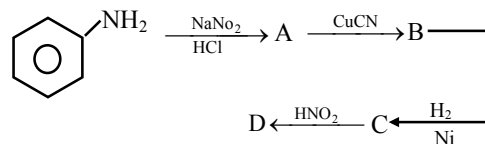


- (1) $\text{CH}_3\text{COOH} + \text{CH}_3\text{COCH}_3$
(2) $\text{CH}_3\text{COOH} + \text{HOOC} \cdot \text{CH}_2\text{CH}_3$
(3) $\text{CH}_3\text{CHO} + \text{CH}_3\text{CH}_2\text{CHO}$
(4) $\text{CH}_3\text{COOH} + \text{CO}_2$

Q.92 Which of the following would have a permanent dipole moment -

- (1) BF_3 (2) SF_4 (3) SiF_4 (4) XeF_4

Q.93 Aniline in a set of reactions yielded a product D



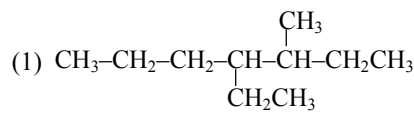
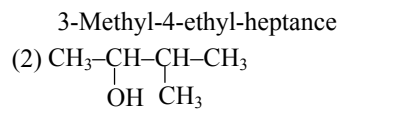
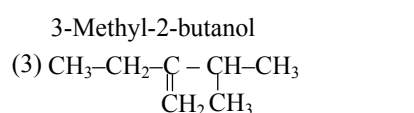
The structure of the product D would be -

- (1) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ (2) $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$
(3) $\text{C}_6\text{H}_5\text{NHOH}$ (4) $\text{C}_6\text{H}_5\text{NHCH}_2\text{CH}_3$

Q.94 The correct sequence of increasing covalent character is represented by -

- (1) $\text{BeCl}_2 < \text{NaCl} < \text{LiCl}$
(2) $\text{NaCl} < \text{LiCl} < \text{BeCl}_2$
(3) $\text{BeCl}_2 < \text{LiCl} < \text{NaCl}$
(4) $\text{LiCl} < \text{NaCl} < \text{BeCl}_2$

Q.95 IUPAC Name of some compounds are given. Which one is incorrect -

- (1) 
3-Methyl-4-ethyl-heptance
(2) 
3-Methyl-2-butanol
(3) 
2-Ethyl-3-methyl-but-1-ene
(4) $\text{CH}_3\text{-C} \equiv \text{C-CH}(\text{CH}_3)_2$
4-Methyl-2-pentyne

- Q.96** A nuclide of an alkaline earth metal undergoes radioactive decay by emission of the α -particles in succession. The group of the periodic table to which the resulting daughter element would belong is :-
(1) Gr. 4 (2) Gr.6 (3) Gr.16 (4) Gr.14
- Q.97** 4.5g of aluminium (at. mass 27 amu) is deposited at cathode from Al^{3+} solution by a certain quantity of electric charge. The volume of hydrogen produced at STP from H^+ ions in solution by the same quantity of electric charge will be -
(1) 44.8L (2) 11.2L (3) 22.4L (4) 5.6L
- Q.98** Which of the following is the electron deficient molecule -
(1) C_2H_6 (2) SiH_4 (3) PH_3 (4) B_2H_6
- Q.99** H_2S gas when passed through a solution of cations containing HCl precipitates the cations of second group of qualitative analysis but not those belonging to the fourth group. It is because-
(1) Presence of HCl decreases the sulphide ion concentration.
(2) Sulphides of group IV cations are unstable in HCl
(3) Solubility product of group II sulphides is more than that of group IV sulphides
(4) Presence of HCl increases the sulphides ion concentration
- Q.100** The correct order of acid strength is -
(1) $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$
(2) $\text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4 < \text{HClO}$
(3) $\text{HClO}_4 < \text{HClO} < \text{HClO}_2 < \text{HClO}_3$
(4) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$
- Q.101** Which of the following is the simplest amino acid -
(1) Alanine (2) Asparagine
(3) Glycine (4) Tyrosine
- Q.102** During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP -
(1) Glycolysis
(2) Krebs cycle
(3) Electron transport chain
(4) Conversion of pyruvic acid to acetyl CoA
- Q.103** Ectophloic siphonostele is found in -
(1) Osmunda and Equisetum
(2) Adiantum and Cucurbitaceae
(3) Marsilea and Botrychium
(4) Dicksonia and Maiden hair fern
- Q.104** G-6-P dehydrogenase deficiency is associated with haemolysis of -
(1) Leucocytes (2) Lymphocytes
(3) Platelets (4) RBCs
- Q.105** Which of the following statements regarding enzyme inhibition is correct -
(1) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein
(2) Non-competitive inhibitors often bind to the enzyme irreversibly
(3) Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme
(4) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate
- Q.106** In contrast to Annelids the Platyhelminths show
(1) Absence of body cavity
(2) Presence of pseudocoel
(3) Radial symmetry
(4) Bilateral symmetry
- Q.107** Which of the following represents the edible part of the fruit of Litchi -
(1) Endocarp (2) Pericarp
(3) Juicy aril (4) Mesocarp
- Q.108** Which one of the following pairs is mismatched-
(1) Nuclear power – radioactive wastes
(2) Solar energy – green house effect
(3) Fossil fuel burning – release of CO_2
(4) Biomass burning – release of CO_2

- Q.109** Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these -
- (1) Are exclusively synthesized in the body of a living organism as at present
 - (2) enhance oxidative metabolism
 - (3) Are conjugated proteins
 - (4) Help in regulating metabolism
- Q.110** *E. coli* cells with a mutated *z* gene of the lac operon cannot grow in medium containing only lactose as the source of energy because -
- (1) They cannot synthesize functional beta galactosidase
 - (2) They cannot transport lactose from the medium into the cell
 - (3) The lac operon is constitutively active in these cells
 - (4) In the presence of glucose, *E. coli* cells do not utilize lactose
- Q.111** The deficiencies of micronutrients, not only affects growth of plants but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which group of three elements shall affect most, both photosynthetic and mitochondrial electron transport -
- (1) Ca, K, Na (2) Co, Ni, Mo
 - (3) Mn, Co, Ca (4) Cu, Mn, Fe
- Q.112** Through which cell of the embryo sac, does the pollen tube enter the embryo sac-
- (1) Persistent synergid
 - (2) Egg cell
 - (3) Central cell
 - (4) Degenerated synergid
- Q.113** An acromian process is characteristically found in the -
- (1) Skull of frog
 - (2) Sperm of mammals
 - (3) Pelvic girdle of mammals
 - (4) Pectoral girdle of mammals
- Q.114** Golden rice is a transgenic crop of the future with the following improved trait -
- (1) High protein content
 - (2) High vitamin – A content
 - (3) High lysine (essential amino acid) content
 - (4) Insect resistance
- Q.115** In a type of apomixis known as adventive embryony, embryos develop directly from the -
- (1) Synergids or antipodals in an embryo sac
 - (2) Nucellus or integuments
 - (3) Zygote
 - (4) Accessory embryo sacs in the ovule
- Q.116** All of the following statements concerning the Actinomycetous filamentous soil bacterium *Frankia* are correct EXCEPT that *Frankia* -
- (1) Forms specialized vesicles in which the nitrogenase is protected from oxygen by a chemical barrier involving triterpene hopanoids
 - (2) Can induce root nodules on many plant species
 - (3) Like Rhizobium, it usually infects its host plant through root hair deformation and stimulates cell proliferation in the host's cortex
 - (4) Cannot fix nitrogen in the free-living state
- Q.117** In ornithine cycle which of the following wastes are removed from the blood -
- (1) CO₂ and ammonia
 - (2) Ammonia and urea
 - (3) CO₂ and urea
 - (4) Urea and urine
- Q.118** At a particular locus, frequency of 'A' allele is 0.6 and that of 'a' is 0.4. What would be the frequency of heterozygotes in a random mating population at equilibrium -
- (1) 0.24 (2) 0.16 (3) 0.48 (4) 0.36

- Q.119** Four healthy people in their twenties got involved in injuries resulting in damage and death of a few cells of the following. Which of the cells are least likely to be replaced by new cells -
 (1) Osteocytes
 (2) Liver cells
 (3) Neurons
 (4) Malpighian layer of the skin
- Q.120** Which one of the following makes use of RNA as a template to synthesize DNA -
 (1) DNA dependant RNA polymerase
 (2) DNA polymerase
 (3) Reverse transcriptase
 (4) RNA polymerase
- Q.121** A student wishes to study the cell structure under a light microscope having 10X eyepiece and 45X objective. He should illuminate the object by which one of the following colours of light so as get the best possible resolution -
 (1) Red (2) Green (3) Yellow (4) Blue
- Q.122** As compared to a C_3 -plant, how many additional molecules of ATP are needed for net production of one molecule of hexose sugar by C_4 -plants -
 (1) Zero (2) Six
 (3) Two (4) Twelve
- Q.123** *Bacillus thuringiensis* (Bt) strains have been used for designing novel -
 (1) Bioinsecticidal plants
 (2) Bio-mineralization processes
 (3) Biofertilizers
 (4) Bio-metallurgical techniques
- Q.124** Secretin and cholecystokinin are digestive hormones. They are secreted in -
 (1) Oesophagus (2) Ileum
 (3) Duodenum (4) Pyloric stomach
- Q.125** Grey crescent is the area -
 (1) At the point of entry of sperm into ovum
 (2) Just opposite to the site of entry of sperm into ovum
 (3) At the animal pole
 (4) At the vegetal pole
- Q.126** Match items in Column I with those in Column II -
- | Column I | Column II |
|-------------------------------|----------------------|
| (A) Peritrichous flagellation | (J) Ginkgo |
| (B) Living fossil | (K) Macrocystes |
| (C) Rhizophore | (L) Escherichia coli |
| (D) Smallest flowering plant | (M) Selaginella |
| (E) Largest Perennial alga | (N) Wolffia |
- Select the correct answer with the following
 (1) A – L ; B – J; C – M ; D – N ; E – K
 (2) A – K ; B – J; C – L ; D – M; E – N
 (3) A – J ; B – K; C – N ; D – L; E – K
 (4) A – N ; B – L; C – K ; D – N; E – J
- Q.127** Using imprints from a plate with complete medium and carrying bacterial colonies, you can select streptomycin resistant mutants and prove that such mutations do not originate as adaptation. These imprints need to be used -
 (1) On plates with and without streptomycin
 (2) Only on plates with streptomycin
 (3) On plates with minimal medium
 (4) Only on plates without streptomycin
- Q.128** Chemiosmotic theory of ATP synthesis in the chloroplasts and mitochondria is based on
 (1) Membrane potential
 (2) Accumulation of K ions
 (3) Proton gradient
 (4) Accumulation of Na ions
- Q.129** Which one of the following experiments suggests that simplest living organisms could not have originated spontaneously from non-living matter -
 (1) Larva could appear in decaying organic matter
 (2) Meat was not spoiled, when heated and kept sealed in a vessel
 (3) microbes did not appear in stored meat
 (4) Microbes appeared from unsterilized organic matter

- Q.130** Which of the following is not used for disinfection of drinking water -
 (1) Chlorine (2) Phenyl
 (3) Chloramine (4) Ozone
- Q.131** Which of the following characters is not typical of the class Mammalia -
 (1) Alveolar lungs
 (2) Ten pairs of cranial nerves
 (3) Seven cervical vertebrae
 (4) Thecodont dentition
- Q.132** Identify the correctly matched pair -
 (1) Kyoto protocol – Climatic change
 (2) Montreal Protocol - Global warming
 (3) Basal Convention – Biodiversity Conservation
 (4) Ramsar Convention – Ground water pollution
- Q.133** Auxospores and hormocysts are formed respectively, by -
 (1) Some cyanobacteria and many diatoms
 (2) Several diatoms and a few cyanobacteria
 (3) Several cyanobacteria and several diatoms
 (4) Some diatoms and several cyanobacteria
- Q.134** Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution -
 (1) production of 'Dolly', the sheep by cloning
 (2) Development of organs from 'stem' cells for organ transplantation
 (3) Development of transgenic animals
 (4) Prevalence of pesticide resistant insects
- Q.135** The name of Norman Borlaug is associated with-
 (1) Green Revolution (2) White Revolution
 (3) Yellow Revolution (4) Blue Revolution
- Q.136** Nucleotides are building blocks of nucleic acids. Each nucleotide is a composite molecule formed by -
 (1) Base-sugar-OH
 (2) Base-sugar-phosphate
 (3) Sugar-phosphate
 (4) (Base-sugar-phosphate)_n
- Q.137** Which of the following is generally used for induced mutagenesis in crop plants -
 (1) Gamma rays (from cobalt 60)
 (2) Alpha particles
 (3) X rays
 (4) UV (260 nm)
- Q.138** One of the most important functions of botanical gardens is that -
 (1) They allow ex-situ conservation of germ plasm
 (2) They provide the natural habitat for wild life
 (3) One can observe tropical plants there
 (4) They provide a beautiful area for recreation
- Q.139** The net pressure gradient that causes the fluid to filter out of the glomeruli into the capsule is -
 (1) 20 mm Hg (2) 50 mm Hg
 (3) 75 mm Hg (4) 30 mm Hg
- Q.140** Epithelial cells of the intestine involved in food absorption have on their surface -
 (1) Zymogen granules (2) Pinocytic vesicles
 (3) Phagocytic vesicles (4) Microvilli
- Q.141** If mammalian ovum fails to get fertilized, which one of the following is unlikely -
 (1) Estrogen secretion further decreases
 (2) Progesterone secretion rapidly declines
 (3) Corpus luteum will disintegrate
 (4) Primary follicle starts developing
- Q.142** The catalytic efficiency of two different enzymes can be compared by the -
 (1) The K_m value
 (2) The pH optimum value
 (3) Molecular size of the enzyme
 (4) Formation of the product
- Q.143** Biodiversity Act of India was passed by the Parliament in the year -
 (1) 2002 (2) 1992 (3) 1996 (4) 2000
- Q.144** The salivary gland chromosomes in the dipteran larva, are useful in gene mapping because -
 (1) They have endoreduplicated chromosomes
 (2) These are fused
 (3) These are easy to stain
 (4) These are much longer in size

- Q.145** Top-shaped multiciliate male gametes, and the mature seed which bears only one embryo with two cotyledons, are characteristic features of -
 (1) Gamopetalous angiosperms
 (2) Conifers
 (3) Polypetalous angiosperms
 (4) Cycads
- Q.146** Which group of three of the following five statements (a-e) contain is all the three correct statements regarding beri-beri -
 (a) A crippling disease prevalent among the native population of sub-Saharan Africa
 (b) A deficiency disease caused by lack of thiamine (vitamin B₁)
 (c) A nutritional disorder in infants and young children when the diet is persistently deficient in essential protein
 (d) Occurs in those countries where the staple diet is polished rice
 (e) The symptoms are pain from neuritis, paralysis, muscle wasting, progressive oedema, mental deterioration and finally heart failure
 (1) b, c and e (2) a, b and d
 (3) b, d and e (4) a, c and e
- Q.147** Which of the following unicellular organism has a macronucleus for trophic function and one or more micronuclei for reproduction -
 (1) *Trypanosoma* (2) *Paramecium*
 (3) *Euglena* (4) *Amoeba*
- Q.148** Protein synthesis in an animal cell occurs -
 (1) On ribosomes presents in cytoplasm as well as in mitochondria
 (2) On ribosomes present in the nucleolus as well as in cytoplasm
 (3) Only on ribosomes attached to the nuclear envelope and endoplasmic reticulum
 (4) Only on the ribosomes present in cytosol
- Q.149** Centromere is required for -
 (1) Movement of chromosomes towards poles
 (2) Cytoplasmic cleavage
 (3) Crossing over
 (4) Transcription
- Q.150** Which one of the following hydrolyses internal phosphodiester bonds in a polynucleotide chain-
 (1) Lipase (2) protease
 (3) Exonuclease (4) Endonuclease
- Q.151** Carbohydrates, the most abundant biomolecules on earth, are produced by -
 (1) Some bacteria, algae and green plant cells
 (2) All bacteria, fungi and algae
 (3) Fungi, algae and green plants cells
 (4) Viruses, fungi and bacteria
- Q.152** Animals have the innate ability to escape from predation. Examples for the same are given below. Select the incorrect example
 (1) Colour change in chameleon
 (2) Poison fangs in snakes
 (3) Melanism in moths
 (4) Enlargement of body size by swallowing air in puffer fish
- Q.153** Which one of the following represents an ovule, where the embryo sac becomes horse- shoe shaped and the funiculus and micropyle are close to each other -
 (1) Amphitropous (2) Anatropous
 (3) Circinotropous (4) Atropous
- Q.154** Three crops that contribute maximum to global food grain production are -
 (1) Wheat, rice and maize
 (2) Rice, maize and sorghum
 (3) Wheat maize and sorghum
 (4) Wheat, rice and barley
- Q.155** Telomerase is an enzyme which is a -
 (1) RNA
 (2) Ribonucleoprotein
 (3) Repetitive DNA
 (4) Simple protein
- Q.156** In order to find out the different types of gametes produced by a pea plants having the genotype AaBb, it should be crossed to a plant with the genotype -
 (1) AaBb (2) aabb (3) AABB (4) aaBB

- Q.157** Prolonged liberal irrigation of agricultural fields is likely to create the problem of -
 (1) Aridity (2) Metal toxicity
 (3) salinity (4) Acidity
- Q.158** According to widely accepted "fluid mosaic model" cell membranes are semi-fluid, where lipids and integral proteins can diffuse randomly. In recent years, this model has been modified in several respects. In this regard, which of the following statements are incorrect -
 (1) Proteins can also undergo flip-flop movements in the lipid bilayer
 (2) Many proteins remain completely embedded within the lipid bilayer
 (3) Proteins in cell membranes can travel within the lipid bilayer
 (4) Proteins can remain confined within certain domains of the membranes
- Q.159** There exists a close association between the alga and the fungus within a lichen. The fungus -
 (1) Provides food for the alga
 (2) Provides protection, anchorage and absorption for the alga
 (3) Fixes the atmospheric nitrogen for the alga
 (4) releases oxygen for the alga
- Q.160** In a woody dicotyledonous tree, which of the following parts will mainly consist of primary tissues -
 (1) Stem and root
 (2) All parts
 (3) Shoot tips and root tips
 (4) Flowers, fruit and leaves
- Q.161** Which of the following is not a hereditary disease -
 (1) Haemophilia (2) Cretinism
 (3) Cystic fibrosis (4) Thalassaemia
- Q.162** Which of the following is the relatively most accurate method for dating of fossils -
 (1) Electron-spin resonance method
 (2) Uranium-lead method
 (3) Potassium-argon method
 (4) Radio-carbon method
- Q.163** More than 70% of world's fresh water is contained in -
 (1) Antarctica
 (2) Polar ice
 (3) Glaciers and Mountains
 (4) Greenland
- Q.164** A woman with normal vision, but whose father was colour blind, marries a colour blind man. Suppose that the fourth child of this couple was a boy. This boy -
 (1) Must have normal colour vision
 (2) May be colour blind or may be normal vision
 (3) Will be partially colour blind since he is heterozygous for the colour blind mutant allele.
 (4) Must be colour blind
- Q.165** production of a human protein in bacteria by genetic engineering is possible because
 (1) Bacterial cell can carry out the RNA splicing reactions
 (2) The mechanism of gene regulation is identical in humans and bacteria
 (3) The human chromosome can replicate in bacterial cell
 (4) The genetic code is universal
- Q.166** Which of the following substances, if introduced into the blood stream, would cause coagulation of blood at the site of its introduction -
 (1) Thromboplastin (2) Fibrinogen
 (3) Heparin (4) Prothrombin
- Q.167** The world's highly prized wool yielding 'Pashmina' breed is -
 (1) Kashmir sheep-Afghan sheep cross
 (2) Goat
 (3) Sheep
 (4) Goat-sheep cross

- Q.168** Photosynthesis in C_4 plants is relatively less limited by atmospheric CO_2 levels because
- (1) The primary fixation of CO_2 is mediated via PEP carboxylase
 - (2) Effective pumping of CO_2 into bundle sheath cells
 - (3) Four carbon acids are the primary initial CO_2 fixation products
 - (4) Rubisco in C_4 plants has higher affinity for CO_2
- Q.169** One of the examples of the action of the autonomous nervous system is -
- (1) Knee-jerk reponse
 - (2) Pupillary reflex
 - (3) Peristalsis of the intestines
 - (4) Swallowing of food
- Q.170** At what stage of the cell cycle are histone proteins synthesized in a eukaryotic cell -
- (1) During telophase
 - (2) During S-phase
 - (3) During G-2 stage of prophase
 - (4) During entire prophase
- Q.171** During transcription holoenzyme RNA polymerase binds to a DNA sequence and the DNA assumes a saddle like structure at the point. What is the sequence called -
- (1) CAAT box
 - (2) GGTT box
 - (3) AAAT box
 - (4) TATA box
- Q.172** The main organelle involved in modification and routing of newly synthesized proteins to their destinations is -
- (1) Endoplasmic Reticulum
 - (2) Lysosome
 - (3) Mitochondria
 - (4) Chloroplast
- Q.173** Damage to thymus in a child may lead to
- (1) A reduction in haemoglobin content of blood
 - (2) A reduction in stem cell production
 - (3) Loss of antibody mediated immunity
 - (4) Loss of cell mediated immunity
- Q.174** Which one of the following depresses brain activity and produces feelings of calmness, relaxation and drowsiness -
- (1) Morphine
 - (2) Valium
 - (3) Hashish
 - (4) Amphetamines
- Q.175** Why is vivipary an undesirable character for annual crop plants -
- (1) It reduces the vigour of the plant
 - (2) The seeds exhibit long dormancy
 - (3) It adversely affects the fertility of the plant
 - (4) The seeds cannot be stored under normal conditions for the next season
- Q.176** There are two opposing views about origin of modern man. According to one view *Homo erectus* in Asia were the ancestors of modern man. A study of variation of DNA however suggested African origin of modern man. What kind of observation of DNA variation could suggest this -
- (1) Greater variation in Asia than in Africa
 - (2) Similar variation in Africa and Asia
 - (3) Variation only in Asia and no variation in Africa
 - (4) Greater variation in Africa than in Asia
- Q.177** Which of the following is not true for a species -
- (1) Members of a species can interbreed
 - (2) Variations occur among members of a species
 - (3) Gene flow does not occur between the populations of a species
 - (4) Each species is reproductively isolated from every other species.
- Q.178** Photosynthetic Active Radiation (PAR) has the following range of wavelengths
- (1) 340-450 nm
 - (2) 450-950 nm
 - (3) 500-600 nm
 - (4) 400-700 nm
- Q.179** Haemophilia is more commonly seen in human males than in human females because -
- (1) This disease is due to a Y-linked recessive mutation
 - (2) This disease is due to an X-linked recessive mutation
 - (3) This disease is due to an X-linked dominant mutation
 - (4) A greater proportion of girls die in infancy

- Q.180** Chlorophyll in chloroplasts is located in -
 (1) Grana (2) Pyrenoid
 (3) Stroma (4) Both (1) and (3)
- Q.181** AIDS is caused by HIV that principally infects
 (1) Activator B cells
 (2) T4 lymphocytes
 (3) Cytotoxic T cells
 (4) All lymphocytes
- Q.182** Which one of the following pairs is mismatched-
 (1) Savanna - acacia trees
 (2) Coniferous forest - evergreen trees
 (3) Tundra - permafrost
 (4) Prairie - epiphytes
- Q.183** In which one pair both the plants can be vegetatively propagated by leaf pieces -
 (1) *Bryophyllum* and *Kalanchoe*
 (2) *Agave* and *Kalanchoe*
 (3) *Asparagus* and *Bryophyllum*
 (4) *Chrysanthemum* and *Agave*
- Q.184** parkinson's disease (characterized by tremors and progressive rigidity of limbs) is caused by degeneration of brain neurons that are involved in movement control and make use of neurotransmitter -
 (1) Norepinephrine (2) Acetylcholine
 (3) GABA (4) Dopamine
- Q.185** A woman with 47 chromosomes due to three copies of chromosome 21 is characterized by -
 (1) Turner syndrome (2) Down syndrome
 (3) Superfemaleness (4) Triploidy
- Q.186** A man and a woman, who do not show any apparent signs of a certain inherited disease, have seven children (2 daughters and 5 sons). Three of the sons suffer from the given disease but none of the daughters are affected. Which of the following mode of inheritance do you suggest for this disease
 (1) Sex-limited recessive
 (2) Autosomal dominant
 (3) Sex-linked recessive
 (4) Sex-linked dominant
- Q.187** At which latitude, heat gain through insolation approximately equals heat loss through terrestrial radiation -
 (1) $42\frac{1}{2}^{\circ}$ North and South
 (2) $22\frac{1}{2}^{\circ}$ North and South
 (3) 40° North and South
 (4) 66° North and South
- Q.188** In a man, abducens nerve is injured. Which one of the following functions will be affected
 (1) Swallowing
 (2) Movement of the eye ball
 (3) Movement of the neck
 (4) Movement of the tongue
- Q.189** De Vries gave his mutation theory on organic evolution while working on -
 (1) *Oenothera lamarckiana*
 (2) *Drosophila melanogaster*
 (3) *Pisum sativum*
 (4) *Althea rosea*
- Q.190** Genes for cytoplasmic male sterility in plants are generally located in -
 (1) Nuclear genome
 (2) Chloroplast genome
 (3) Cytosol
 (4) Mitochondrial genome
- Q.191** A patient is generally advised to specially consume more meat, lentils, milk and eggs in diet only when he suffers from -
 (1) Anemia (2) Scurvy
 (3) Kwashiorkor (4) Rickets
- Q.192** Barophilic prokaryotes -
 (1) Grow slowly in highly alkaline frozen lakes at high altitudes
 (2) Grow and multiply in very deep marine sediments
 (3) Readily grow and divide in sea water enriched in any soluble salt of barium
 (4) Occur in water containing high concentrations of barium hydroxide

- Q.193** An important step in the manufacture of pulp for paper industry from the woody tissues of plants is the -
- (1) Removal of water from the wood by prolonged heating at approximately 50°
 - (2) Treatment of wood with chemicals that break down cellulose
 - (3) Removal of oils present in the wood by treatment with suitable chemicals
 - (4) Preparation of pure cellulose by removing lignin
- Q.194** Potometer works on the principle of -
- (1) Potential difference between the tip of the tube and that of the plant
 - (2) Amount of water absorbed equals the amount transpired
 - (3) Osmotic pressure
 - (4) Root pressure
- Q.195** The ability of the Venus Flytrap to capture insects is due to -
- (1) Rapid turgor pressure changes
 - (2) A passive process requiring no special ability on the part of the plant
 - (3) Specialized "muscle-like" cells
 - (4) Chemical stimulation by the prey
- Q.196** Which of the following pairs, is correctly matched -
- (1) Fibrous joint – between phalanges
 - (2) Cartilaginous joint – skull bones
 - (3) Gliding joint – between zygapophyses of the successive vertebrae
 - (4) Hinge joint – between vertebrae
- Q.197** According to IUCN Red List, what is the status of Red Panda (*Ailurus fulgens*) ?
- (1) Critically endangered species
 - (2) Vulnerable species
 - (3) Extinct species
 - (4) Endangered species
- Q.198** A person is undergoing prolonged fasting. His urine will be found to contain abnormal quantities of -
- (1) Fats
 - (2) Amino acids
 - (3) Ketones
 - (4) Glucose
- Q.199** For retting of Jute the fermenting microbe used is -
- (1) Methophilic bacteria
 - (2) *Helicobacter pylori*
 - (3) Butyric acid bacteria
 - (4) *Streptococcus lactin*
- Q.200** From the following statements select the wrong one -
- (1) Prawn has two pairs of antennae
 - (2) Millipedes have two pairs of appendages in each segment of the body
 - (3) Animals belonging to Phylum porifera are exclusively marine
 - (4) Nematocysts are characteristic of the phylum cnidaria.

ANSWER KEY (AIPMT-2005)

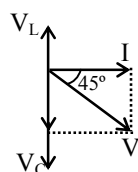
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Ans	3	2	3	2	3	3	1	1	2	2	3	4	3	2	1	4	4	3	1	4
Ques.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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Ques.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	1	1	3	2	2	4	2	2	3	3	4	2	1	3	4	4	3	3	3	3
Ques.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans	2	3	3	1	3	2	2	2	2	3	2	3	2	2	2	4	4	2	2	2
Ques.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans	2	1	1	1	4	2	1	2	1	2	2	2	1	2	1	4	4	4	1	4
Ques.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans	3	3	1	4	3	1	3	2	4	1	4	4	4	2	2	2	1	3	3	3
Ques.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Ans	4	4	1	3	2	1	2	3	2	2	2	1	2	4	1	2	1	1	1	4
Ques.	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Ans	4	1	1	1	4	3	2	1	1	4	1	4	1	1	2	2	3	1	2	4
Ques.	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Ans	2	1	2	2	4	1	2	2	3	2	4	1	4	2	4	1	3	4	2	1
Ques.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
Ans	2	4	1	4	2	3	4	2	1	4	3	2	4	2	1	3	4	3	3	3

HINTS & SOLUTIONS

1. Energy of photon = $\frac{12400}{4100} \approx 3\text{eV}$
3. Energy released in given reaction = BE of products –
BE of reactants = $C - (a + b) = C - a - b$
4. Here $X_C - X_L = R$

$$\Rightarrow \frac{1}{2\pi fC} = (R + 2\pi fL)$$

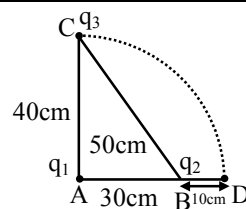
$$\Rightarrow C = \frac{1}{2\pi(2\pi fL + R)}$$



6. Reading of voltmeter = $\frac{\frac{E_1}{r_1} + \frac{E_2}{r_2}}{\frac{1}{r_1} + \frac{1}{r_2}} = \frac{E_1 r_2 + E_2 r_1}{r_1 + r_2}$

= 14 volt

7.



$$U_i = \frac{1}{4\pi\epsilon_0} \left[\frac{q_1 q_3}{(0.4)} + \frac{q_1 q_2}{(0.3)} + \frac{q_2 q_3}{(0.5)} \right]$$

$$U_i = \frac{1}{4\pi\epsilon_0} \left[\frac{q_1 q_3}{(0.4)} + \frac{q_1 q_2}{(0.3)} + \frac{q_2 q_3}{(0.1)} \right]$$

$$\text{Therefore } \Delta U = U_f - U_i =$$

$$\frac{1}{4\pi\epsilon_0} q_2 q_3 \left(\frac{1}{0.1} - \frac{1}{0.5} \right)$$

$$= \frac{q_2 q_3}{\pi\epsilon_0} (10^{-2}) = \frac{q_3}{4\pi\epsilon_0} (8q_2)$$

$$\Rightarrow K = 8q_2$$

8. $B = \frac{\mu_0 I}{2R} = \frac{\mu_0}{2R} \left(\frac{e}{T} \right) = \frac{\mu_0}{2R} \left(\frac{ev}{2\pi R} \right)$

$$\Rightarrow R^2 = \frac{\mu_0 ev}{4\pi B} \Rightarrow R \propto \sqrt{\frac{v}{B}}$$

9. $P = I^2 R \Rightarrow R = \frac{P}{I^2} = \frac{1}{25} = 0.04 \Omega$

10. Work done = $\frac{1}{4\pi\epsilon_0} \left(\frac{(-qQ)}{a} - \frac{(-qQ)}{a} \right) = 0$

11. $\vec{F} = q(\vec{v} \times \vec{B}) = qvB(\hat{i} \times (-\hat{k})) = qvB\hat{j} \Rightarrow$ force on the charge is along OY

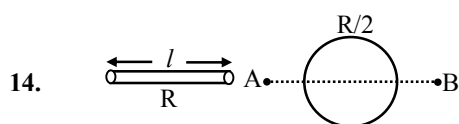
12. $\mu_p \neq 0, \mu_f \neq 0$ & $\mu_d = 0$

13. Number of beats per second = $n_2 - n_1 = 3$

($\because n_1 = 250, n_2 = 253$)

\Rightarrow Number of beats produced per minute

$= 3 \times 60 = 180$



$\Rightarrow R_{AB} = \left(\frac{R/2}{2} \right) = \frac{R}{4}$

15. $V_{\max} = a\omega \Rightarrow f = \frac{\omega}{2\pi} = \frac{V_{\max}}{2\pi a} = \frac{31.4}{2\pi \times 5}$
 $= \frac{31.4}{10\pi} = 1 \text{ Hz}$

16. Let $e = \alpha(\theta - \theta_C) + \beta(\theta^2 - \theta_C^2)$

where θ_C = temperature of cold junction. at inversion

temperature $e = 0 \Rightarrow \theta_i = -\theta_C - \frac{\alpha}{\beta}$ at neutral

temperature $\frac{de}{d\theta} = 0$

$\Rightarrow \theta_n = -\frac{\alpha}{2\beta}$

$\Rightarrow \theta_i = -\frac{\alpha}{\beta} - \theta_C = 2\theta_n - \theta_C \Rightarrow \theta_n = \frac{\theta_i + \theta_C}{2}$

$\Rightarrow 300 = \frac{620 + \theta_C}{2} \Rightarrow \theta_C = -20^\circ\text{C}$

17. $\frac{h}{I} \equiv \frac{J - \sec}{Kg - m^2} \equiv \frac{ML^2T^{-1}}{ML^2} = \frac{1}{T} \equiv \text{frequency}$

18. $KE = \frac{P^2}{2m} = \frac{(18 \times 6)^2}{2 \times 12} = 486 \text{ J}$

19. Isotones \rightarrow Number of neutrons are same.

20. $2h\nu_0 = h\nu_0 + \frac{1}{2}m(4 \times 10^6)^2$

$5h\nu_0 = h\nu_0 + \frac{1}{2}mv^2 \Rightarrow 4 \times \frac{1}{2}m(4 \times 10^6)^2$
 $= \frac{1}{2}mv^2 \Rightarrow v = 8 \times 10^6 \text{ m/s}$

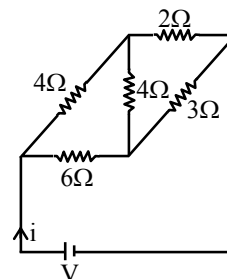
21. $\therefore \oint \vec{E} \cdot d\vec{\ell} = V \therefore \oint Q \vec{E} \cdot d\vec{\ell} = QV$

But $Q \vec{E} = \vec{F}$ & $\vec{F} \cdot d\vec{\ell} = dW \Rightarrow \boxed{W = QV}$

22. $\eta = \frac{W}{Q} = 1 - \frac{T_2}{T_1} \Rightarrow W = Q \left(1 - \frac{T_2}{T_1} \right)$
 $= 1.2 \times 10^4 \text{ cal}$

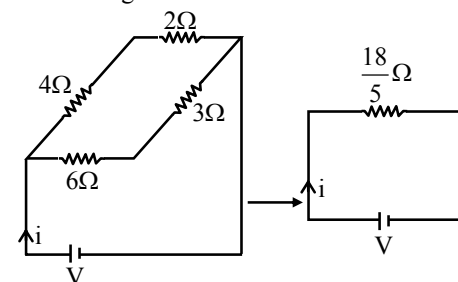
23. $\tau = MB = (IA)B = I \frac{\sqrt{3}}{4} l^2 B \Rightarrow l = 2 \left(\frac{\tau}{\sqrt{3}BI} \right)^{1/2}$

26.



Here $\frac{4}{6} = \frac{2}{3} \Rightarrow$ Balanced wheat stone Bridge

Therefore given ckt. can be reduced to



$\Rightarrow i = \frac{5V}{18}$

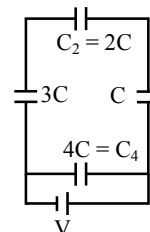
27. $I = I_{cm} + Md^2 = \frac{MR^2}{2} + MR^2 = \frac{3}{2} MR^2$

29. For FCC $4r = a\sqrt{2}$ but $2r = 2.54 \text{ Å}$

so $a = (\sqrt{2})(2.54) = 3.59 \text{ Å}$

use $\theta \sim \lambda/a \simeq 10^{-6} \text{ rad.}$

31.
32.



$Q_4 = 4 \text{ V}; Q_2 = \left(\frac{6}{11} C \right) V = \frac{6CV}{11}$

$\Rightarrow \frac{Q_2}{Q_4} = \frac{6CV}{11} \times \frac{1}{4CV} = \frac{3}{22}$

34. $a_r = \omega^2 r = (2\pi n)^2 r = \left(2\pi \times \frac{1}{2}\right)^2 (1) = \pi^2$

$a_T = 0 \Rightarrow$ option (2) is correct

37. K.E. = -T.E. = +3.4 eV

39. Use $R_{\text{Heat}} = \frac{\ell}{KA} = \frac{\ell}{K\pi r^2}$

40. $(2\hat{i} + 3\hat{j} + 8\hat{k}) \cdot (4\hat{j} - 4\hat{i} + \alpha\hat{k}) = 0 \Rightarrow \alpha = \frac{1}{2}$

41. use $g = \frac{GM}{R^2} = \frac{G \frac{4}{3} \pi R^3 \rho}{R^2} = \frac{4}{3} \pi G \rho R$

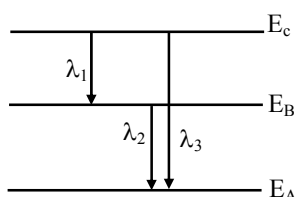
42. $(\vec{B} \times \vec{A}) \cdot \vec{A} = (BA \sin \theta) (\vec{n} \cdot \vec{A}) = 0$

since \vec{n} is perpendicular to both \vec{A} & \vec{B}

43. Use $I \propto \frac{1}{r^2}$

44. $W = \int F \cdot dx = \text{Area under the curve}$
 $= (3 \times 3) + \frac{1}{2} \times (3) (3) = 13.5 \text{ J}$

46.



$\therefore (E_C - E_B) + (E_B - E_A) = (E_C - E_A)$

$\Rightarrow \frac{hc}{\lambda_3} = \frac{hc}{\lambda_1} + \frac{hc}{\lambda_2} \Rightarrow \lambda_3 = \left(\frac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2} \right)$

47. $x = ae^{-\alpha t} + be^{\beta t}$

$v = \frac{dx}{dt} = -a \propto e^{-\alpha t} + b\beta e^{\beta t}$

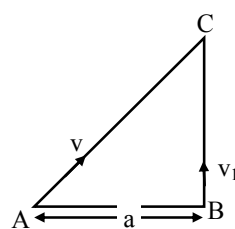
$\frac{dv}{dt} = a \alpha^2 e^{-\alpha t} + b\beta^2 e^{\beta t}$

$\therefore \frac{dv}{dt} > 0$ (Always)

$\Rightarrow v$ is increasing function of t

\Rightarrow option (2) is correct

48.



$AC = vt, BC = v_1 t$

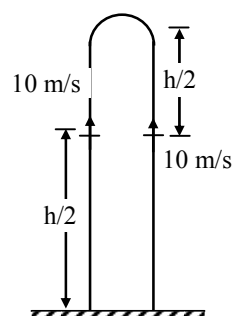
$\therefore AB = \sqrt{AC^2 - BC^2}$

$\therefore a = \sqrt{v^2 t^2 - v_1^2 t^2} \Rightarrow t = \frac{a}{\sqrt{v^2 - v_1^2}}$

49.

$\frac{L_1^2}{2I_1} = \frac{L_2^2}{2I_1} \Rightarrow \frac{L_1^2}{2(I)} = \frac{L_2^2}{2(2I)} \Rightarrow \frac{L_1}{L_2} = \frac{1}{\sqrt{2}}$

50.



$10^2 = 2(g) \left(\frac{h}{2} \right) \Rightarrow h = \frac{100}{10} = 10 \text{ m}$