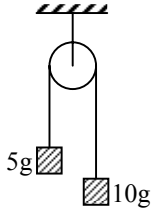
AIPMT - 2000

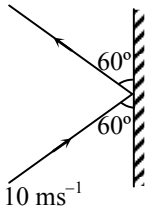
Q.1 Two masses as shown are suspended from a massless pulley. Calculate the acceleration of the system when masses are left free :



(1) 2g/3 (2) g/3

(3) g/9 (4) g/7

Q.2 A body of mass 3 kg hits a wall at an angle of 60º & returns at the same angle. The impact time was 0.2 s. Calculate the force exerted on the wall :



(1) $150\sqrt{3}$ N (2) $50\sqrt{3}$ N

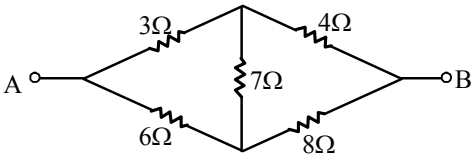
(3) 100 N (4) $75\sqrt{3}$ N

Q.3 A mass of 1kg is thrown up with a velocity of 100 m/s. After 5 seconds, it explodes into two parts. One part of mass 400 g comes down with a velocity 25 m/s Calculate the velocity of other part :

(1) 40 m/s upward (2) 40 m/s downward

(3) 100 m/s upward (4) 60 m/s downward

Q.4 Calculate the net resistance of the circuit between A and B :



(1) 8/3 Ω (2) 14/3 Ω

(3) 16/3 Ω (4) 22/3 Ω

Q.5 A capacitor is charged with a battery and energy stored is U. After disconnecting battery another capacitor of same capacity is connected in parallel with it. Then energy stored in each capacitor is :

(1) U/2 (2) U/4

(3) 4 U (4) 2 U

Q.6 Two projectiles of same mass and with same velocity are thrown at an angle 60º & 30º with the horizontal, then which quantity will remain same :

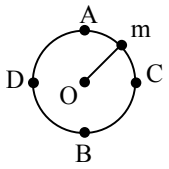
(1) Time of flight

(2) Horizontal range of projectile

(3) Max height acquired

(4) All of them

Q.7 A mass is performing vertical circular motion (see figure).If The average velocity of the particle is increased, then at which point the string will break :



(1) A (2) B (3) C (4) D

Q.8 For the given reaction, the particle X is :

$$6^{C^{11}} \rightarrow 5^{B^{11}} + \beta^{+} + X$$

(1) Neutron (2) Anti neutrino

(3) Neutrino (4) Proton

Q.9 A man is slipping on a frictionless inclined plane & a bag falls down from the same height. Then the speed of both is related as :

(1) $V_B > V_m$ (2) $V_B < V_m$

(3) $V_B = V_m$ (4) V_B and V_m can't related

Q.10 A body of weight 72 N moves from the surface of earth at a height half of the radius of the earth, then gravitational force exerted on it will be :

(1) 36 N (2) 32 N (3) 144 N (4) 50 N

Q.11 Rainbow is formed due to :

(1) Scattering & refraction

(2) Total internal reflection & dispersion

(3) Reflection only

(4) Diffraction and dispersion

Q.12 Gravitational force is required for :

(1) Stirring of liquid (2) Convection

(3) Conduction (4) Radiation

Q.13 For a plane convex lenx (μ = 1.5) has radius of curvature 10 cm. It is silvered on its plane surface. Find focal length after silvering :

(1) 10 cm (2) 20 cm

(3) 15 cm (4) 25 cm

Q.14 By photo electric effect, Einstein proved :

(1) $E = h\nu$ (2) $KE = \frac{1}{2}mv^2$

(3) $E = mc^2$ (4) $E = \frac{-Rhc^2}{n^2}$

Q.15 Maximum frequency of emission is obtained for the transition :

(1) n = 2 to n = 1 (2) n = 6 to n = 2

(3) n = 1 to n = 2 (4) n = 2 to n = 6

Q.16 For a hollow cylinder & a solid cylinder rolling without slipping on an inclined plane, then which of these reaches earlier on the ground :

(1) Solid cylinder

(2) Hollow cylinder

(3) Both simultaneously

(4) Can't say anything

Q.17 To find out degree of freedom, the correct expression is :

(1) $f = \frac{2}{\gamma - 1}$ (2) $f = \frac{\gamma + 1}{2}$

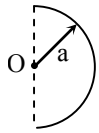
(3) $f = \frac{2}{\gamma + 1}$ (4) $f = \frac{1}{\gamma + 1}$

Q.18 The frequency order of for γ - rays (b), X – rays (a), UV – rays (c) :

(1) b > a > c (2) a > b > c

(3) c > b > a (4) a > c > b

Q.19 Electric field at centre O of semicircle of radius 'a' having linear charge density λ given is given by



(1) $\frac{2\lambda}{\epsilon_0 a}$ (2) $\frac{\lambda\pi}{\epsilon_0 a}$

(3) $\frac{\lambda}{2\pi\epsilon_0 a}$ (4) $\frac{\lambda}{\pi\epsilon_0 a}$

Q.20 The width of river is 1 km. The velocity of boat is 5 km/hr. The boat covered the width of river with shortest will possible path in 15 min. Then the velocity of river stream is :

(1) 3 km/hr (2) 4 km/hr

(3) $\sqrt{29}$ km/hr (4) $\sqrt{41}$ km/hr

Q.21 Motion of a particle is given by equation $S = (3t^3 + 7t^2 + 14\ t + 8)m$, The value of acceleration of the particle at t = 1 sec. is :

(1) 10 m/s^2 (2) 32 m/s^2

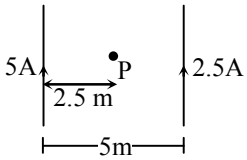
(3) 23 m/s^2 (4) 16 m/s^2

Q.22 A charge Q is situated at the corner of a cube, the electric flux passed through all the six faces of the cube is :

(1) $\frac{Q}{6\epsilon_0}$ (2) $\frac{Q}{8\epsilon_0}$

(3) $\frac{Q}{\epsilon_0}$ (4) $\frac{Q}{2\epsilon_0}$

Q.23 For adjoining fig., The magnetic field at point, 'P' will be :



(1) $\frac{\mu_0}{4\pi}\odot$ (2) $\frac{\mu_0}{\pi}\otimes$

(3) $\frac{\mu_0}{2\pi}\otimes$ (4) $\frac{\mu_0}{2\pi}\odot$

Q.24 A charge having q/m equal to 10^8 c/kg and with velocity 3×10^5 m/s enters into a uniform magnetic field B = 0.3 tesla at an angle 30º with direction of field. Then radius of curvature will be :

(1) 0.01 cm (2) 0.5 cm

(3) 1 cm (4) 2 cm

Q.25 The value of quality factor is :

(1) $\frac{\omega L}{R}$ (2) $\frac{\omega}{RC}$

(3) $\sqrt{LC}$ (4) L/R

Q.26 Two stationary sources each emitting waves of wave length λ. An observer moves from one source to other with velocity u. Then number of beats heared by him :

(1) $\frac{2u}{\lambda}$ (2) $\frac{u}{\lambda}$

(3) $\sqrt{u\lambda}$ (4) $\frac{u}{2\lambda}$

Q.27 A string is cut into three parts, having fundamental frequencies n_1, n_2 and n_3 respectively. Then original fundamental frequency 'n' related by the expression as :

(1) $\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$

(2) $n = n_1 \times n_2 \times n_3$

(3) $n = n_1 + n_2 + n_3$

(4) $n = \frac{n_1 + n_2 + n_3}{3}$

Q.28 The equations of two waves given as $x = a\cos(\omega t + \delta)$ and $y = a\cos(\omega t + \alpha)$, Where $\delta = \alpha + \pi/2$, then resultant wave represent :

(1) a circle (c.w)

(2) a circle (a.c.w)

(3) an Ellipse (c.w)

(4) an ellipse (a.c.w)

Q.29 The relation between λ and $T_{1/2}$ is :

($T_{1/2}$ = half life, $\lambda \rightarrow$ decay constant)

(1) $T_{1/2} = \frac{\ell n 2}{\lambda}$ (2) $T_{1/2}\, \ell n 2 = \lambda$

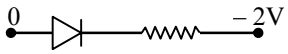
(3) $T_{1/2} = \frac{1}{\lambda}$ (4) $(\lambda + T_{1/2}) = \frac{\ell n}{2}$

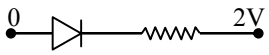
Q.30 The ratio (W/Q) for a carnot – engine is $\frac{1}{6}$, Now the temp. of sink is reduced by 62ºC, then this ratio becomes twice, therefore the initial temp. of the sink and source are respectively :

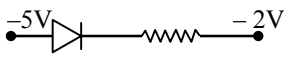
(1) 33ºC, 67ºC (2) 37ºC, 99ºC

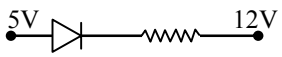
(3) 67ºC, 33ºC (4) 97 K, 37 K

Q.31 From the following diode circuit. Which diode in forward biased condition :

(1) 

(2) 

(3) 

(4) 

Q.32 Given Truth table is correct for :

A	B	Y
1	1	1
1	0	0
0	1	0
0	0	0

(1) NAND (2) AND

(3) NOR (4) OR

Q.33 The bob of simple pendulum having length ℓ, is displaced from mean position to an angular position θ with respect to vertical. If it is released, then velocity of bob at lowest position :

(1) $\sqrt{2g\ell(1-\cos\theta)}$

(2) $\sqrt{2g\ell(1+\cos\theta)}$

(3) $\sqrt{2g\ell\cos\theta}$

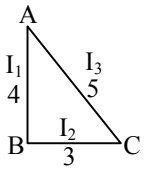
(4) $\sqrt{2g\ell}$

Q.34 If $\vec{F} = (60\,\hat{i} + 15\,\hat{j} - 3\,\hat{k})$ N and $\vec{V} = (2\,\hat{i} - 4\,\hat{j} + 5\,\hat{k})$ m/s, then instantaneous power is :

(1) 195 watt (2) 45 watt

(3) 75 watt (4) 100 watt

Q.35 For the adjoining diagram, a triangular lamina is shown the correct relation between I_1, I_2 & I_3 is (I – moment of inertia)



(1) $I_1 > I_2$ (2) $I_2 > I_1$

(3) $I_3 > I_1$ (4) $I_3 > I_2$

Q.36 Two spherical bob of masses M_A and M_B are hung vertically from two strings of length ℓ_A and ℓ_B respectively. They are excuting SHM with frequency relation $f_A = 2f_B$, Then :

(1) $\ell_A = \frac{\ell_B}{4}$

(2) $\ell_A = 4\ell_B$

(3) $\ell_A = 2\,\ell_B$ & $M_A = 2M_B$

(4) $\ell_A = \frac{\ell_B}{2}$ & $M_A = \frac{M_B}{2}$

Q.37 Nuclear – Fission is best explained by :

(1) Liquid droplet theory

(2) Yukawa π - meson theory

(3) Independent particle model of the nucleus

(4) Proton-proton cycle

Q.38 Who evaluated the mass of electron indirectly with help of charge :

(1) Thomson (2) Millikan

(3) Rutherford (4) Newton

Q.39 A car battery of emf 12 V and internal resistance $5 \times 10^{-2}\ \Omega$, receives a current of 60 Å from external source, then terminal voltage of battery is :

(1) 12 V (2) 9 V

(3) 15 v (4) 20 V

Q.40 Two bulbs of (40 W, 200 V), and (100 W, 200 V). Then correct relation for their resistance :

(1) $R_{40} < R_{100}$

(2) $R_{40} > R_{100}$

(3) $R_{40} = R_{100}$

(4) No relation can be predicted

Q.41 According to the Faraday Law of electrolysis, the mass deposited at electrode proportional to :

(1) $m \propto I^2$

(2) $m \propto Q$

(3) $m \propto Q^2$

(4) 'm' does not depend on Q

Q.42 A tall man of height 6 feet, want to see his full image. Then required minimum length of the mirror will be :

(1) 12 feet (2) 3 feet

(3) 6 feet (4) Any length

Q.43 The potentiometer is best for measuring voltage, as :

(1) It has a sensitive galvanometer

(2) It has wire of high resistance

(3) It measures p.d. like in closed circuit

(4) It measures p.d. like in open circuit

Q.44 For a planet having mass equal to mass of the earth but radius is one fourth of radius of the earth. Then escape velocity for this planet will be

(1) 11.2 km/s (2) 22.4 km/s

(3) 5.6 km/s (4) 44.8 km/s

Q.45 The correct relation for α, β for a transistor :

(1) $\beta = \frac{1-\alpha}{\alpha}$ (2) $\beta = \frac{\alpha}{1-\alpha}$

(3) $\alpha = \frac{\beta-1}{\beta}$ (4) $\alpha\beta = 1$

Q.46 The life span of atomic hydrogen is :

(1) Fraction of one sec. (2) One year

(3) One hour (4) One day

Q.47 The cations and anions are arranged in alternate form in :

(1) Metallic crystal

(2) Ionic crystal

(3) Co-valent crystal

(4) Semi-conductor crystal

Q.48 When an electron do transition from n = 4 to n = 2, then emitted line in spectrum will be :

(1) First line of Lyman series

(2) Second line of Balmer series

(3) First line of Paschen series

(4) Second line of Paschen series

Q.49 A bubble in glass slab (μ = 1.5) when viewed from one side appears at 5 cm and 2 cm from other side, then thickness of slab is :

(1) 3.75 cm (2) 3 cm

(3) 10.5 cm (4) 2.5 cm

Q.50 Which pair have not equal dimensions :

(1) Energy and torque

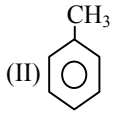
(2) Force and impulse

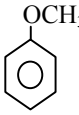
(3) Angular momentum and Plank's constant

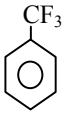
(4) Elastic modulus and pressure

Q.51 Increasing order of electrophilic substitution for following compounds :

(I) 

(II) 

(III) 

(IV) 

(1) IV< I < II < III (2) III < II < I < IV

(3) I < IV < III < II (4) II < III < I < IV

Q.52 Ethyl benzoate can be prepared from benzoic acid by using :

(1) Ethyl alcohol

(2) Ethyl alcohol and dry HCl

(3) Ethyl chloride

(4) Sodium ethoxide

Q.53 Polarization in acrolein as :

(1) $\overset{+\delta}{CH_2}=CH-\overset{-\delta}{C}HO$

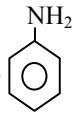
(2) $\overset{-\delta}{CH_2}=CH-\overset{+\delta}{C}HO$

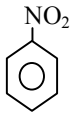
(3) $\overset{-\delta}{CH_2}=CH-\overset{+\delta}{C}HO$

(4) $\overset{+\delta}{CH_2}=CH-\overset{-\delta}{C}HO$

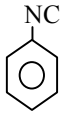
Q.54 $A \xrightarrow[(\text{अपचयन})]{\text{reduction}} B \xrightarrow{CHCl_3/KOH} C \xrightarrow[(\text{अपचयन})]{\text{reduction}}$

N-methyl aniline than A is :

(1) 

(2) 

(3) CH_3NH_2

(4) 

Q.55 First product of the reaction between RCHO and NH_2NH_2 : -

(1) $RCH = NNH_2$ (2) RCH = NH

(3) RCH_2NH_2 (4) $RCON_3$

Q.56 In Friedal craft reaction Toluene can be prepared by :

(1) $C_6H_6 + CH_3Cl$ (2) $C_6H_5Cl + CH_4$

(3) $C_6H_6 + CH_2Cl_2$ (4) $C_6H_6 + CH_3COCl$

Q.57 Which reagent converts propene to 1-propanol :
(1) H_2O, H_2SO_4
(2) B_2H_6, H_2O_2, OH^-
(3) $Hg(OAc)_2$, $NaBH_4/H_2O$
(4) Aq. KOH

Q.58 Reduction by $LiAlH_4$ of hydrolysed product of an ester gives :
(1) Two alcohols
(2) Two aldehyde
(3) One acid and one alcohol
(4) Two acids

Q.59 α-D-glucose and β-D-glucose are :
(1) Epimers (2) Anomer
(3) Enantiomers (4) Diastereomers

Q.60 $CF_2 = CF_2$ is monomer of :
(1) Teflon (2) Orlon
(3) Polythene (4) Nylon-6

Q.61 Correct order of stability is :
(1) 1–butene > Trans–2–butene > Cis–2–butene
(2) Trans–2–butene > 1–butene > Cis–2–butene
(3) Trans–2–butene > Cis–2-butene > 1–butene
(4) Cis-2–butene > Trans–2–butene > 1–butene

Q.62 2-butene shows geometrical isomerism due to :
(1) Restricted rotation about double bond
(2) Free rotation about double bond
(3) Free rotation about single bond
(4) Chiral carbon

Q.63 Dihedral angle in staggered form of ethane is :
(1) 0º (2) 120º
(3) 60º (4) 180º

Q.64 Which one is responsible for produce energy in bio reaction :
(1) Thyroxine (2) Adrenelene
(3) Oestrogen (4) Projestrone

Q.65 Average molar kinetic energy of CO and N_2 at same temperature is :
(1) $KE_1 = KE_2$
(2) $KE_1 > KE_2$
(3) $KE_1 < KE_2$
(4) Can't say any thing. Both volumes are not given

Q.66 For given energy, corresponding wavelength will be $E = 3.03 \times 10^{-19}$ Joules ($h = 6.6 \times 10^{-34}$ J x sec., $C = 3 \times 10^8$ m/sec.)
(1) 65.3 nm. (2) 6.53 nm.
(3) 3.4 nm. (4) 653 nm.

Q.67 Equilibrium constant Kp for following reaction :
$MgCO_3(s) \rightleftharpoons MgO(s) + CO_2(g)$
(1) $Kp = P_{CO_2}$
(2) $Kp = P_{CO_2} \times \frac{P_{CO_2} \times P_{MgO}}{P_{MgCO_3}}$
(3) $Kp = \frac{P_{CO_2} + P_{MgO}}{P_{MgCO_3}}$
(4) $Kp = \frac{P_{MgCO_3}}{P_{CO_2} \times P_{MgO}}$

Q.68 Correct relation b/w dissociation constant's of a di-basic acid :
(1) $Ka_1 = Ka_2$ (2) $Ka_1 > Ka_2$
(3) $Ka_1 < Ka_2$ (4) $Ka_1 = \frac{1}{Ka_2}$

Q.69 For a any reversible reaction. If increases concentration of reactants. Then effect on equilibrium constant :
(1) Depend's on amount of concentration
(2) Unchange
(3) Decrease
(4) Increase

Q.70 A cube of any crystal A-atom placed at every corners and B-atom placed at every centre of face. The formula of compound :
(1) AB (2) AB_3
(3) A_2B_2 (4) A_2B_3

Q.71 In quantitative analysis of second group in lab. H_2S gas is passed in acidic medium for ppt. When Cu^{+2} and Cd^{+2} react with KCN, than in which of the following condition, ppt will not be formed due to relative stability :
(1) $K_2[Cu(CN)_4]$ – More stable
$K_2[Cd(CN)_4]$ – Less stable
(2) $K_2[Cu(CN)_4]$ – Less stable
$K_2[Cd(CN)_4]$ – More stable
(3) $K_3[Cu(CN)_4]$ – More stable
$K_2[Cd(CN)_4]$ – Less stable
(4) $K_3[Cu(CN)_4]$ – Less stable
$K_3[Cd(CN)_4]$ – More stable

Q.72 Conjugate acid of NH_2^- :
(1) NH_4OH (2) NH_4^+
(3) NH^{-2} (4) NH_3

Q.73 Which statement is wrong about pH and H^+
(1) pH of neutral water does not zero
(2) Adding 1N, 1N sol^n of CH_3COOH and NaOH pH will be seven
(3) pH of dilute and hot H_2SO_4 is more than concentrate and cold H_2SO_4
(4) Mixing solution of CH_3COOH and HCl, pH will be less than 7

Q.74 A 300 gram radioactive sample has half life of 3 hour's. After 18 hour's remaining quantity will be :
(1) 4.68 gram (2) 2.34 gram
(3) 3.34 gram (4) 9.37 gram

Q.75 Which of the following compound is electron defficient :
(1) $BeCl_2$ (2) BCl_3 (3) CCl_4 (4) PCl_5

Q.76 $d\pi$ - $p\pi$ bond present in :
(1) CO_3^{2-} (2) PO_4^{-3} (3) NO_3^- (4) NO_2^-

Q.77 Which statement is wrong :
(1) Bond energy of $F_2 > Cl_2$
(2) Electronegativity of F > Cl
(3) F is more oxidising than Cl
(4) Electron affinity of Cl > F

Q.78 Which compound form linear polymer due to H-bond :
(1) H_2O (2) NH_3 (3) HBr (4) HCl

Q.79 Shape of $Fe(CO)_5$ is :
(1) Octahedral
(2) Square planar
(3) Trigonal bipyramidal
(4) Square pyramidal

Q.80 Correct order of dissociation energy of N_2 and N_2^+ is :
(1) $N_2 > N_2^+$ (2) $N_2 = N_2^+$
(3) $N_2^+ > N_2$ (4) None

Q.81 Isoelectronic species are :
(1) CO, CN^-, NO^+, C_2^{2-}
(2) CO^-, CN, NO, C_2^-
(3) CO^+, CN^+,NO^-, C_2
(4) CO, CN, NO, C_2

Q.82 Which ion is colourless :
(1) Cr^{+4} (2) Sc^{+3}
(3) Ti^{+3} (4) V^{+3}

Q.83 Mg is present in :
(1) Chlorophyl (2) Haemoglobin
(3) Vitamin-12 (4) Vitamin-B

Q.84 Which of the following element exhibit maximum oxidation state :
(1) Cr (2) Mn (3) Fe (4) V

Q.85 Which of the following statement is correct for the stability of ions of ethyl alcohol and phenol :
(1) Delocalisation of π-electrons in phenoxide ion
(2) Delocalisation of electrons in ethoxide ion
(3) Inductive effect of ethyl and phenyl group
(4) Localisation of π-electrons in phenoxide ion

Q.86 Which compound has planar structure :
(1) XeF_4 (2) $XeOF_2$
(3) XeO_2F_2 (4) XeO_4

Q.87 Which complex compound will give four isomers :
(1) $[Fe(en)_3]Cl_3$
(2) $[Co(en)_2Cl_2]Cl$
(3) $[Fe(PPh_3)_3NH_3ClBr]Cl$
(4) $[Co(PPh_3)_3Cl]Cl_3$

Q.88 Which species does not exhibits paramagnetism :
(1) N_2^+ (2) O_2^- (3) CO (4) NO

Q.89 For the disproportionation of copper :
$2\ Cu^+ \rightarrow Cu^{+2} + Cu$, E^o is : - (Given E^o for Cu^{+2}/Cu is 0.34 V & E^o for Cu^{+2}/Cu^+ is 0.15 V :
(1) 0.49 V (2) – 0.19 V
(3) 0.38 V (4) – 0.38 V

Q.90 Cell reaction is spontaneous when :
(1) ΔG^o is negative (2) ΔG^o is positive
(3) ΔE°_{Red} is positive (4) ΔE°_{Red} is negative

Q.91 At infinite dilution equivalent conductances of Ba^{+2} & Cl^- ions are 127 & 76$ohm^{-1}cm^{-1}$ eq^{-1} respectively. Equivalent conductance of $BaCl_2$ at infinite dilutions is :
(1) 139.5 (2) 101.5
(3) 203 (4) 279

Q.92 $2Zn + O_2 \rightarrow 2ZnO$ $\Delta G^o = -616$ J
$2Zn + S_2 \rightarrow 2ZnS$ $\Delta G^o = -293$ J
$S_2 + 2O_2 \rightarrow 2SO_2$ $\Delta G^o = -408$ J
ΔG^o for the following reaction is :
$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$
(1) – 731 J (2) – 1317 J
(3) – 501 J (4) + 731 J

Q.93 At 27ºC latent heat of fusion of a compound is 2930 J/mol. Entropy change is :
(1) 9.77 J/mol–K (2) 10.77 J/mol–K
(3) 9.07 J/mol–K (4) 0.977 J/mol–K

Q.94 For the reaction $C_2H_5OH(\ell) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(\ell)$ which one is true :

(1) $\Delta H = \Delta E - RT$

(2) $\Delta H = \Delta E + RT$

(3) $\Delta H = \Delta E + 2RT$

(4) $\Delta H = \Delta E - 2RT$

Q.95 For the reaction $H^+ + BrO_3^- + 3Br^- \rightarrow 5Br_2 + H_2O$ which of the following relation correctly represents the consumption & formation of reactants and products :

(1) $\frac{d[Br^-]}{dt} = -\frac{3}{5}\frac{d[Br_2]}{dt}$

(2) $\frac{d[Br^-]}{dt} = \frac{3}{5}\frac{d[Br_2]}{dt}$

(3) $\frac{d[Br^-]}{dt} = -\frac{5}{3}\frac{d[Br_2]}{dt}$

(4) $\frac{d[Br^-]}{dt} = \frac{5}{3}\frac{d[Br_2]}{dt}$

Q.96 From the colligative properties of solution which one is the best method for the determination of mol. wt of proteins & polymers :

(1) Osmotic pressure

(2) Lowering in V.P.

(3) Lowering is freezing point

(4) Elevation in B.Pt.

Q.97 Which one of the following method is commonly used method for destruction of colloid :

(1) Dialysis

(2) Condensation

(3) Filteration by animal membrane

(4) By adding electrolyte

Q.98 Volume of CO_2 obtained by the complete decomposition of 9.85 gm. $BaCO_3$ is :

(1) 2.24 lit. (2)1.12 lit.

(3) 0.84 lit. (4) 0.56 lit.

Q.99 Oxidation numbers of A, B and C are + 2, +5 and – 2 respectively possible formula of compound is :

(1) $A_2(BC_2)_2$ (2) $A_3(BC_4)_2$

(3) $A_2(BC_3)_2$ (4) $A_3(B_2C)_2$

Q.100 R and S enantiomer are differ in :

(1) Rotation of PPL

(2) Solubility in achiral solvent

(3) Chemical properties

(4) Dipole moment

Q.101 The first step for initiation of photosynthesis will be :

(1) Photolysis of water

(2) Excitement of chlorophyll molecule due to absorption of light

(3) ATP formation

(4) Glucose formation

Q.102 When the plants are grown in magnesium deficient but urea rich soil; the symptoms expressed are :

(1) Yellowish leaves (2) Colourless petiole

(3) Dark green leaves (4) Shoot apex die

Q.103 For the synthesis of one glucose molecule the calvin cycle operates for :

(1) 2 times (2) 4 times

(3) 6 times (4) 8 times

Q.104 Plants take zinc in form of :

(1) $ZnSO_4$ (2) Zn^{++} (3) ZnO (4) Zn

Q.105 The bacteria generally used for genetic engineering is :

(1) *Agrobacterium* (2) *Bacillus*

(3) *Pseudomonas* (4) *Clostridium*

Q.106 For assimilation of one CO_2 molecule; the energy required in form of ATP & $NADPH_2$

(1) 2 ATP & 2 $NADPH_2$

(2) 5 ATP & 3 $NADPH_2$

(3) 3 ATP & 2 $NADPH_2$

(4) 18 ATP & 12 $NADPH_2$

Q.107 Which is the first CO_2 Acceptor enzyme in C_4 plants :

(1) RuDP Carboxylase (2) Phosphoric acid

(3) RUBISCO (4) PEP-Carboxylase

Q.108 According to mendelism which character is showing dominance :

(1) Terminal position of flower

(2) Green colour in seed coat

(3) Wrinkled seed

(4) Green pod colour

Q.109 Due to the cross between TTRr × ttrr the resultant progenies showed how many percent plants tall, red flowered :

(1) 50% (2) 75% (3) 25% (4) 100%

Q.110 Which is showing accurate pairing :

(1) Syphilis - *Treponema pallidum*

(2) AIDS - *Bacillus conjugalis*

(3) Gonorrhoea - *Leishmania denovoni*

(4) Typhoid – *Mycobacterium leprae*

Q.111 Which is expressing right appropriate pairing :
(1) Brassicaceae - Sunflower
(2) Malvaceae - Cotton
(3) Papilionaceae - Catechu
(4) Liliaceae - Wheat

Q.112 Enzymes not found in :
(1) Fungi (2) Algae
(3) Virus (4) Cyanobacteria

Q.113 Virus are living, because :
(1) They multiply in host cells
(2) Carry anaerobic respiration
(3) Carry metabolic activity
(4) Cause infection

Q.114 If the apical bud has been removed then we observe :
(1) More lateral branches
(2) More axillary buds
(3) Plant growth stops
(4) Flowering stops

Q.115 Which hormone is responsible for fruit ripening :
(1) Ethylene (2) Auxin
(3) Ethyl chloride (4) Cytokinin

Q.116 Eight nucleated embryosac is a :
(1) Only monosporic (2) Only bisporic
(3) Only tetra sporic (4) Any of the above

Q.117 Which is the cause of damage to relative biological effectiveness :
(1) High temperature (2) Pollution
(3) Radiation (4) Low temperature

Q.118 Which is the reason for highest biomass in aquatic ecosystem :
(1) Nano plankton, blue green algae, green algae
(2) Sea grass, and slime molds
(3) Benthonic and brown algae
(4) Diatoms

Q.119 Geocarpic fruits is :
(1) Carrot (2) Radish
(3) Ground nut (4) Turnip

Q.120 Endosperm is formed during the double fertilization by :
(1) Two polar nuclei & one male gamete
(2) One polar nuclei & one male gamete
(3) Ovum and male gamete
(4) Two polar nuclei & two male gametes

Q.121 By which action a seed coat becomes permeable to water :
(1) Sclarification (2) Stratification
(3) Vernalization (4) All of the above

Q.122 What is true for mammalia :
(1) Platypus is oviparous
(2) Bats have feather
(3) Elephant is a ovo viviparous
(4) Diaphragm is absent in them

Q.123 Which of the following character is not found in all the chordates :
(1) Diaphragm (2) Coelom
(3) Pharyngeal gill clifts (4) Dorsal nerve cord

Q.124 Hair are found in the inflorescences of *Zea mays* are the modification of :
(1) Style (2) Stigma (3) Spathe (4) Filaments

Q.125 Pneumatophores are found in :
(1) The vegetation which is found in marshy and saline lake
(2) The vegetation which found in saline soil
(3) Xerophytes
(4) Epiphytes

Q.126 Concentration of urine depends upon which organ :
(1) Bowman's capsule
(2) Length of Henle's loop
(3) P.C.T.
(4) Network of capillaries arising from glomerulus

Q.127 In which point pulmonary artery is different from pulmonary vein :
(1) Its lumen is broad (2) Its wall is thick
(3) It have valves
(4) It does not possess endothelium

Q.128 Reason, why hair loss is more in old age :
(1) Reduction of blood supply
(2) Decrease in protein synthesis
(3) Low energy production
(4) Reduced storage of glycogen

Q.129 What is the work of copper T :
(1) To inhibit ovulation
(2) To inhibit fertilization
(3) To inhibit implantation of blastocyst
(4) To inhibit gametogenesis

Q.130 What is the work of progesteron which is present in oral contraceptive pills :
(1) To inhibit ovulation
(2) To check oogenesis
(3) To check entry of sperms in to cervix & to make them inactive
(4) To check sexual behaviour

Q.131 Conversion of ammonia to urea is done by ……..... Cycle :
(1) Ornithin cycle (2) Arginine cycle
(3) Fumaric cycle (4) Citrulline cycle

Q.132 What is name of joint between ribs and sternum :
(1) Cartilaginous joint (2) Angular joint
(3) Gliding joint (4) Fibrous joints

Q.133 Bone related with skull is :
(1) Coracoid (2) Arytenoid
(3) Pterygoid (4) Atlas

Q.134 Melatonin is secreted by :
(1) Pineal body (2) Skin
(3) Pituitary Gland (4) Thyroid

Q.135 M S H is secreted by :
(1) Anteria lobe of pituitary
(2) Middle lobe of pituitary
(3) Posteria lobe of pituitary
(4) Endostyle

Q.136 A person who is eating boiled potato his food contains the component is :
(1) Cellulose which is digested by cellulase
(2) Starch which is not digested
(3) Lactose which is not digested
(4) DNA which can be digested by pancreatic DNA'ase

Q.137 In mammals milk is digested by action of :
(1) Rennin (2) Amylase
(3) Intestinal bacteria (4) Invertase

Q.138 What happens if bone of frog is kept in dilute hydrochloric acid :
(1) Will become flexible
(2) Will turn black
(3) Will break in pieces
(4) Will shrinke

Q.139 Which disease of man is similar with cattle's, bovine spongyform encephalopathy :
(1) Encephalitis
(2) Jecob-crutzfelt disease
(3) Spongiocitis of cerebrum
(4) Spondylitis

Q.140 Erythroblastosis foetalis is caused when :
(1) Rh^- female & Rh^+ male
(2) Rh^+ female & Rh^- male
(3) Rh^+ female & Rh^+ male
(4) Rh^- female & Rh^- male

Q.141 Depolarization of axolema during nerve conduction takes place because of :
(1) Equal amount of Na^+ & K^+ move out across axolema
(2) Na^+ move inside and K^+ move more out side
(3) More Na^+ outside
(4) None

Q.142 Which statement is true for WBC :
(1) Non nucleated
(2) In deficiency cancer is caused
(3) Manufactured in thymus
(4) Can squeeze through blood capillaries

Q.143 Which pair is correct :
(1) Sweat = temperature regulation
(2) Saliva = sense of food taste
(3) Sebum = sexual attraction
(4) Humerus = Hind leg

Q.144 Which gland secretes odourous secretion in mammals :
(1) Bartholins (2) Prostate
(3) Anal gland (4) Liver-bile

Q.145 Characteristic of simple epithelium is :
(1) They are arranged indiscriminately
(2) They make a definite layer
(3) Continue to divide and help in organ function
(4) None

Q.146 Which food should be eaten in deficiency of Rhodopsin in eyes :
(1) Carrot & ripe papaya
(2) Guava, banana
(3) Mango & Potato
(4) None

Q.147 Which factor is responsible for inhibition of enzymatic process during feed back :
(1) Substrate (2) Enzymes
(3) End product (4) Temperature

Q.148 During viral infection the protein formed in host cells to resist is :
(1) Interferone (2) Antitoxin
(3) Antibody (4) Histone

Q.149 The movement of ions against the concentration gradient will be :
(1) Active transport
(2) Osmosis
(3) Diffusion
(4) All

Q.150 Which is not a vestigial organ in man :
(1) Third molar (2) Nails
(3) Segmental muscles of abdomen
(4) Coccyx

Q.151 Homo sapiens have evolved in :
(1) Paleocene (2) Plestocene
(3) Oligocene (4) Myocene

Q.152 Character which is closely related to human evolution :
(1) Disappearance of tail
(2) Reduction in size of jaws
(3) Binocular vision
(4) Flat nails

Q.153 Which evidence of evolution related to Darwin's finches :
(1) Evidences from biogeographical distribution
(2) Evidences from comparative anatomy
(3) Evidences from embryology
(4) Evidences from palaeontological

Q.154 Who is directly related to man :
(1) Gorilla (2) Rhesus
(3) Gibbon (4) Orangutan

Q.155 Lemur edri-edri is found in :
(1) Madagascar (2) Mauritius
(3) India (4) Sri Lanka

Q.156 Coconut milk is used in tissue culture in which present :
(1) Cytokinin (2) Auxin
(3) Gibberellin (4) Ethylene

Q.157 A giant rat is formed in the laboratory, what is the reason :
(1) Gene mutation (2) Gene synthesis
(3) Gene manipulation (4) Gene replication

Q.158 Plasmid has been used as vector because :
(1) It is circular DNA which have capacity to join to eukaryotic DNA
(2) It can move between prokaryotic and eukaryotic cells
(3) Both ends show replication
(4) It has antibiotic resistance gene

Q.159 Irregularity is found in drosophila during the organ differentiation for example- inplace of wing, long legs are formed. Which gene is responsible for :
(1) Double dominant gene
(2) Homeotic gene
(3) Complimentary gene
(4) Plastid

Q.160 Which cell organelle is concerned with glycosylation of protein :
(1) Ribosome
(2) Peroxisome
(3) Endoplasmic reticulum
(4) Mitochondria

Q.161 Simillarity in DNA and RNA :
(1) Both are polymer of nucleotides
(2) Both have similar pyrimidine
(3) Both have similar sugar
(4) Both are genetic material

Q.162 Aquatic fern is used to increase the yield in paddy crop :
(1) *Azolla* (2) *Salvinia*
(3) *Marsilea* (4) *Isoetes*

Q.163 Plant group with largest ovule, largest tree, and largest gametes :
(1) Gymnosperm (2) Angiosperm
(3) Bryophyta (4) Pteridophyta

Q.164 In ferns, Meiosis takes place at the time of :
(1) Spore formation
(2) Spore germination
(3) Gamete formation
(4) Antheridia and archegonia formation

Q.165 Similarity in *Ascaris lumbricoides* and *Anopheles stephensi* :
(1) Sexual dimorphism (2) Metamerism
(3) Anaerobic respiration (4) Endoparasitism

Q.166 Length of one loop of B- DNA :
(1) 3.4 nm. (2) 0.34 nm.
(3) 20 nm. (4) 10 nm.

Q.167 Primary function of enteronephric nephridia of *Pheretima* :
(1) Osmoregulation
(2) Excretion of nitrogenous waste
(3) Respiration
(4) Locomotion

Q.168 Which statement is correct :
(1) *A. indica* is largest wild honey bee
(2) Wax is waste material of honey bee
(3) C.V. Fritsch discovered the transmission methods in honey bee
(4) Drone of honey bee is diploid

Q.169 ATP is :
(1) Nucleotide (2) Nucleoside
(3) Nucleic acid (4) Vitamin

Q.170 Essential amino acid is :
(1) Phenyl alanine (2) Glycine
(3) Aspartic acid (4) Serine

Q.171 Anticodon occurs in :
(1) t-RNA (2) m-RNA
(3) r-RNA (4) DNA

Q.172 In three dimensional view the molecule of t-RNA is :
(1) L-shaped (2) S-shaped
(3) Y-shaped (4) E-shaped

Q.173 Saline solution is given to patients of Cholera because :
(1) Na^+ prevents water loss from body
(2) NaCl function as regulatory material
(3) NaCl produces energy
(4) NaCl is antibacterial

Q.174 Function of telomeres in nucleus :
(1) Pole ward movement
(2) To initiate the RNA synthesis
(3) To seal the ends of chromosome
(4) To recognize the homologous chromosome

Q.175 Spindle fibre unite with which structure of chromosomes :
(1) Chromocentre (2) Chromomere
(3) Kinetochore (4) Centriole

Q.176 Which of the following have carbohydrate as prosthetic group :
(1) Glycoprotein
(2) Chromoprotein
(3) Lipoprotein
(4) Nucleoprotein

Q.177 Viable material of endangered species can be preserved by :
(1) Gene bank (2) Gene library
(3) Herbarium (4) Gene pool

Q.178 Proteoglycan in cartilages which is part of polysaccharide :
(1) Condriotin (2) Ossein
(3) Cassin (4) Cartilegen

Q.179 Mangolian idiots are due to trisomy in 21^{st} chromosome is called :
(1) Down's syndrome
(2) Turner's syndrome
(3) Kleinfelters syndrome
(4) Triplex syndrome

Q.180 What happens in plants during vascularisation :
(1) Differentiation of procambium, formation of primary phloem followed by formation of primary xylem
(2) Differentiation of procambium followed by the formation of primary phloem and xylem simultaneously
(3) Formation of procambium, primary phloem and xylem simultaneously
(4) Differentiation of procambium followed by the formation of secondary xylem

Q.181 Which of the following ribosomes are engaged in protein synthesis in animal cell :
(1) Ribosomes which occur on nuclear membrane and E.R.
(2) Ribosomes of only cytosol
(3) Ribosomes of only nucleolus and cytosol
(4) Ribosomes of only mitochondria and cytosol

Q.182 First cloned animal :
(1) Dolly sheep (2) Polly sheep
(3) Molly sheep (4) Dog

Q.183 Which of the following is initiation codon :
(1) UAG (2) AUC
(3) AUG (4) CCU

Q.184 Method of DNA replication in which two strands of DNA separates and synthesize new strands :
(1) Dispersive
(2) Conservative
(3) Semiconservative
(4) Non conservative

Q.185 In *Drosophila* the XXY condition leads to femaleness whereas in human beings the same condition leads to Klienfelter's syndrome in male. It proves :
(1) In human beings Y chromosome is active in sex determination
(2) Y chromosome is active in sex determination in both human beings and *Drosophila*
(3) In *Drosophila* Y-chromosome decides femaleness
(4) Y chromosome of man have genes for syndrome

Q.186 In which stage of cell cycle, DNA replication occurs :
(1) G_1 - phase (2) S - phase
(3) G_2 - phase (4) M - phase

Q.187 Black rust of wheat is caused by :
(1) *Puccinia* (2) *Ustilago*
(3) *Albugo* (4) *Phytophthora*

Q.188 Which of the following animals have scattered cells with cell – tissue grade organisation :
(1) Sponge (2) *Hydra*
(3) Liver fluke (4) *Ascaris*

Q.189 Blastopore is the pore of :
(1) Archenteron (2) Blastocoel
(3) Coelom (4) A.C.

Q.190 Cleavage in mammals :
(1) Holoblastic equal
(2) Holoblastic unequal
(3) Superficial
(4) Discoidal

Q.191 Extranuclear DNA is found in :
(1) Lysosome and chloroplast
(2) Chloroplast and mitochondria
(3) Mitochondria and lysosome
(4) Golgi and E.R.

Q.192 Which of the following is used to manufacture ethanol from starch :
(1) Penicilline
(2) Saccharomyces
(3) Azotobactor
(4) Lactobacillus

Q.193 A student observed an algae with chl. 'a' 'd' and phycoerythrin it should belong to :
(1) Phaeophyta (2) Rhodophyta
(3) Chlorophyta (4) Bacillariophyta

Q.194 Lysosome contains :
(1) Oxidative enzymes
(2) Hydrolytic enzymes
(3) Reductive enzymes
(4) Anabolic enzymes

Q.195 Role of enzyme in reactions :
(1) Decrease activation energy
(2) Increase activation energy
(3) Inorganic catalyst
(4) None of the above

Q.196 What happens in light reaction (Photo chemical reaction) :
(1) Formation of ATP and $NADPH_2$
(2) Formation of ATP
(3) Formation of sugar
(4) Breakdown of sugar

Q.197 Most of the mutations are :
(1) Harmful (2) Harmful and recessive
(3) Beneficial (4) Dominant

Q.198 Stored food in fungi :
(1) Starch (2) Proteins
(3) Glycogen (4) Chitin

Q.199 Living beings maintain continuity of life by :
(1) Adaptation
(2) DNA–replication and its transfer in next generation
(3) RNA synthesis
(4) None of the above

Q.200 What shall be the effect of destruction of wild life :
(1) Wild gene of disease resistance will not be obtained
(2) Soil erosion
(3) Floods
(4) Green house effect

ANSWER KEY (AIPMT-2000)

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans	2	1	3	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	3	1
Ques.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans	2	2	3	2	1	1	1	2	1	2	1	2	1	2	2	1	1	2	3	2
Ques.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	2	2	4	2	2	1	2	2	3	2	1	2	4	2	1	1	2	1	2	1
Ques.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans	3	1	3	1	1	4	1	2	2	2	3	4	2	1	2	2	1	2	3	1
Ques.	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ans	1	2	1	2	1	1	3	3	3	1	1	1	1	1	1	1	4	2	2	1
Ques.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Ans	2	1	3	2	1	3	4	4	1	1	2	3	1	1	1	4	2	3	3	1
Ques.	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Ans	1	1	1	1	1	2	2	1	3	1	1	1	3	1	2	4	1	1	2	1
Ques.	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Ans	2	4	1	3	2	1	3	1	1	2	2	2	1	1	1	1	3	1	2	3
Ques.	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Ans	1	1	1	1	1	1	2	3	1	1	1	1	1	3	3	1	1	1	1	2
Ques.	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
Ans	1	1	3	3	1	2	1	2	1	1	2	2	2	2	1	1	2	3	2	1

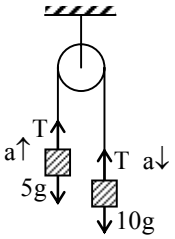
HINTS & SOLUTIONS

1. $10g - T = 10a$

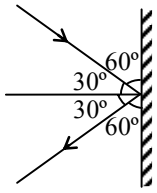
$T - 5g = 5a$

$5g = 15a$

$a = \frac{g}{3}$



2.



$$F = \frac{\Delta p}{\Delta t} = \frac{mv\cos 30^\circ - (-mv\cos 30^\circ)}{\Delta t}$$

$$= \frac{2mv\cos 30^\circ}{\Delta t} = \frac{2\times 3\times 10\times\sqrt{3}}{0.2\times 2} = 150\sqrt{3}\ \text{N}$$

3. Velocity after 5 second

$v = 100 - 10 \times 5$

$v = 50$ m/s.

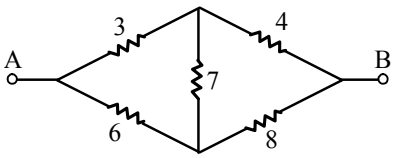
from conservation of momentum

$1 \times 50\,\hat{j} = 0.4 \times 25\,(-\hat{j}) + 0.6\,\vec{v}$

$50\,\hat{j} + 10\,\hat{j} = 0.6\,\vec{v}$

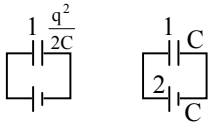
$$\vec{v} = \frac{60\hat{j}}{0.6} = 100\,\hat{j} = 100\ \text{m/s}\,\hat{j}$$

4. It is balanced wheatstone bridge so equivalent resistance between A & B



$$R = \frac{R_1\times R_2}{R_1+R_2} = \frac{14\times 7}{21} = \frac{14}{3}\ \Omega$$

5.



$$\text{energy stored (U)} = \frac{q^2}{2C}$$

After connecting with another capacitor

$$V_{Common} = \frac{q_1+q_2}{C_1+C_2} = \frac{q+0}{C+C} = \frac{q}{2C}$$

$\because$ Energy on each capacitor

$$= \frac{1}{2}\,CV_{Common}^2 = \frac{1}{2}\left(\frac{q}{2C}\right)^2 = \frac{U}{4}.$$

6. $R = \dfrac{2u^2 \sin\theta\cos\theta}{g}$

Range of a projectile for angles of projection θ and $90 - \theta$ are same.

7. Tension in the string at the lowest position B is maximum.

10. $F = mg = 72N$

$$g' = g\left(\frac{R_e}{R_e + h}\right)^2 = g\left(\frac{R_e}{R_e + R_e/2}\right)^2$$

$$= g\left[\frac{2R_e}{3R_e}\right]^2 = \frac{4}{9}g$$

$$F' = mg' = mg \times \frac{4}{9} = 72 \times \frac{4}{9} = 32N$$

13. Equivalent power of combination

$P_{eq} = 2P_L + P_M$

$$= 2(\mu - 1)\left(\frac{1}{R}\right) + 0$$

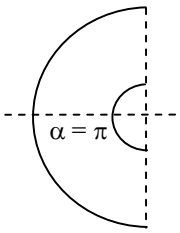
The required focal length

$$f = -\frac{1}{P_{eq}} = -\frac{R}{2(\mu-1)} = -\frac{10}{2(1.5-1)} = -10cm$$

17. $\because \gamma = 1 + \dfrac{2}{f}$

$$\Rightarrow \frac{2}{f} = \gamma - 1 \quad \Rightarrow f = \frac{2}{\gamma - 1}$$

19.



Electric field at $O = \dfrac{2K\lambda}{a}\sin(\alpha/2)$

$$= \frac{2\lambda}{4\pi\in_0 a}\sin\frac{\pi}{2} = \frac{\lambda}{2\pi\in_0 a}$$

20. $t = \dfrac{d}{\sqrt{u^2 - v^2}}$

$$\frac{1}{4} = \frac{1}{\sqrt{(5)^2 - v^2}}$$

$$\frac{1}{16} = \frac{1}{25 - v^2}$$

$v = 3$ km/hr.

21. $v = \dfrac{ds}{dt} = \dfrac{d}{dt}(3t^3 + 7t^2 + 14t + 8)$

$= 9t^2 + 14t + 14$

$a = \dfrac{dv}{dt} = 18t + 14$

at, $t = 1$ sec.

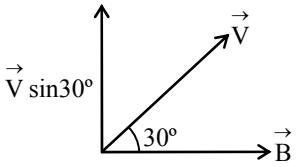
$a = 32\ ms^{-2}$.

23. Magnetic field due to 5A $\rightarrow \dfrac{5\mu_0}{2\pi\times 2.5} = \dfrac{2\mu_0}{2\pi}\otimes$

Magnetic field due to 2.5A $\rightarrow \dfrac{2.5\mu_0}{2\pi\times 2.5} = \dfrac{\mu_0}{2\pi}\odot$

Resultant Magnetic field $= \dfrac{2\mu_0}{2\pi} - \dfrac{\mu_0}{2\pi} = \dfrac{\mu_0}{2\pi}\otimes$

24.

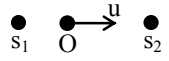


$$r = \frac{mV_\perp}{qB}$$

$$r = \left(\frac{m}{q}\right)\left(\frac{3\times10^5 \times \sin 30^o}{0.3}\right)$$

$$r = \frac{3\times10^5}{10^8 \times 0.3 \times 2} = 0.5 \times 10^{-2}\ m = 0.5\ cm$$

26.



For first source

$$n_1 = n\left(\frac{v-u}{v}\right) = \left(1 - \frac{u}{v}\right)n$$

for IInd source

$$n_2 = n\left(\frac{v+u}{v}\right) = \left(1 + \frac{u}{v}\right)n$$

Beat freq. $= |n_1 - n_2| = n + \dfrac{nu}{v} - n + \dfrac{nu}{v}$

$$= \frac{2nu}{v} = 2\frac{u}{\lambda}\left[\because v = n\lambda \ \therefore \frac{1}{\lambda} = \frac{n}{v}\right]$$

27. $\ell = \ell_1 + \ell_2 + \ell_3$

$$\frac{k}{n} = \frac{k}{n_1} + \frac{k}{n_2} + \frac{k}{n_3}$$

$$\Rightarrow \frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$$

30. $$\frac{W}{Q} = \frac{1}{6}$$

$$1 - \frac{T_L}{T_H} = \frac{1}{6}$$

$$\frac{T_L}{T_H} = n\frac{5}{6}$$

If sink temp. decrease by 62ºC then

$$1 - \frac{T_L - 62}{T_H} = \frac{2}{6} \Rightarrow \frac{T_L - 62}{T_H} = \frac{2}{3}$$

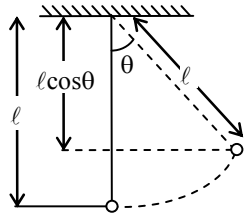
$$2T_H = 3T_L - 186 \Rightarrow 2T_H = 3 \times \frac{5}{6} T_H - 186$$

$$2T_H - \frac{5}{2} T_H = -186 \Rightarrow \frac{5-4}{2} T_H = 186$$

$T_H = 186 \times 2 \quad = 372\ K = 99ºC$

$T_L = \frac{5}{6} \times 372 \quad = 310\ K = 37ºC$

33.



Potential energy at extreme position = kinetic energy at mean position

$$mg\ell(1 - \cos\theta) = \frac{1}{2} mv^2$$

$$v = \sqrt{2g\ell(1 - \cos\theta)}$$

34 $P = \vec{F} . \vec{v}$

$= (60\hat{i} + 15\hat{j} - 3\hat{k}) . (2\hat{i} - 4\hat{j} + 5\hat{k})$

$= (120 - 60 - 15) = 45$ watt

35. For triangular lamina

Longest side $\rightarrow I_{min}$

Smallest side $\rightarrow I_{max}$

Therefore $I_2 > I_1 > I_3$

36. $$f = \frac{1}{2\pi} \sqrt{\frac{g}{\ell}}$$

$$f \propto \frac{1}{\sqrt{\ell}}$$

$$\frac{f_A}{f_B} = \sqrt{\frac{\ell_B}{\ell_A}}$$

$$\Rightarrow \frac{2f_B}{f_B} = \sqrt{\frac{\ell_B}{\ell_A}}$$

$$\Rightarrow 4 = \frac{\ell_B}{\ell_A}$$

$$\Rightarrow \ell_A = \frac{\ell_B}{4}$$

39. $V = E + IR$

$= 12 + 60 \times 5 \times 10^{-2}$

$= 12 + 3$

$= 15$ V

40. $P = \frac{V^2}{R}$, $P \propto \frac{1}{R}$

i.e. $R_{40} > R_{100}$

42. The minimum height of mirror

$$= \frac{h}{2} = \frac{6}{2} = 3 \text{ feet}$$

44. V_{es} for earth is 11.2 km/sec.

$$v_{es} = \sqrt{\frac{2GM_e}{R_e}} = 11.2 \text{ km/sec.}$$

$$v'_{es} = \sqrt{\frac{2GM_e \times 4}{R_e}} = 2\sqrt{\frac{2GM_e}{R_e}}$$

$= 2 \times 11.2 = 22.4$ km/sec.

49. From one side, $\frac{t - x}{5} = 1.5$

From other side, $\frac{x}{2} = 1.5 \rightarrow x = 3$

$\therefore \quad \frac{t-3}{5} = 1.5 \Rightarrow t = 7.5 + 3 = 10.5$ cm