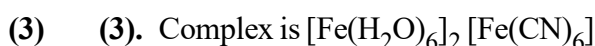
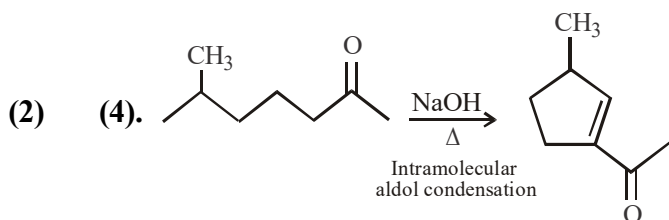
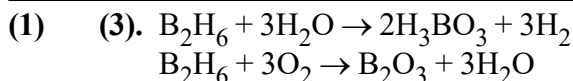


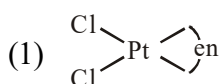
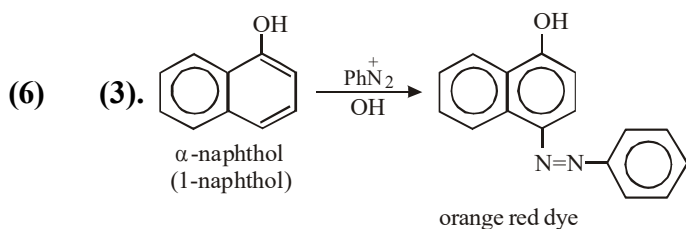
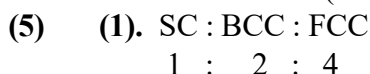
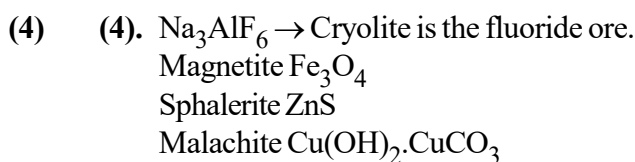
NEET 2020

FULL TEST-3 SOLUTIONS

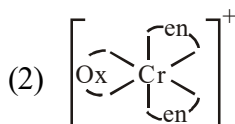
STANDARD ANSWER KEY											
Q	1	2	3	4	5	6	7	8	9	10	11
A	3	4	3	4	1	3	4	4	3	1	1
Q	12	13	14	15	16	17	18	19	20	21	22
A	2	4	2	1	3	3	2	2	3	3	2
Q	23	24	25	26	27	28	29	30	31	32	33
A	3	4	1	4	3	2	2	2	2	2	2
Q	34	35	36	37	38	39	40	41	42	43	44
A	2	3	2	2	1	4	4	2	2	1	4
Q	45	46	47	48	49	50	51	52	53	54	55
A	4	4	1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



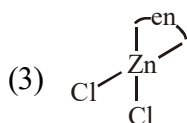
Complex ion	Configuration	No. of unpaired electrons	Magnetic moment
$Fe(H_2O)_6]^{2+}$	$t_{2g}^4 e_g^2$	4	4.9 BM
$Fe(CN)_6]^{4-}$	$t_{2g}^6 e_g^0$	0	0



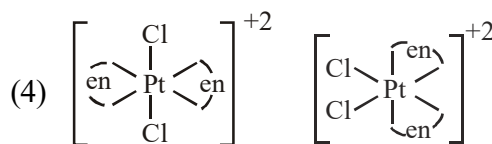
No trans isomer possible because bidentate ligand will be co-ordinating only at 90° angle in square planar complex.



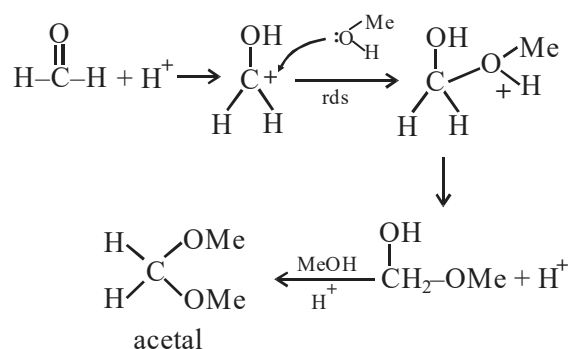
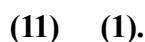
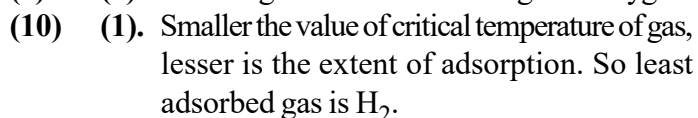
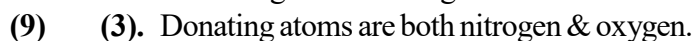
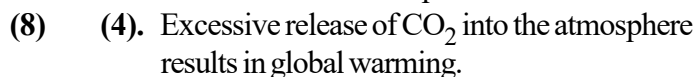
No trans isomer possible.



sp^3 hybridized so no trans possible.

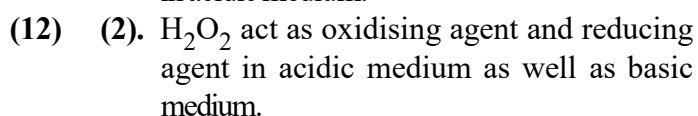


trans and cis both are possible.

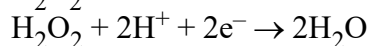


$$\text{Rate} \propto \frac{1}{\text{Steric crowding of aldehyde}}$$

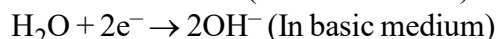
t-butanol can show formation of carbocation in acidic medium.



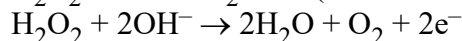
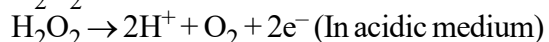
H_2O_2 act as oxidant :-



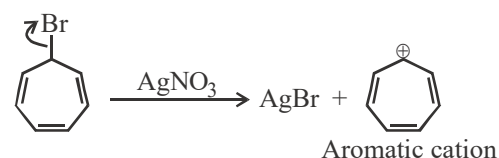
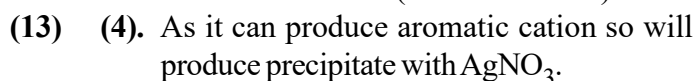
(In acidic medium)



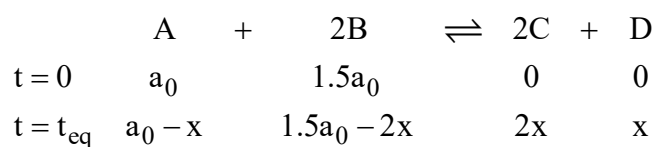
H_2O_2 act as reductant :-



(In basic medium)

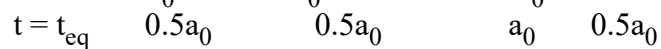


(14) (2).

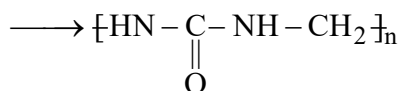
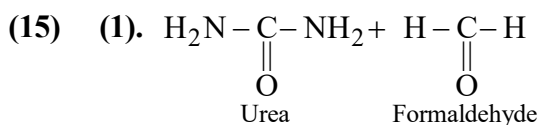


At equilibrium $[A] = [B]$

$$a_0 - x = 1.5a_0 - 2x \Rightarrow x = 0.5a_0$$



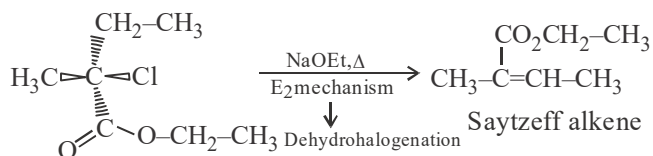
$$K_C = \frac{[C]^2[D]}{[A][B]^2} = \frac{(a_0)^2(0.5a_0)}{(0.5a_0)(0.5a_0)^2} = 4$$



(16) (3). Lowering of vapour pressure
 $= p^0 - p = p^0 \cdot x_{\text{solute}}$

$$\begin{aligned}
 \therefore \Delta p &= 35 \times \frac{0.6/60}{\frac{0.6}{60} + \frac{360}{18}} = 35 \times \frac{0.01}{0.01 + 20} \\
 &= 35 \times \frac{0.01}{20.01} = .017 \text{ mm Hg}
 \end{aligned}$$

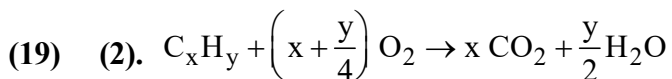
(17) (3).



(18) (2). V_2O_5 is catalyst \rightarrow contact process for H_2SO_4
 $\text{TiCl}_4/\text{Al}(\text{Me})_3 \rightarrow$ Ziegler Natta salt used as catalyst for polymerisation of ethene.

$\text{PdCl}_2 \rightarrow$ used as catalyst for ethanal (Wacker process).

Iron oxide \rightarrow is used as catalyst in Haber's synthesis.



$$\begin{array}{ccc}
 \left(\frac{25}{M}\right) & & \\
 x \times \frac{25}{M} & & \frac{y}{2} \times \frac{25}{M} \\
 = 2 & & = 0.5
 \end{array}$$

$$\text{C} \quad x \times \frac{25}{M} = 2$$

$$\text{H} \quad y \times \frac{25}{M} = 1$$

$$\text{C}_{2y}\text{H}_y \equiv 24y \text{ gm C} + y \text{ gm H}$$

or
 24 : 1 ratio by mass

(20) (3). In Friedal crafts alkylation product obtained is more activated and hence polysubstitution will take place.

(21) (3). Fledspar - $\text{KAlSi}_3\text{O}_8 - \text{NaAlSi}_3\text{O}_8 - \text{CaAl}_2\text{Si}_2\text{O}_8$

Zeolites - $\text{NaAlSi}_2\text{O}_6 \cdot \text{H}_2\text{O}$

Mica - $\text{KAl}_3\text{Si}_3\text{O}_{10}(\text{OH})_2$

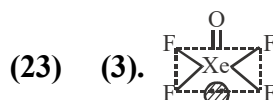
Asbestos - $\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$

These all are silicates having basic unit $(\text{SiO}_4)^{4-}$

(22) (2). 0.1 eq. of Ni^{+2} will be discharged.
 No. of eq = (No. of moles) \times (n-factor)

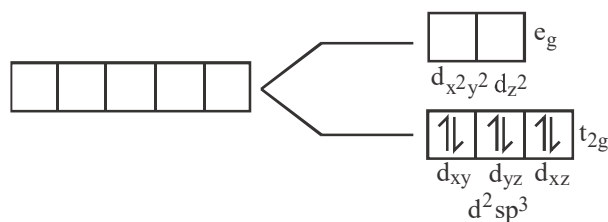
$$0.1 = (\text{No. of moles}) \times 2$$

$$\text{No. of moles of Ni} = \frac{0.1}{2} = 0.05$$



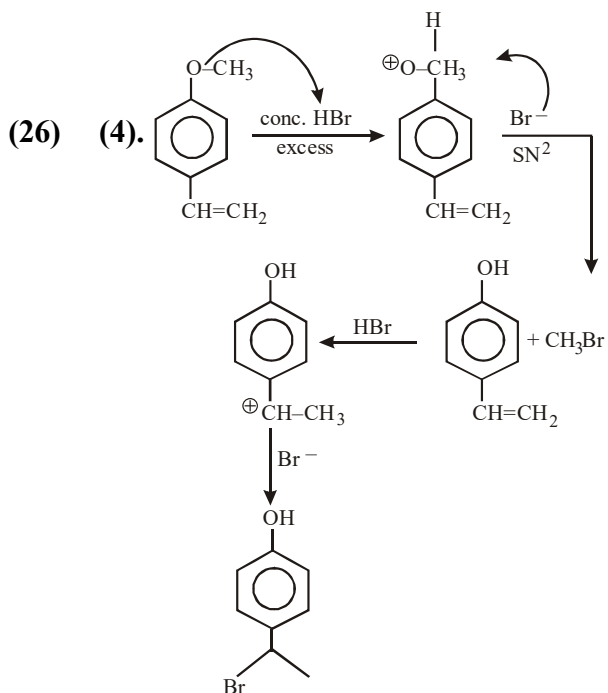
$$sp^3d^2 \Rightarrow [5\sigma\text{-bond} + 1 \ell.p.]$$

(24) (4). $\text{K}_3[\text{Co}(\text{CN})_6]$
 $\text{Co}^{+3} \rightarrow [\text{Ar}]_{18} 3d^6$

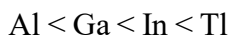


(25) (1). $\text{A} \xrightarrow{k_1} \text{B} \xrightarrow{k_2} \text{C}$

$$\frac{d[\text{B}]}{dt} = 0 = k_1 [\text{A}] - k_2 [\text{B}]$$



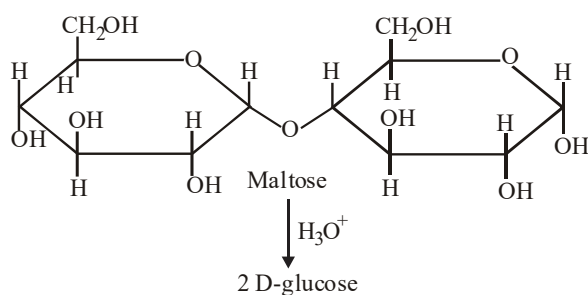
- (27) (3). Due to inert pair effect as we move down the group in 13th group lower oxidation state becomes more stable.



- (28) (2). Aerosol is suspension of fine solid or liquid particles in air or other gas.

Ex. Fog, dust, smoke etc

- (29) (2).



- (30) (2). $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) ; \Delta n_g < 0$

- (31) (2). $\text{Be}(\text{OH})_2$ is amphoteric in nature while rest all alkaline earth metal hydroxide are basic in nature.

(32) (2).
$$\ln \frac{K_2}{K_1} = \frac{E_a}{R} \left[\frac{1}{T_1} - \frac{1}{T_2} \right]$$

$$2.303 \log \frac{K_2}{10^{-5}} = 4606 \left[\frac{1}{400} - \frac{1}{500} \right]$$

$$\Rightarrow K_2 = 10^{-4} \text{ s}^{-1}$$

- (33) (2). Thermal stability of Alkaline earth metals carbonates increases down the group, because down the group polarizing power of cation decreases. So thermal stability increases. Hence, Thermal stability order : $\text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BaCO}_3$

- (34) (2). In acyclic compounds angle strain does not govern the stability of a conformation.

- (35) (3). Usually Sc(Scandium) does not show variable oxidation states.

Most common oxidation states of :

(i) Sc : +3

(ii) V : +2, +3, +4, +5

(iii) Ti : +2, +3, +4

(iv) Cu : +1, +2

- (36) (2). Higher the oxidation potential better will be reducing power.

- (37) (2).

(i) Wilkinson catalyst : $\text{RhCl}(\text{PPh}_3)_3$

(ii) Chlorophyll : $\text{C}_{55}\text{H}_{72}\text{O}_5\text{N}_4\text{Mg}$

(iii) Vitamin B_{12} (also known as cyanocobalamin) contain cobalt.

(iv) Carbonic anhydrase contains a zinc ion.

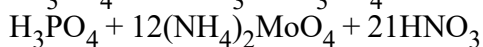
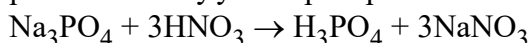
(38) (1).
$$(E_n)^{\text{th}} = (E_{\text{GND}})_{\text{H}} \cdot \frac{Z^2}{n^2}$$

$$E_{3\text{rd}}(\text{He}^+) = (-13.6 \text{ eV}) \frac{2^2}{3^2} = -6.04 \text{ eV}$$

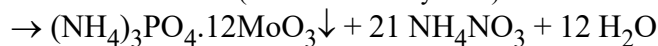
- (39) (4). The phosphorus containing organic compound are detected by 'Lassaigne's test' by heated with an oxidizing agent (sodium peroxide).

The phosphorus present in the compound in oxidised to phosphate.

The solution is boiled with nitric acid and then treated with ammonium molybdate to produced canary yellow precipitate.

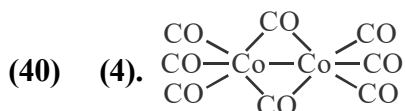


(Ammonium molybdate)



(Ammonium phosphomolybdate)

(Canary yellow precipitate)



Bridging CO are 2 and Co-Co bond is 1.

(41) (2). Basicity $\propto +R \propto \frac{1}{-R}$

$$\propto +H \propto \frac{1}{-H}$$

(42) (2). Ti \rightarrow |Ar| 3d² 4s²

Mn \rightarrow |Ar| 3d⁵ 4s²

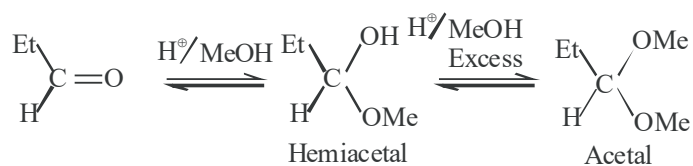
Ni \rightarrow |Ar| 3d⁸ 4s²

Zn \rightarrow |Ar| 3d¹⁰ 4s²

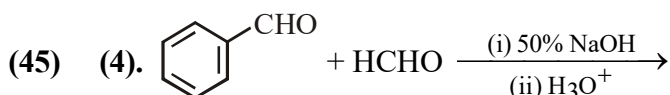
Correct order of I.P. is : Ti < Mn < Ni < Zn

(43) (1). In case of 'Be' electron remove from '2s' orbital while in case of 'B' electron remove from '2p' orbital. '2s' orbital have greater penetration effect then '2p' orbitals. So 'Be' having more I.E. then 'B'.

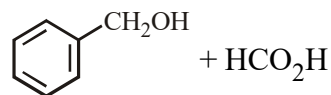
(44) (4).



Acetone as substrate is less reactive than propanal towards nucleophilic addition.



This is cross cannizaro reaction so more reactive carbonyl compound is oxidized and less reactive is reduced so answer is



(46) (4). $E_0 = B_0 \times C = 100 \times 10^{-6} \times 3 \times 10^8$
 $= 3 \times 10^4 \text{ N/C}$

(47) (1). $L \frac{di}{dt} = 25$; $L \times \frac{15}{1} = 25$; $L = \frac{5}{3} \text{ H}$

$$\Delta E = \frac{1}{2} \times \frac{5}{3} \times (25^2 - 10^2)$$

$$= \frac{5}{6} \times 525 = 437.5 \text{ J}$$

(48) (2). $f_{\text{app}} = f_0 \left[\frac{v_2 \pm v_0}{v_2 \mp v_s} \right]$

$$f_1 = f_0 \left[\frac{340}{340 - 34} \right] ; f_2 = f_0 \left[\frac{340}{340 - 17} \right]$$

$$\frac{f_1}{f_2} = \frac{340 - 17}{340 - 34} = \frac{323}{306} = \frac{19}{18}$$

(49) (4). $T = 2\pi \sqrt{\frac{I}{\mu B}}$; $T_h = 2\pi \sqrt{\frac{mR^2}{(2\mu) B}}$

$$T_c = 2\pi \sqrt{\frac{(1/2) mR^2}{\mu B}}$$

(50) (2). Since it is a balanced wheatstone bridge, its

$$\text{equivalent resistance} = \frac{4}{3} \Omega$$

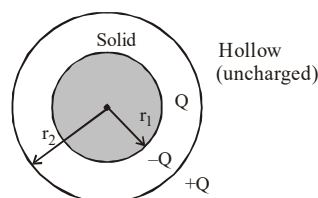
$$\varepsilon = B\ell v = 5 \times 10^{-4} \text{ V}$$

So total resistance

$$R = \frac{4}{3} + 1.7 \approx 3 \Omega$$

$$\therefore i = \frac{\varepsilon}{R} \approx 166 \mu\text{A} \approx 170 \mu\text{A}$$

(51) (1). As given in the first condition :

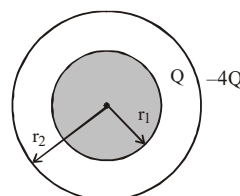


Both conducting spheres are shown.

$$V_{\text{in}} - V_{\text{out}} = \left(\frac{kQ}{r_1} \right) - \left(\frac{kQ}{r_2} \right)$$

$$= kQ \left(\frac{1}{r_1} - \frac{1}{r_2} \right) = V$$

In the second condition :



Shell is now given charge $-4Q$.

$$V_{in} - V_{out} = \left(\frac{kQ}{r_1} - \frac{4kQ}{r_2} \right) - \left(\frac{kQ}{r_2} - \frac{4kQ}{r_2} \right)$$

$$= \frac{kQ}{r_1} - \frac{kQ}{r_2} = kQ \left(\frac{1}{r_1} - \frac{1}{r_2} \right) = V$$

Hence, we also obtain that potential difference does not depend on charge of outer sphere.

\therefore P.d. remains same

- (52) (1). Velocity of 1 kg block just before it collides with 3kg block = $\sqrt{2gh} = \sqrt{2000} \text{ m/s}$

Applying momentum conservation just before and just after collision.

$$1 \times \sqrt{2000} = 4v \Rightarrow v = \frac{\sqrt{2000}}{4} \text{ m/s}$$

Initial compression of spring

$$1.25 \times 10^6 x_0 = 30 \Rightarrow x_0 \approx 0$$

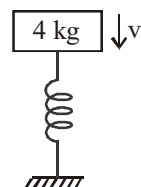
Applying work energy theorem,

$$W_g + W_{sp} = \Delta KE$$

$$\Rightarrow 40 \times x + \frac{1}{2} \times 1.25 \times 10^6 (0^2 - x^2)$$

$$= 0 - \frac{1}{2} \times 4 \times v^2$$

Solving $x \approx 4 \text{ cm}$



- (53) (3). $\left[\frac{\ell}{r} \right] = T$; $[CV] = AT$

$$\text{So, } \left[\frac{\ell}{rCV} \right] = \frac{T}{AT} = A^{-1}$$

- (54) (3). $N_A = N_0 e^{-5\lambda t}$
 $N_B = N_0 e^{-\lambda t}$

$$\frac{N_A}{N_B} = \frac{e^{-5\lambda t}}{e^{-\lambda t}} = \frac{1}{e^2}$$

$$\Rightarrow e^{-4\lambda t} = e^{-2} \Rightarrow 4\lambda t = 2 \Rightarrow t = 1 / 2\lambda$$

- (55) (1). For closed organ pipe, resonate frequency is odd multiple of fundamental frequency.

$$\therefore (2n + 1) f_0 \leq 20,000$$

(f_0 is fundamental frequency = 1.5 KHz)

$$\therefore n = 6$$

\therefore Total number of overtone that can be heard is 7. (0 to 6).

- (56) (2). At saturation, $V_{CE} = 0$

$$V_{CE} = V_{CC} - I_C R_C$$

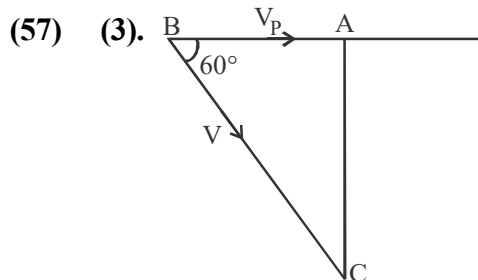
$$I_C = \frac{V_{CC}}{R_C} = 5 \times 10^{-3} \text{ A}$$

$$\text{Given } \beta_{dc} = \frac{I_C}{I_B} ; I_B = \frac{5 \times 10^{-3}}{200} = 25 \mu\text{A}$$

At input side

$$V_{BB} = I_B R_B + V_{BE} = (25 \text{mA})(100 \text{k}\Omega) + 1 \text{V}$$

$$V_{BB} = 3.5 \text{ V}$$



$$AB = V_p \times t ; BC = Vt$$

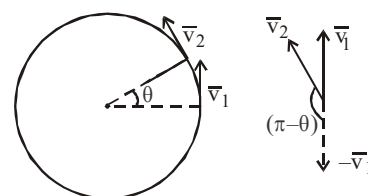
$$\cos 60^\circ = \frac{AB}{BC} ; \frac{1}{2} = \frac{V_p \times t}{Vt} ; V_p = \frac{V}{2}$$

- (58) (4).

	ΔE	ΔW	ΔQ
ab			250
bc		0	60
ca	-180		

	ΔE	ΔW	ΔQ
ab	120	130	250
bc	60	0	60
ca	-180		

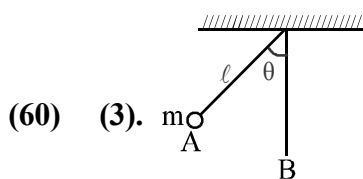
- (59) (2).



$$|\Delta \vec{v}| = \sqrt{v_1^2 + v_2^2 + 2v_1 v_2 \cos(\pi - \theta)}$$

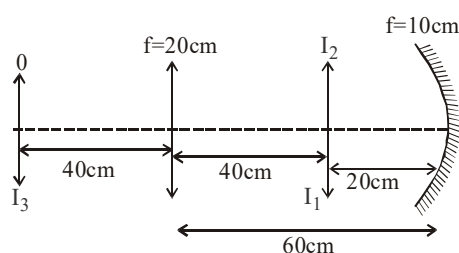
$$= 2v \sin \frac{\theta}{2} \quad \text{Since, } [|\vec{v}_1| = |\vec{v}_2|]$$

$$= (2 \times 10) \times \sin(30^\circ) = 10 \text{ m/s}$$



- (60) (3). Maximum kinetic energy at lowest point B is given by $K = mg\ell (1 - \cos \theta)$ where $\theta =$ angular amp.
 $K_1 = mg\ell (1 - \cos \theta)$
 $K_2 = mg (2\ell) (1 - \cos \theta)$
 $K_2 = 2K_1$.

- (61) (1). There will be 3 phenomenon
 (i) Refraction from lens
 (ii) Reflection from mirror
 (iii) Refraction from lens
 After these phenomena. Image will be on object and will have same size.



- 1st refraction $u = -40\text{cm}$; $f = +20\text{cm}$
 $\Rightarrow v = +40\text{ cm}$ (image I_1) and $m_1 = -1$
 For reflection
 $u = -20\text{cm}$; $f = -10\text{cm}$
 $\Rightarrow v = -20\text{cm}$ (image I_2) and $m_2 = -1$
 2nd refraction
 $u = -40\text{cm}$; $f = +20\text{cm}$
 $\Rightarrow v = +40\text{ cm}$ (image I_3) and $m_3 = -1$
 Total magnification $= m_1 \times m_2 \times m_3 = -1$
 and final image is formed at distance 40 cm from convergent lens and is of same size as the object.

- (62) (3). $h = \frac{2S_1 \cos \theta_1}{r_1 \rho_1 g}$; $h = \frac{2S_2 \cos \theta_2}{r_2 \rho_2 g}$
 $\Rightarrow \frac{r_1}{r_2} = \frac{2}{5}$

- (63) (4). Efficiency of Carnot engine $= 1 - \frac{T_{\text{sink}}}{T_{\text{source}}}$

Given, $\frac{1}{6} = 1 - \frac{T_{\text{sink}}}{T_{\text{source}}} \Rightarrow \frac{T_{\text{sink}}}{T_{\text{source}}} = \frac{5}{6} \dots (1)$

Also, $\frac{2}{6} = 1 - \frac{T_{\text{sink}} - 62}{T_{\text{source}}} \Rightarrow \frac{62}{T_{\text{source}}} = \frac{1}{6} \dots (2)$

$\therefore T_{\text{source}} = 372\text{ K} = 99^\circ\text{C}$

Also, $T_{\text{sink}} = \frac{5}{6} \times 372 = 310\text{ K} = 37^\circ\text{C}$

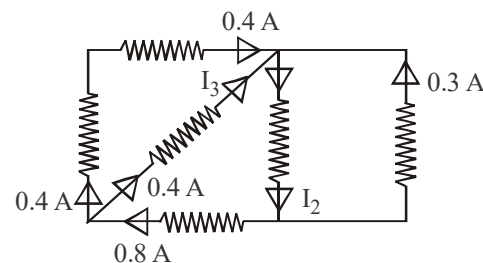
(Note : Temperature of source is more than temperature of sink)

- (64) (2). Since $D_m = (\mu - 1) A$ and on increasing the wavelength, μ decreases and hence D_m decreases.

(65) (2). $\alpha = \frac{\Delta\omega}{\Delta t} = \frac{25 \times 2\pi}{5} = 10\pi \text{ rad / sec}^2$

$\tau = \left(\frac{5}{4} MR^2\right) \alpha$
 $= \frac{5}{4} \times 5 \times 10^{-3} \times (10^{-2})^2 \times 10\pi$
 $= 1.9625 \times 10^{-5} \text{ Nm} = 2.0 \times 10^{-5} \text{ Nm}$

- (66) (1).



From KCL, $I_3 = 0.8 - 0.4 = 0.4\text{A}$
 $I_2 = 0.4 + 0.4 + 0.3 = 1.1\text{ A}$
 $I_6 = 0.4\text{A}$

- (67) (1). $I = \frac{nE}{At}$

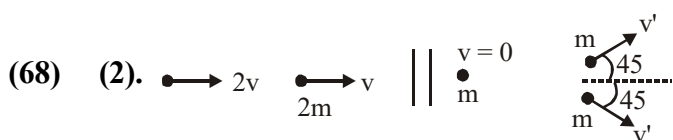
$16 \times 10^{-3} = \frac{n \times 10 \times 16 \times 10^{-19}}{t \times 10^{-4}}$

$\frac{n}{t} = 10^{11}$

Number of emitted photoelectrons per second

$= \frac{10}{100} \times 10^{11} = 10^{10}$

$KE_{\text{max}} = hv - \phi = 10 - 5 = 5\text{eV}$



Linear momentum conservation

$$m \cdot 2v + 2m \cdot v = m \cdot 0 + m \frac{v'}{\sqrt{2}} \times 2$$

$$v' = 2\sqrt{2}v$$

(69) (2). Given $N_p = 300, N_s = 150, P_0 = 2200 \text{ W}$
 $I_s = 10 \text{ A}$
 $P_0 = V_0 I_0 \Rightarrow 2200 = V_0 \times 10 \Rightarrow V_0 = 220 \text{ V}$

$$\therefore \frac{V_i}{V_0} = \frac{N_p}{N_s} \Rightarrow V_i = 2 \times 220 = 440 \text{ V}$$

Also, $P_0 = V_i I_i$

$$\Rightarrow I_i = \frac{2200}{400} = 5 \text{ A}$$

(70) (4). $m = \frac{f}{f-u}; 5 = \frac{-40}{-40-u}; u = -32 \text{ cm}$

(71) (2). Energy released for transition $n = 2$ to $n = 1$ of hydrogen atom

$$E = 13.6 Z^2 \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

$$Z = 1, n_1 = 1, n_2 = 2$$

$$E = 13.6 \times 1 \times \left(\frac{1}{1^2} - \frac{1}{2^2} \right); E = 13.6 \times \frac{3}{4} \text{ eV}$$

For He^+ ion $z = 2$

(1) $n = 1$ to $n = 4$

$$E = 13.6 \times 2^2 \times \left(\frac{1}{1^2} - \frac{1}{4^2} \right) = 13.6 \times \frac{15}{4} \text{ eV}$$

(2) $n = 2$ to $n = 4$

$$E = 13.6 \times 2^2 \times \left(\frac{1}{2^2} - \frac{1}{4^2} \right) = 13.6 \times \frac{3}{4} \text{ eV}$$

(3) $n = 2$ to $n = 5$

$$E = 13.6 \times 2^2 \times \left(\frac{1}{2^2} - \frac{1}{5^2} \right) = 13.6 \times \frac{21}{25} \text{ eV}$$

(4) $n = 2$ to $n = 3$

$$E = 13.6 \times 2^2 \times \left(\frac{1}{2^2} - \frac{1}{3^2} \right) = 13.6 \times \frac{5}{9} \text{ eV}$$

Energy required for transition of He^+ for $n=2$ to $n=4$ matches exactly with energy released in transition of H for $n = 2$ to $n = 1$.

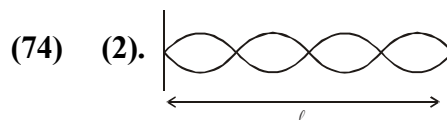
(72) (3). Energy of catapult = $\frac{1}{2} \times \left(\frac{\Delta \ell}{\ell} \right)^2 \times Y \times A \times \ell$

$$= \text{Kinetic energy of the ball} = \frac{1}{2} m v^2$$

$$\frac{1}{2} \times \left(\frac{20}{42} \right)^2 \times Y \times \pi \times 9 \times 10^{-6} \times 42 \times 10^{-2}$$

$$= \frac{1}{2} \times 2 \times 10^{-2} \times (20)^2; Y = 3 \times 10^6 \text{ Nm}^{-2}$$

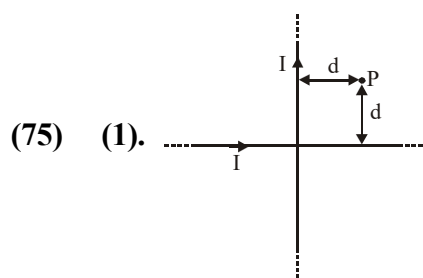
(73) (2). $I = \frac{6}{300} = 0.02$ (D_2 is in reverse bias)



$$4^{\text{th}} \text{ harmonic: } 4 \frac{\lambda}{2} = \ell; 2\lambda = \ell$$

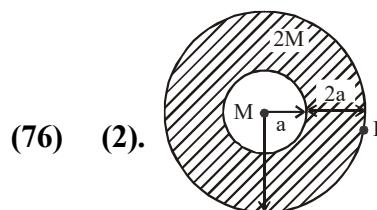
$$\text{From equation } \frac{2\pi}{\lambda} = 0.157$$

$$\lambda = 40, \ell = 2\lambda = 80 \text{ m}$$



Magnetic field at point P

$$\vec{B}_{\text{net}} = \frac{\mu_0 I}{2\pi d} (-\hat{k}) + \frac{\mu_0 I}{2\pi d} (\hat{k}) = 0$$



We use Gauss's Law for gravitation
 $g \cdot 4\pi r^2 = (\text{Mass enclosed}) 4\pi G$

$$g = \frac{3M4\pi G}{4\pi(3a)^2} = \frac{MG}{3a^2}$$

(77) (4). For diffraction

Location of 1st minima

$$y_1 = \frac{D\lambda}{a} = 0.2469 D\lambda$$

Location of 2nd minima

$$y_2 = \frac{2D\lambda}{a} = 0.4938 D\lambda$$

Now for interference

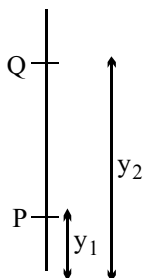
Path difference at P, $\frac{dy}{D} = 4.8\lambda$

Path difference at Q, $\frac{dy}{D} = 9.6\lambda$

So orders of maxima in between P & Q is

5, 6, 7, 8, 9

5 bright fringes all present between P & Q.



(78) (3). $U = \frac{f_1}{2} n_1 RT + \frac{f_2}{2} n_2 RT$

$$= \frac{5}{2}(3RT) + \frac{3}{2} \times 5RT = 15RT$$

(79) (3). Initial energy of capacitor

$$U_i = \frac{1}{2} CV^2 = 600 \text{ pJ}$$

Since battery is disconnected so charge remain same.

Final energy of capacitor

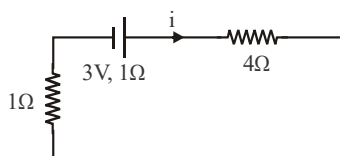
$$U_f = \frac{Q^2}{2C'} = \frac{1}{2} \times \frac{120 \times 120}{12 \times 6.5} = 92 \text{ pJ}$$

$$W + U_f = U_i$$

$$W = 508 \text{ pJ}$$

(80) (2). Resistance of wire AB = $400 \times 0.01 = 4\Omega$

$$i = 3 / 6 = 0.5 \text{ A}$$



Now voltmeter reading

$$= i (\text{Resistance of } 50\text{cm length})$$

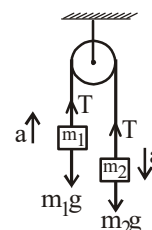
$$= (0.5\text{A}) (0.01 \times 50) = 0.25 \text{ volt}$$

(81) (1). $\frac{h}{mv} = 10^{-3} \left(\frac{3 \times 10^8}{6 \times 10^{14}} \right)$

$$v = \frac{6.63 \times 10^{-34} \times 6 \times 10^{14}}{9.1 \times 10^{-31} \times 3 \times 10^5} = 1.45 \times 10^6 \text{ m/s}$$

(82) (4). $m_2 g - T = m_2 a$
 $T - m_1 g = m_1 a$
 Solving these we get

$$a = \frac{m_2 - m_1}{m_2 + m_1} g$$



(83) (4) Resolving power $\propto 1/\lambda$

$$\frac{\theta_1}{\theta_2} = \frac{\lambda_2}{\lambda_1} = \frac{5500}{4400} = \frac{5}{4}$$

(84) (3). Work done by retarding force = kinetic energy of vehicle

$$F \times S = KE; S = \frac{KE}{F}$$

Lorry and car have same kinetic energy and retarding force on them are also same so, S will be same for both.

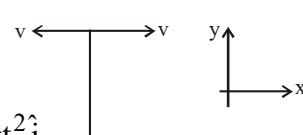
(85) (1). By conservation of angular momentum

$$L_i = L_f$$

$$0 + 0 = \frac{M}{2} VR + \frac{MR^2}{2} \omega$$

$$\omega = (-) \frac{V}{R}$$

-ve sign shows angular velocity of disc is in opposite direction.

(86) (3). $\vec{r}_1 = vt \hat{i} - \frac{1}{2} gt^2 \hat{j}$ 

$\vec{r}_2 = vt(-\hat{i}) - \frac{1}{2} gt^2 \hat{j}$

$$\vec{r}_1 \cdot \vec{r}_2 = 0 \Rightarrow -v^2 t^2 + \frac{1}{4} g^2 t^4 = 0$$

$$v^2 = \frac{1}{4} g^2 t^2 ; v = \frac{gt}{2}$$

$$\Delta x = 2vt = 2 \times v \times \frac{2v}{g} = \frac{4v^2}{g}$$

(87) (2). $R \propto A^{1/3}$

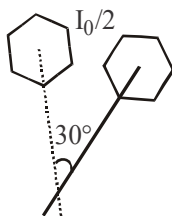
$$\frac{R_1}{R_2} = \left(\frac{64}{27}\right)^{1/3} = \frac{4}{3}$$

(88) (1). $I = I_0$

$$I_R = \frac{I_0}{2} \cos^2 30^\circ$$

$$I_R = \frac{3}{8} I_0$$

$$\frac{I_R}{I_0} = \frac{3}{8} \Rightarrow \frac{I_R}{I_0} \times 100 = \frac{300}{8} = 37.5\%$$



(89) (3). Given that,

Refractive index of flint glass = $\mu_f = 1.620$ Refractive index of crown glass = $\mu_c = 1.518$ Refracting angle of flint prism = $A_f = 6.0^\circ$

For zero net deviation of mean ray

$$(\mu_f - 1)A_f = (\mu_c - 1)A_c$$

$$A_e = \frac{\mu_f - 1}{\mu_c - 1} A_f = \frac{1.620 - 1}{1.518 - 1} (6.0^\circ) = 7.2$$

(90) (4). No stress will develop as both ends of rod are free and rod is placed on smooth floor.

(91) (3)

(92) (4)

(93) (3)

(94) (1)

(95) (3)

(96) (2)

(97) (2)

(98) (3)

(99) (2)

(100) (2)

(101) (4)

(102) (2)

(103) (3)

(104) (4)

(105) (3)

(106) (3)

(107) (2)

(108) (3)

(109) (1)

(110) (4)

(111) (4)

(112) (3)

(113) (4)

(114) (3)

(115) (4)

(116) (2). In this question

Epinephrine and relaxin interact with membrane bound receptor while rest of three interact with intracellular receptors.

(117) (2)

(118) (3)

(119) (4)

(120) (4)

(121) (1)

(122) (2)

(123) (2)

(124) (2)

(125) (3)

(126) (4)

(127) (1)

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