NEET 2020
FULL TEST-1 SOLUTIONS

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

(1) **(4).** $P_{total} = X_A . P_A^0 + X_B . P_B^0$
$= 0.5 \times 400 + 0.5 \times 600 = 500$ mmHg
Now, mole fraction of A in vapour,

$$Y_A = \frac{P_A}{P_{total}} = \frac{0.5 \times 400}{500} = 0.4$$

and mole fraction of B in vapour,
$Y_B = 1 - 0.4 = 0.6$

(2) **(4).** Correct order of oxidation state of nitrogen in oxides of nitrogen is following:

$$\overset{+1}{N_2O} < \overset{+2}{NO} < \overset{+3}{N_2O_3} < \overset{+4}{NO_2}$$

(3) **(3).** $\left[-\overset{O}{\overset{\|}{C}}-(CH_2)_5-\overset{H}{\overset{|}{N}}- \right]_n$ (Nylon-6)

(4) **(1).** Distance between two nearest tetrahedral void $= a / 2$

(5) **(1).** For $K_2[HgI_4]$
$i = 1 + 0.4\,(3 - 1) = 1.8$

(6) **(3).** $2\overset{+7}{Mn}O_4 + 5C_2O_4^{2-} + 16H^+$

$$\rightarrow 2\overset{+2}{Mn^{2+}} + 10CO_2 + 8H_2O$$

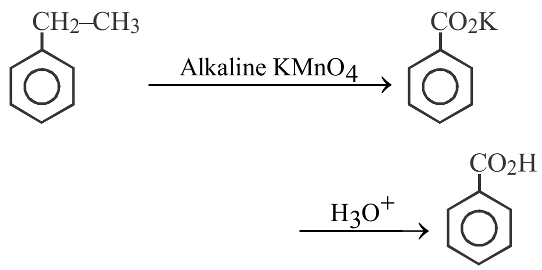
10 e^- trans for 10 molecules of CO_2 so per molecule of CO_2 transfer of e^- is '1'

(7) **(3).** Example of E_2 elimination and conjugated diene is formed with phenyl ring in conjugation which makes it very stable.

(8) **(1).** 1. Bauxite–$AlO_x(OH)_{3-2x}$, where $0 < x < 1$
2. Siderite – $FeCO_3$
3. Calamine – $ZnCO_3$
4. Malachite – $CuCO_3.Cu(OH)_2$

(9) **(1).** $Sm^{3+}(4f^5)$ = yellow colour.

(10) **(2).**



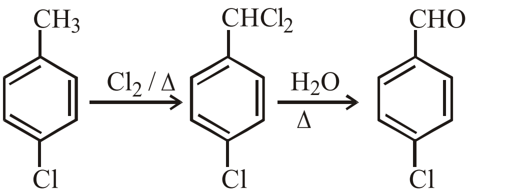
(11) **(1).** Hydration enthalpy depends upon ionic potential (charge / size). As ionic potential increases hydration enthalpy increases.

(12) **(4).**

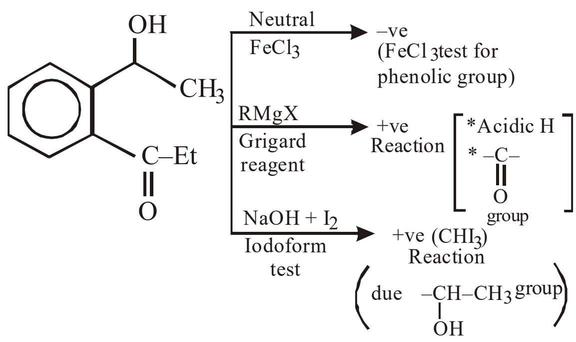
$$\underset{(X)}{2KMnO_4} \xrightarrow[\Delta]{513K} \underset{(Y)}{K_2MnO_4} + MnO_2 + O_2(g)$$

$MnO_2 + 4NaCl + 4H_2SO_4 \rightarrow MnCl_2 + 4NaHSO_4 + 2H_2O + Cl_2(g)$
(Z) pungent gas

(13) **(4).**



(14) **(1).**



(15) **(2).** K = 2, 8, 8 ,1
After removal of one electron, second electron we have to remove from another shell, hence there is large difference between first and second ionization energies.

(16) **(1).** $Zn + 2HCl \rightarrow ZnCl_2 + H_2 \uparrow$
$Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2 \uparrow$

(17) **(1).** All statements are correct
$B_2O_3 \rightarrow$ acidic
Al_2O_3 & Ga_2O_3 are amphoteric oxides of In & Tl are basic

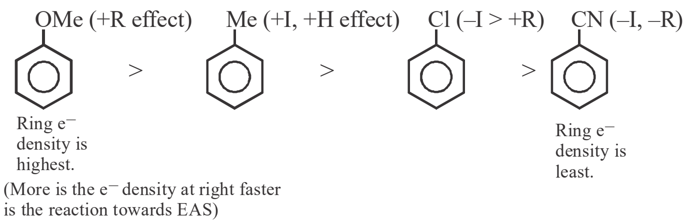
(18) **(2).** $\wedge_m^\circ(HA) = \wedge_m^\circ(HCl) + \wedge_m^\circ(NaA) - \wedge_m^\circ(NaCl)$
$= 425.9 + 100.5 - 126.4 = 400$ $Scm^2\,mol^{-1}$

$$\wedge_m = \frac{1000\,K}{M} = \frac{1000 \times 5 \times 10^{-5}}{10^{-3}}$$

$= 50$ $S\,cm^2\,mol^{-1}$

$$\alpha = \frac{\wedge_m}{\wedge_m^\circ} = \frac{50}{400} = 0.125$$

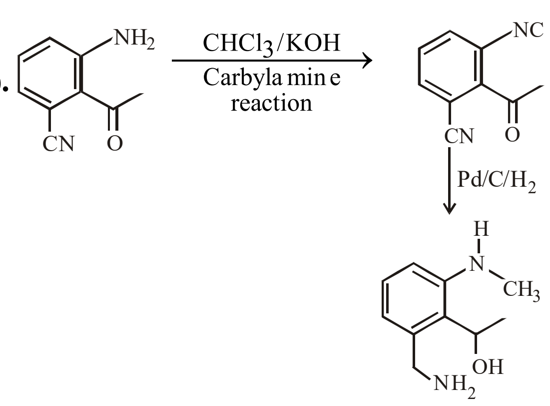
(19) (3).



(20) (1). In electrophoresis precipitation occurs at the electrode which is oppositely charged therefore (1) is correct.

(21) (2). $T_{eq} = \frac{\Delta H}{\Delta S} = \frac{491.1 \times 1000}{198} = 2480.3\ K$

(22) (1).



(23) (4). $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

$$\frac{k_p}{k_c} = (RT)^{\Delta n_g} = (RT)^0 = 1$$

$N_2O_4(g) \rightleftharpoons 2NO_2(g)$

$$\frac{k_p}{k_c} = (RT)^1 = 24.62$$

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

$$\frac{k_p}{k_c} = (RT)^{-2} = \frac{1}{(RT)^2} = 1.65 \times 10^{-3}$$

(24) (4). $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$

t = 0, 3.0 M

t = 30, 2.75 M

$$\frac{-\Delta [N_2O_5]}{\Delta t} = \frac{0.25}{30}$$

$$\frac{1}{2} \times \frac{-\Delta [N_2O_5]}{\Delta t} = \frac{1}{4} \times \frac{\Delta [NO_2]}{\Delta t}$$

$$\frac{\Delta [NO_2]}{\Delta t} = \frac{0.25}{30} \times 2 = 1.66 \times 10^{-2}\ M/min$$

(25) (4). 2/5 air escaped from vessel,

$\therefore$ 3/5 air remain is vessel. P, V constant

$n_1T_1 = n_2T_2$

$$n_1 (300) = \left(\frac{3}{5} n_1\right) T_2 \Rightarrow T_2 = 500\ K$$

(26) (2).

(a) $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$

$400 \times 0.1 = 40 \quad 400 \times 0.1 = 40$

$20 \quad 0$

$$\therefore [H^+] = \frac{20 \times 2}{800} = \frac{1}{20} \Rightarrow pH = -\log\left(\frac{1}{20}\right)$$

$\therefore$ pH = 1.3, so (a) is correct

(b) $\log\left(\frac{Kw_2}{Kw_1}\right) = \frac{\Delta H}{2.303\ R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$

So ionic product of water is temp. dependent hence (b) is correct.

(c) $K_a = 10^{-5}$, pH = 5 $\Rightarrow [H^+] = 10^{-5}$

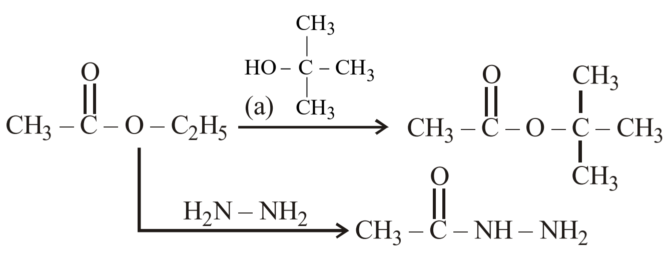
$$K_a = \frac{c\,\alpha^2}{(1-\alpha)} \Rightarrow K_a = \frac{[H^+]\cdot\alpha}{(1-\alpha)}$$

$$\therefore 10^{-5} = \frac{10^{-5}\cdot\alpha}{(1-\alpha)} \Rightarrow 1-\alpha = \alpha \Rightarrow \alpha = \frac{1}{2} = 50\%$$

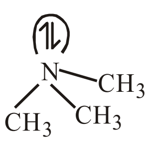
so (c) is correct.

(d) Le-chatelier's principle is applicable to common –Ion effect so option (d) is wrong.

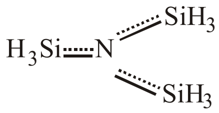
(27) (3).



(28) (4).



Nitrogen is sp^3 hybrid and pyramidal no back-bonding i.e.more basic

(b) 

Nitrogen sp^2 hybrid and planar due to back bonding and less basic because lone pair is not available for donation.

(29) **(1).** 8g NaOH, mol of NaOH $= \frac{8}{40} = 0.2$ mol

18g H_2O, mol of $H_2O = \frac{18}{18} = 1$ mol

$\therefore \quad X_{NaOH} = \frac{0.2}{1.2} = 0.167$

Molality $= \frac{0.2 \times 1000}{18} = 11.11$ m

(30) **(1).** $H_2SO_4 + 2NH_3 \rightarrow (NH_4)_2SO_4$

10mL of 1M H_2SO_4 = 10m mol

$[\because M \times V_{(mL)} = \text{m mol}]$

NH_3 consumed = 20m mol

Acid used for the absorption of ammonia

= 20 – 10 m mol

= 10 mL of 2N (or 1 M) H_2SO_4

$\%N = \frac{1.4 \times N \times V}{w} = \frac{1.4 \times 10 \times 2}{0.75}$

= 37.33%

(31) **(1).** HCl with Na_2CO_3

Eq. of HCl = Eq. of Na_2CO_3

$\frac{25}{1000} \times M \times 1 = \frac{30}{1000} \times 0.1 \times 2$; $M = \frac{6}{25}M$

Eq of HCl = Eq. of NaOH

$\frac{6}{25} \times 1 \times \frac{V}{1000} = \frac{30}{1000} \times 0.2 \times 1$

V = 25 ml

(32) **(4).** $I_2(s) \rightarrow I_2(g)$: $\Delta H_1 = 24$ cal/g at 200°C

$\Delta H_2 = \Delta H_1 + \Delta C_{Prxn}(T_2 - T_1)$

= 24 + (0.031 – 0.055) × 50

= 24 – 1.2 = 22.8 Cal/g

(33) **(3).** For strongest oxidising agent, standard reduction potential should be highest.

(34) **(4).** The highest oxidation state of U and Pu is 6+ and 7+ respectively.

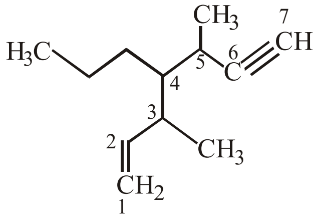
(35) **(4).** Seliwanoff's test is used to distinguished aldose and ketose group.

(36) **(1).** $\underset{\text{Washing soda (X)}}{Na_2CO_3.10H_2O(s)} \xrightarrow{\Delta} \underset{\text{(Y)}}{Na_2CO_3.H_2O}$

$\xrightarrow[T>373K]{\Delta} \underset{\text{Soda ash (Z)}}{Na_2CO_3}$

(37) **(4).** The maximum prescribed concentration of Cu in drinking water is 3 ppm.

(38) **(1).** Noradrenaline is a neutro transmitter and it belongs to catecholamine family that fanctions in brain & body as a harmone & neutro transmitter.

(39) **(4).** 

3,5-Dimethyl-4-propylhept-1-en-6-yne

Longest carbon chain, including multiple bonds, and numbering starts from double bond.

(40) **(1).** B C

Al Si

Ga < Ge

Along the period electronegativity increases.

(41) **(3).** $C_{(graphite)} + O_2(g) \rightarrow CO_2(g)$ ...(1)

$\Delta_r H^o = x$ kJ /mol

$C_{(graphite)} + \frac{1}{2} O_2(g) \rightarrow CO(g)$ ...(2)

$\Delta_r H^o = y$ kJ /mol

$CO(g) + \frac{1}{2} O_2(g) \rightarrow CO_2(g)$ ...(3)

$\Delta_r H^\circ = z$ kJ mol^{-1}

(1) = (2) + (3)

x = y + z

(42) **(2).** cis–$[PtCl_2(NH_3)_2]$ is used in chemotherapy to inhibits the growth of tumors.

(43) **(1).** $CF_3-CH=CH_2 \xrightarrow{HCl} CF_3-\underset{|}{\overset{H}{C}}H-\overset{\oplus}{C}H_2$

$\rightarrow CF_3-\underset{|}{\overset{H}{C}}H-\underset{|}{\overset{Cl}{C}}H_2$

Due to higher e^- withdrawing nature of CF_3 group. It follow anti markovnikoff product.

(44) **(2).** $C_2O_4^{2-}$ (oxalato) : Bidentate
H_2O (aqua) : Monodentate

(45) **(2).**
$$\frac{\dfrac{1}{\lambda_2} = R_H\left(\dfrac{1}{n_1^2} - \dfrac{1}{n_2^2}\right) Z^2}{\dfrac{1}{\lambda_1} = R_H\left(\dfrac{1}{m_1^2} - \dfrac{1}{m_2^2}\right) Z^2}$$

As for shortest wavelengths both n_2 and m_2 are ∞.

$$\therefore \quad \frac{\lambda_1}{\lambda_2} = \frac{9}{1} = \frac{m_1^2}{n_1^2}$$

Now if $m_1 = 3$ & $n_1 = 1$ it will justify the statement hence Lyman and Paschen (2) is correct.

(46) **(3).** Potential difference between two faces perpendicular to x-axis will be

$$\ell \cdot (\vec{V} \times \vec{B}) = 12\text{mV}$$

(47) **(2).** $N_1 = N_0\, e^{-10\lambda t}$
$N_2 = N_0 e^{-\lambda t}$

$$\frac{1}{e} = \frac{N_1}{N_2} = e^{-9\lambda t} \Rightarrow 9\lambda t = 1 \Rightarrow t = 1/9\lambda$$

(48) **(3).** $v = 2f(\ell_2 - \ell_1)$
$v = 2 \times 480 \times (70 - 30) \times 10^{-2}$
$v = 960 \times 40 \times 10^{-2}$
$v = 38400 \times 10^{-2}$ m/s
$v = 384$ m/s

(49) **(1).** $P = I^2R$
$4.4 = 4 \times 10^{-6}\, R$
$R = 1.1 \times 10^6\, \Omega$

$$P' = \frac{11^2}{R} = \frac{11^2}{1.1} \times 10^{-6} = 11 \times 10^{-5}\,\text{W}$$

(50) **(4).** Energy of photon $= \dfrac{12500}{980} = 12.75$ eV

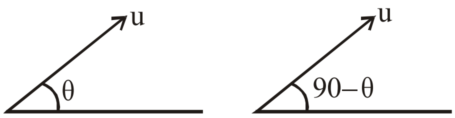
Electron will excite to $n = 4$
Since 'R' $\propto n^2$
$\therefore$ Radius of atom will be $16a_0$

(51) **(2).** For adiabatic process : $TV^{\gamma-1}$ = constant

For diatomic process : $\gamma - 1 = \dfrac{7}{5} - 1$

$\therefore$ $x = 2/5$

(52) **(2).**



For same range angle of projection will be θ & $90 - \theta$.

$$R = \frac{u^2\, 2\sin\theta\cos\theta}{g}$$

$$h_1 = \frac{u^2\sin^2\theta}{g} \;;\; h_2 = \frac{u^2\sin^2(90-\theta)}{g}$$

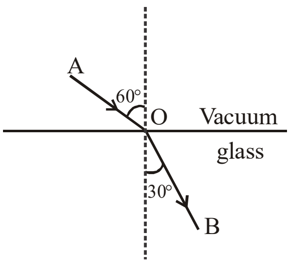
$$\frac{R^2}{h_1h_2} = 16$$

(53) **(1).** Numerical aperature of the microscope is given as, $NA = \dfrac{0.61\lambda}{d}$

Where d = minimum separation between two points to be seen as distinct

$$d = \frac{0.61\lambda}{NA} = \frac{(0.61) \times (5000 \times 10^{-10}\,\text{m})}{1.25}$$
$$= 2.4 \times 10^{-7}\ \text{m} = 0.24\ \mu\ \text{m}$$

(54) **(1).**



From Snell's law

$1.\sin 60° = \mu \sin 30° \Rightarrow \mu = \sqrt{3}$

Optical path = AO + μ (OB)

$$\frac{a}{\cos 60°} + \sqrt{3}\,\frac{b}{\cos 30°} = 2a + 2b$$

(55) **(4).** Energy $= \dfrac{1}{2}nRT = \dfrac{f}{2}PV = \dfrac{f}{2}(3 \times 10^6)\,(2)$
$= f \times 3 \times 10^6$

$f = 3$
$E = 9 \times 10^6$ J

(56) **(3).** $\chi = \frac{I}{H}$; $I = \frac{\text{Magnetic moment}}{\text{Volume}}$

$$I = \frac{20 \times 10^{-6}}{10^{-6}} = 20\ N/m^2$$

$$\chi = \frac{20}{60 \times 10^{+3}} = \frac{1}{3} \times 10^{-3}$$

$= 0.33 \times 10^{-3} = 3.3 \times 10^{-4}$

(57) **(1).** $\omega = 6 \times 10^{14} \times 2\pi$

$f = 6 \times 10^{14}$

$C = f\lambda$

$$\lambda = \frac{C}{f} = \frac{3 \times 10^8}{6 \times 10^{14}} = 5000\text{Å}$$

$$\text{Energy of photon} = \frac{12375}{5000} = 2.475\ eV$$

From Einstein's equation

$KE_{max} = E - \phi$

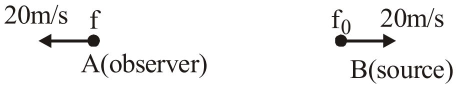
$eV_s = E - \phi$

$eV_s = 2.475 - 2$

$eV_s = 0.475\ eV$

$V_s = 0.475\ V = 0.48$ volt

(58) **(1).**



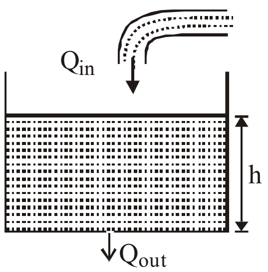
Applying Doppler effect for sound

$$f = \frac{v + v_0}{v - v_s} f_0$$

(v_0 and v_s is taken ⊕ when approaching each other)

$$2000 = \frac{340 + (-20)}{340 - (-20)} f_0 \ ;\ f_0 = 2250\ Hz$$

(59) **(4).**



Since height of water column is constant.

Water inflow rate (Q_{in}) = water outflow rate

$Q_{in} = 10^{-4}\ m^3s^{-1}$

$Q_{out} = Au = 10^{-4} \times \sqrt{2gh}$

$10^{-4} = 10^{-4}\ \sqrt{20 \times h}$

$h = (1/20)\ m = 5cm$

(60) **(3).** Orbital velocity, $V = \sqrt{\frac{GMe}{r}}$

$$T_A = \frac{1}{2} m_A V_A^2,\quad T_B = \frac{1}{2} m_B V_B^2$$

$$\frac{T_A}{T_B} = \frac{m \times \frac{Gm}{R}}{2m \times \frac{Gm}{2R}} = 1$$

(61) **(4).** Q = 2 (BE of He) – (BE of Li)

$= 2 \times (4 \times 7.06) - (7 \times 5.60)$

$= 56.48 - 39.2 = 17.3$ MeV

(62) **(4).** $i = e$; $r_1 = r_2 = A/2 = 30°$

By Snell's law,

$$1 \times \sin i = \sqrt{3} \times \frac{1}{2} = \frac{\sqrt{3}}{2}\ ;\ i = 60°$$

(63) **(4).** Since unpolarised light falls on P_1

⇒ Intensity of light transmitted from $P_1 = I_0/2$

Pass axis of P_2 will be at an angle of 30º with P_1

∴ Intensity of light transmitted from

$$P_2 = \frac{I_0}{2}\cos^2 30° = \frac{3I_0}{8}$$

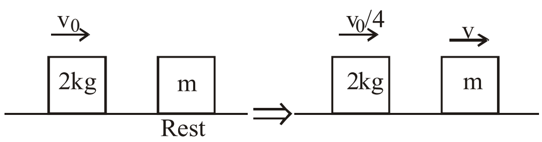
Pass axis of P_3 is at an angle of 60º with P_2

∴ Intensity of light transmitted from

$$P_3 = \frac{3I_0}{8}\cos^2 60° = \frac{3I_0}{32}$$

$$\therefore\ \frac{I_0}{I} = \frac{32}{3} = 10.67$$

(64) **(2).**



By conservation of linear momentum :

$$2v_0 = 2\left(\frac{v_0}{4}\right) + mv \Rightarrow 2v_0 = \frac{v_0}{2} + mv$$

$\Rightarrow \quad \frac{3v_0}{2} = mv$ .... (1)

Since collision is elastic

$V_{separation} = v_{approch}$

$\Rightarrow \quad v - \frac{v_0}{4} = v_0 \Rightarrow \frac{5v_0}{4} = v$ ....(2)

Equating (2) and (1)

$$\frac{3v_0}{2} = m\left(\frac{5v_0}{4}\right) \Rightarrow m = \frac{6}{5} = 1.2 \text{ kg}$$

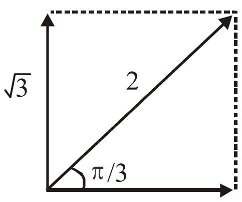
(65) (4). Suppose M is mass and a is side of larger triangle, then M/4 and a/2 will be mass and side length of smaller triangle.

$$\frac{I_{removed}}{I_{original}} = \frac{\frac{M}{4}}{M} \cdot \frac{\left(\frac{a}{2}\right)^2}{(a)^2} \quad ; \quad I_{removed} = \frac{I_0}{16}$$

$$I = I_0 - \frac{I_0}{16} = \frac{15I_0}{16}$$

(66) (4). $y = 5\,[\sin(3\pi t) + \sqrt{3}\cos(3\pi t)]$

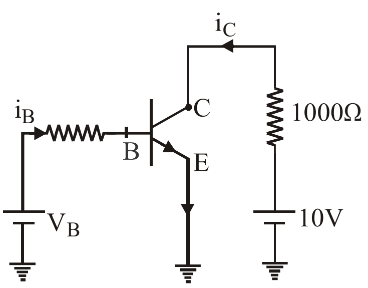
$$= 10\sin\left(3\pi t + \frac{\pi}{3}\right)$$



Amplitude = 10 cm

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{3\pi} = \frac{2}{3}\text{sec}$$

(67) (3).



At saturation state, V_{CE} becomes zero

$$i_c = \frac{10V}{1000\Omega} = 10mA$$

Now current gain factor $\beta = \frac{i_C}{i_B}$

$$i_B = \frac{10mA}{250} = 40\mu A$$

(68) (2). Since mass of the object remains same. Weight of object will be proportional to 'g' (acceleration due to gravity)

Given $\frac{W_{earth}}{W_{planet}} = \frac{9}{4} = \frac{g_{earth}}{g_{planet}}$

Also, $g_{surface} = \frac{GM}{R^2}$ (M is mass planet, G is universal gravitational constant, R is radius of planet)

$$\frac{9}{4} = \frac{GM_{earth}R^2_{planet}}{GM_{planet}R^2_{earth}}$$

$$= \frac{M_{earth}}{M_{planet}} \times \frac{R^2_{planet}}{R^2_{earth}} = 9\frac{R^2_{planet}}{R^2_{earth}}$$

$$\therefore \quad R_{planet} = \frac{R_{earth}}{2} = \frac{R}{2}$$

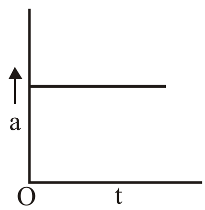
(69) (4). For first lens, $\frac{1}{V} - \frac{1}{-20} = \frac{1}{5}$; $V = \frac{20}{3}$

For second lens,

$$V = \frac{20}{3} - 3 = \frac{14}{3} \; ; \; \frac{1}{V} - \frac{1}{14/3} = \frac{1}{-5}$$

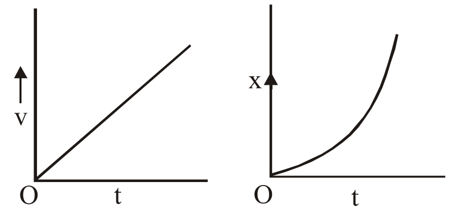
V = 70 cm

(70) (3). Given initial velocity u = 0 and acceleration is constant



At time t, $v = 0 + a\,t \Rightarrow v = at$

Also $x = 0\,(t) + \frac{1}{2}at^2 \Rightarrow x = \frac{1}{2}at^2$



Graph (a) ; (b) and (d) are correct.

(71) **(2).** Velocity of wave on string

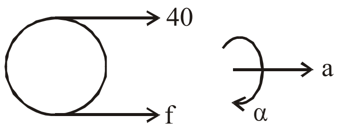
$$V = \sqrt{\frac{T}{\mu}} = \sqrt{\frac{8}{5} \times 1000} = 40 \text{ m / s}$$

Now, wavelength of wave $\lambda = \frac{v}{n} = \frac{40}{100}$ m

Separation between successive nodes,

$$\frac{\lambda}{2} = \frac{20}{100} \text{ m} = 20 \text{ cm}$$

(72) **(2).**



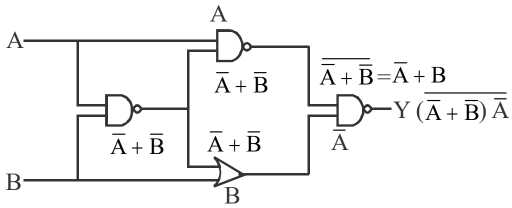
$40 + f = m\,(R\alpha)$ ....(i)

$40 \times R - f \times R = mR^2\alpha$

$40 - f = mR\alpha$ ...... (ii)

From (i) and (ii), $\alpha = \frac{40}{mR} = 16$

(73) **(2).**

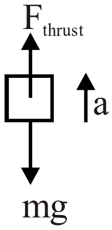


$$y = \overline{(\overline{A} + \overline{B})\,\overline{A}} = \overline{\overline{A} + \overline{A}B} = A\,(\overline{\overline{A}B})$$

$$= A\,(A + \overline{B}) = A + A\overline{B} = A\overline{B}$$

(74) **(2).** $F_{thrust} - mg = ma$

$m = 5000$ kg, $a = 20$ m/s^2



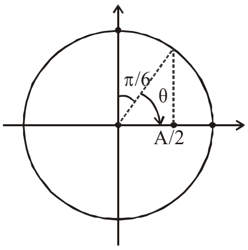
$\Rightarrow$ $F_{thrust} = 150000$ N

$$F_{thrust} = U_{rel} \times \frac{dm}{dt}$$

$$\Rightarrow \quad (-800) \times \frac{dm}{dt} = 150000$$

$$\Rightarrow \quad \frac{dm}{dt} \approx -187.5 \text{ kg/s}$$

(75) **(3).**



$V(t) = 220 \sin(100\pi t)$ volt

Time taken,

$$t = \frac{\theta}{\omega} = \frac{\pi/3}{100\pi} = \frac{1}{300} \text{ sec} = 3.3 \text{ ms}$$

(76) **(2).** Path difference = $d \sin\theta \approx d\theta$

$= 0.1 \times (1/40)$ mm = 2500 nm

or bright fringe, path difference must be integral multiple of λ.

$\therefore$ $2500 = n\lambda_1 = m\lambda_2$

$\therefore$ $\lambda_1 = 625$, $\lambda_2 = 500$ (from m = 5)

(for n = 4)

(77) **(4).** $4F^2 + 9F^2 + 12F^2 \cos\theta = R^2$

$4F^2 + 36\,F^2 + 24\,F^2 \cos\theta = 4R^2$

$4F^2 + 36\,F^2 + 24\,F^2 \cos\theta$

$= 4\,(13F^2 + 12F^2\cos\theta) = 52\,F^2 + 48F^2\cos\theta$

$$\cos\theta = -\frac{12F^2}{24F^2} = -\frac{1}{2}$$

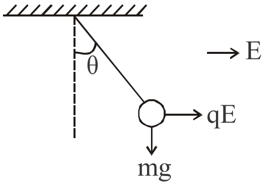
(78) **(1).** $KE = q\,\Delta V$

$$r = \frac{\sqrt{2mq\Delta V}}{qB} \;;\quad r \propto \sqrt{\frac{m}{q}} \;;\quad \frac{r_p}{r_\alpha} = \frac{1}{\sqrt{2}}$$

(79) **(4).** $i = \frac{\varepsilon}{13r}$; $i\left(\frac{x}{L}12r\right) = \frac{\varepsilon}{2}$

$$\frac{\varepsilon}{13r}\left(\frac{x}{L} \times 12r\right) = \frac{\varepsilon}{2} \Rightarrow x = \frac{13L}{24}$$

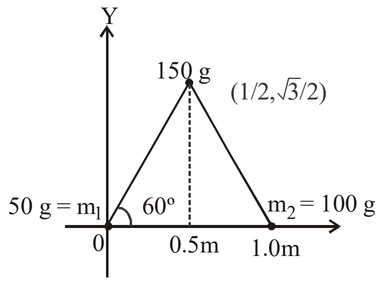
(80) **(3).**



$$\tan\theta = \frac{qE}{mg} = \frac{5 \times 10^{-6} \times 2000}{2 \times 10^{-3} \times 10}$$

$$\tan\theta = \frac{1}{2} \Rightarrow \theta = \tan^{-1}(0.5)$$

(81) **(3).**



The co-ordinates of the centre of mass

$$\vec{r}_{cm} = \frac{0 + 150 \times \left(\frac{1}{2}\hat{i} + \frac{\sqrt{3}}{2}\hat{j}\right) + 100 \times \hat{i}}{300}$$

$$\vec{r}_{cm} = \frac{7}{12}\hat{i} + \frac{\sqrt{3}}{4}\hat{j} \quad \therefore \text{Co-ordinate} \left(\frac{7}{12}, \frac{\sqrt{3}}{4}\right) \text{m}$$

(82) **(4).** Magnetic field at 'O' will be done to 'PS' and 'QN' only
i.e. $B_0 = B_{PS} + B_{QN} \rightarrow$ Both inwards
Let current in each wire = i

$$\therefore \quad B_0 = \frac{\mu_0 i}{4\pi d} + \frac{\mu_0 i}{4\pi d}$$

or $\quad 10^{-4} = \frac{\mu_0 i}{2\pi d} = \frac{2 \times 10^{-7} \times i}{4 \times 10^{-2}} \quad \therefore \quad i = 20\,A$

(83) **(4).** Electric field of equitorial plane of dipole

$$= -\frac{K\vec{P}}{r^3}$$

At P, $F = -\frac{K\vec{P}}{r^3}Q$; At P', $F' = -\frac{K\vec{P}Q}{(r/3)^3} = 27\,F$

(84) **(3).** $P = \frac{\Delta KE}{\Delta t} = \frac{\frac{1}{2}mv^2}{t}$

$$\therefore \quad v \propto \sqrt{t} \;;\; \frac{dx}{dt} \propto \sqrt{t} \quad \therefore \; x \propto t^{3/2}$$

(85) **(4).** $\beta = \frac{\Delta P}{(-\Delta V / V)} = \frac{h\rho g}{(-\Delta V / V)}$

$$= \frac{100 \times 10^3 \times 10}{10^{-3}} = 10^9 N/m^2$$

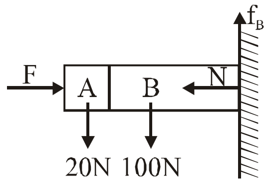
(86) **(3).** $\tau = C\theta$
$C = \tau / \theta$
$C = [ML^2T^{-2}]$

(87) **(3).** $Q = \sigma A T^4$,

$$\frac{Q_1}{Q_2} = \left(\frac{T_1}{T_2}\right)^4 = \left(\frac{273+27}{273+177}\right)^4$$

$$= \left(\frac{300}{450}\right)^4 = \left(\frac{2}{3}\right)^4 = \frac{16}{81}$$

(88) **(1).**

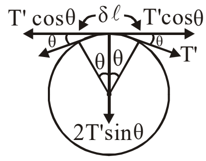


Various forces acting on the system are shown in the figure. For vertical equilibrium of the system, f_B = 100 N + 20 N = 120 N
i.e., frictional force applied by the wall on the block B is 120 N.

(89) **(4).** $\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mK}}$

$$\lambda \rightarrow 2\lambda \Rightarrow K \rightarrow \frac{K}{4}$$

(90) **(3).** $2T'\sin\theta = T\,d\ell$
$2T'\theta = T\,(2\theta\,.\,R)$
Tension $T' = RT$



(91)	(3)	**(92)**	(2)	**(93)**	(2)
(94)	(2)	**(95)**	(2)	**(96)**	(2)
(97)	(2)	**(98)**	(4)	**(99)**	(3)
(100)	(2)				

(101) **(1).** Due to intake of alcohol cerebrum is first affected but most affected part is cerebellum.

(102)	(4)	**(103)**	(4)	**(104)**	(1)
(105)	(4)	**(106)**	(2)	**(107)**	(1)
(108)	(1)	**(109)**	(4)		

(110) **(4).** Sarcoplasmic reticulum is less extensive in red muscles in comparison to white muscles.

(111)	(3)	**(112)**	(4)	**(113)**	(1)
(114)	(1)	**(115)**	(2)	**(116)**	(2)
(117)	(1)	**(118)**	(3)	**(119)**	(3)
(120)	(1)	**(121)**	(3)	**(122)**	(2)
(123)	(3)	**(124)**	(3)	**(125)**	(2)
(126)	(1)	**(127)**	(1)	**(128)**	(3)
(129)	(2)	**(130)**	(1)	**(131)**	(4)

(132) (4)	**(133)** (1)	**(134)** (4)	**(156)** (1)	**(157)** (4)	**(158)** (3)
(135) (4)	**(136)** (1)	**(137)** (2)	**(159)** (3)	**(160)** (1)	**(161)** (4)
(138) (4)	**(139)** (4)	**(140)** (4)	**(162)** (3)	**(163)** (4)	**(164)** (2)
(141) (1)	**(142)** (4)	**(143)** (2)	**(165)** (3)	**(166)** (4)	**(167)** (4)
(144) (1)	**(145)** (3)	**(146)** (3)	**(168)** (3)	**(169)** (4)	**(170)** (2)
(147) (4)	**(148)** (3)	**(149)** (4)	**(171)** (1)	**(172)** (1)	**(173)** (3)
(150) (4)	**(151)** (1)	**(152)** (2)	**(174)** (1)	**(175)** (3)	**(176)** (2)
(153) (3)	**(154)** (2)	**(155)** (4)	**(177)** (1)	**(178)** (3)	**(179)** (3)
			(180) (3)		