

COURSE
NUCLEUS

**JEE-MAIN MOCK TEST-1
XII**

TEST CODE				
1	1	2	5	8

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans	3	4	3	2	1	4	4	1	4	1	1	1	4	2	2
Q.No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans	2	1	2	3	2	4	4	3	3	4	1	3	2	4	2
Q.No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans	3	1	1	1	3	3	3	2	1	4	4	1	2	3	2
Q.No.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	2	2	1	4	1	2	2	2	1	1	2	4	2	3	3
	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC
Q.No.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans	2	2	4	4	2	4	4	3	2	3	2	2	4	2	2
	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC	PC	IOC	OC
Q.No.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans	1	2	2	3	2	3	1	3	2	1	2	3	1	4	4

HINTS & SOLUTIONS

MATHEMATICS

Q.1 $\vec{r} = \vec{a} + \lambda\vec{b} + \mu\vec{c}$

taking dot with $\vec{b} \times \vec{c}$

$[\vec{r} \vec{b} \vec{c}] = [\vec{a} \vec{b} \vec{c}]$ where $\vec{a} = (0,1,1)$;

$\vec{b} = (1,-1,1)$ and $\vec{c} = (2,-1,0)$

$[\vec{a} \vec{b} \vec{c}] = \begin{vmatrix} 0 & 1 & 1 \\ 1 & -1 & 1 \\ 2 & -1 & 0 \end{vmatrix} = 0 - (0 - 2) + 1(-1 + 2) = 3$

and $[\vec{r} \vec{b} \vec{c}] = \begin{vmatrix} x & y & z \\ 1 & -1 & 1 \\ 2 & -1 & 0 \end{vmatrix} =$

$x(0 + 1) - y(0 - 2) + z(-1 + 2) = x + 2y + z$

hence equation of plane is

$x + 2y + z = 3$;

$\therefore p = \left| \frac{-3}{\sqrt{6}} \right| = \frac{\sqrt{3}}{2}$ Ans.]

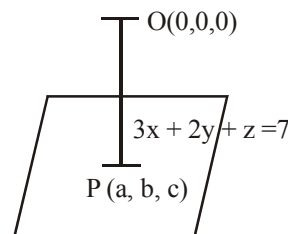
Q.2 $(\vec{a} \times \vec{b}) \times \vec{V} - \vec{u} \times (\vec{d} \times \vec{a}) = [\vec{a} \vec{c} \vec{d}] \vec{b}$

$(\vec{a} \cdot \vec{V}) \vec{b} - (\vec{b} \cdot \vec{V}) \vec{a} - (\vec{u} \cdot \vec{a}) \vec{d} + (\vec{u} \cdot \vec{d}) \vec{a} = [\vec{a} \vec{c} \vec{d}] \vec{b}$

$[\vec{a} \vec{c} \vec{d}] \vec{b} - [\vec{b} \vec{c} \vec{d}] \vec{a} - [\vec{b} \vec{c} \vec{a}] \vec{d} + [\vec{b} \vec{c} \vec{d}] \vec{a} = [\vec{a} \vec{c} \vec{d}] \vec{b}$

$[\vec{b} \vec{c} \vec{a}] \vec{d} = 0 \Rightarrow \vec{a}, \vec{b}, \vec{c}$ are coplanar]

Q.3 Clearly minimum value of $a^2 + b^2 + c^2$



$= \left(\frac{|(3(0) + 2(0) + (0) - 7)|}{\sqrt{(3)^2 + (2)^2 + (1)^2}} \right)^2 = \frac{49}{14} = \frac{7}{2}$ units.

(This is possible when P(a, b, c) is foot of perpendicular from O(0, 0, 0) on the plane.)

Alternatively:

Let $\vec{V}_1 = 3\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{V}_2 = a\hat{i} + b\hat{j} + c\hat{k}$

Now $\vec{V}_1 \cdot \vec{V}_2 = 3a + 2b + c = 7 \leq |\vec{V}_1| |\vec{V}_2|$

$\Rightarrow 7 \leq \sqrt{14} \times \sqrt{a^2 + b^2 + c^2}$

$\Rightarrow (a^2 + b^2 + c^2) \geq \frac{49}{14}$

Hence $a^2 + b^2 + c^2|_{\text{least}} = \frac{7}{2}$ **Ans.]**

Q.4 $w = \frac{(1+i)^2 - 3(1+i) + 6}{2+i} = \frac{3-i}{2+i}$

$= \frac{(3-i)(2-i)}{5} = \frac{5-5i}{5} = 1-i$

Hence $|w| = \sqrt{2}$ and amp. $w = -\frac{\pi}{4}$.]

Q.5 Answer is 0]

Q.6 $\frac{6!}{1! \cdot 5!} \cdot 2! + \frac{6!}{2! \cdot 4!} \cdot 2! + \frac{6!}{3! \cdot 3! \cdot 2!} \cdot 2!$

(concept of grouping)

G_1	G_2
1	5
2	4
3	3

$12 + 30 + 20 = 62$

Alternatively: 1st tourist can go G_1 or G_2 in 2 ways
|||ly all others. Hence required number of ways
 $= 2^6 - 2 = 62$ **Ans.]**

Q.7 ${}^{13}C_5 - {}^6C_5; \quad 13 \begin{matrix} 6B \\ 7G \end{matrix}]$

Q.8 Urn A $\begin{matrix} 9R \\ 11W \end{matrix}$; Urn B $\begin{matrix} 12R \\ 3W \end{matrix}$

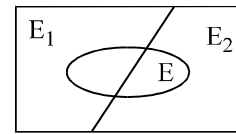
E : event of drawing a red ball;

$E_1 = 1$ or 2 on die $\Rightarrow P(E_1) = \frac{1}{3}$

$E_2 = 3, 4, 5, 6$ on die $\Rightarrow P(E_2) = \frac{2}{3}$

$E = (E \cap E_1) + (E \cap E_2)$

$P(E) = P(E_1) \cdot P(E/E_1) + P(E_2) P(E/E_2)$



Using the law of total probabilities,

$P(\text{red ball}) = \frac{2}{6} \cdot \frac{9}{20} + \frac{4}{6} \cdot \frac{12}{15} = \frac{41}{60}$ **Ans.]**

Q.9 A : Coin randomly selected tossed 10 times, fell head wise 7 times

B_1 : coin was a fair coin $P(B_1) = 1/2$

B_2 : Coin was a weighted coin $P(B_2) = 1/2$

$P(A/B_1) = {}^{10}C_7 \cdot \left(\frac{1}{2}\right)^7 \cdot \left(\frac{1}{2}\right)^3 = {}^{10}C_3 \cdot \frac{1}{2^{10}}$

$P(A/B_2) = {}^{10}C_7 \cdot \left(\frac{4}{5}\right)^7 \cdot \left(\frac{1}{5}\right)^3 = {}^{10}C_3 \cdot \frac{4^7}{5^{10}}$

$P(B_1/A) = \frac{\frac{1}{2^{10}}}{\frac{1}{2^{10}} + \frac{4^7}{5^{10}}} = \frac{1}{1 + \frac{4^7 \cdot 2^{10}}{5^{10}}}$

$= \frac{5^{10}}{5^{10} + 8^8}$ **Ans.]**

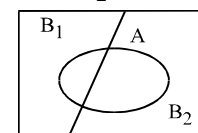
Q.10 Let B_1 : Taxi is black 0.85

B_2 : Taxi is white 0.15

A: witness says that taxi involved in the hit and run accident was White.

$P(A/B_1) = 0.2$

$P(A/B_2) = 0.8$



$P(B_1/A) = \frac{(0.85)(0.2)}{(0.85)(0.2) + (0.15)(0.8)}$

$= \frac{0.170}{0.170 + 0.120} = \frac{17}{17+12} = \frac{17}{29}$ **Ans.]**

Q.11 Arrange the data in increasing order as,

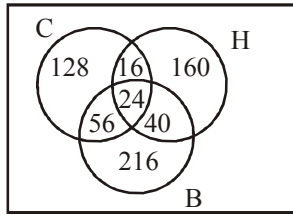
$$p - \frac{7}{2}, p - 3, p - \frac{5}{2}, p - 2, p - \frac{1}{2}, p + \frac{1}{2},$$

$$p + 4, p + 5.$$

As, number of observations = 8

So, median =

$$\frac{(4^{\text{th}} \text{ observation}) + (5^{\text{th}} \text{ observation})}{2} = \left(p - \frac{5}{4} \right) \text{ Ans.}$$



Q.12

$$V = 800$$

$$\text{Total playing game} = 640$$

$$800 - 640 = 160 \quad]$$

Q.13 Since, root mean square \geq arithmetic mean

$$\therefore \sqrt{\frac{\sum_{i=1}^n x_i^2}{n}} \geq \frac{\sum_{i=1}^n x_i}{n} = \sqrt{\frac{400}{n}} \geq \frac{80}{n} \Rightarrow n \geq 16$$

Hence, possible value of $n = 18$.]

Q.14

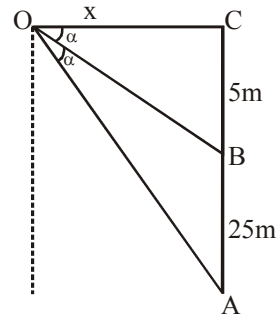
p	q	$q \rightarrow p$	$p \rightarrow (q \rightarrow p)$	$p \vee q$	$p \rightarrow (p \vee q)$
T	T	T	T	T	T
T	F	T	T	T	T
F	T	F	T	T	T
F	F	T	T	F	T

Q.15 In ΔOBC , we have

$$\tan \alpha = \frac{5}{x} \quad \text{(i)}$$

$$\text{Also, } \tan 2\alpha = \frac{30}{x} \quad \text{(ii)}$$

Dividing (ii) by (i), we have



$$\tan 2\alpha = \frac{30}{5} \tan \alpha$$

$$\Rightarrow \frac{2 \tan \alpha}{1 - \tan^2 \alpha} = 6 \tan \alpha \Rightarrow \tan^2 \alpha = \frac{2}{3}$$

$$\Rightarrow \tan \alpha = \sqrt{\frac{2}{3}}$$

$$\therefore x = 5 \cot \alpha = 5 \cdot \sqrt{\frac{3}{2}} \quad]$$

Q.16 Equation of the line is

$$\vec{r} = \vec{a} + t(\vec{p} \times \vec{q}) \dots (1)$$

$$\text{now (1) intersects } \vec{r} \cdot \vec{n} = d \quad \dots (2)$$

substituting \vec{r} from (1) in (2)

$$(\vec{a} + t(\vec{p} \times \vec{q})) \cdot \vec{n} = d$$

$$\vec{a} \cdot \vec{n} + t[\vec{p} \cdot \vec{q} \cdot \vec{n}] = d$$

$$\Rightarrow t = \frac{(d - \vec{a} \cdot \vec{n})}{[\vec{p} \cdot \vec{q} \cdot \vec{n}]}$$

hence the position vector of R is

$$\vec{r} = \vec{a} + \frac{(d - \vec{a} \cdot \vec{n})}{[\vec{p} \cdot \vec{q} \cdot \vec{n}]} (\vec{p} \times \vec{q}) \text{ Ans.]}$$

Q.17 Vector perpendicular to $2\hat{i} + \hat{j} - \hat{k}$ and

$\hat{i} + 3\hat{j} - \hat{k}$ is

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 1 & -1 \\ 1 & 3 & -1 \end{vmatrix} = 2\hat{i} + \hat{j} + 5\hat{k}$$

Any general point on the line is

$(1 + 2\lambda, 1 + \lambda, 1 - \lambda)$ at their point of intersection. This point satisfies equation of plane

$$(1 + 2\lambda) + 3(1 + \lambda) - (1 - \lambda) = 9 \Rightarrow \lambda = 1$$

\therefore Point of intersection is (3, 2, 0).

Hence required line is

$$\vec{r} = (3\hat{i} + 2\hat{j}) + k(2\hat{i} + \hat{j} + 5\hat{k})$$

$$\Rightarrow \frac{x-3}{2} = \frac{y-2}{1} = \frac{z}{5} \text{ Ans.}]$$

Q.18

$$S = w + 2w^2 + 3w^3 + \dots + 9w^9$$

$$Sw = w^2 + 2w^3 + \dots + 8w^9 + 9w^{10}$$

$$\text{where } w^9 = (\cos 40^\circ + i \sin 40^\circ)^9 = 1$$

$$\text{and } |w| = 1$$

$$S(1-w) = w + w^2 + w^3 + \dots + w^9 - 9w^{10}$$

$$= \frac{w(1-w^9)}{1-w} - 9w = 0 - 9w$$

$$S = -\frac{9w}{1-w} \text{ (using } w^9 = 1); \left| \frac{1}{S} \right| = \left| \frac{w-1}{9w} \right|$$

$$= \frac{1}{9} |\cos 40^\circ + i \sin 40^\circ - 1|$$

$$= \frac{1}{9} |-2 \sin^2 20^\circ + 2i \sin 20^\circ \cos 20^\circ|$$

$$= \frac{1}{9} |2 \sin 20^\circ i (\cos 20^\circ + i \sin 20^\circ)| = \frac{2}{9} \sin 20^\circ$$

Q.19 Answer is $6 - \frac{15}{2}i$

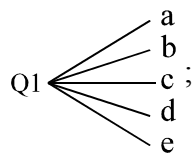
Q.20 Treat W, B, G, R as beggar

$$000000 \emptyset \emptyset \emptyset = {}^9C_3 = 84$$

or co-eff. of x^6 in

$$(1+x+x^2+x^3+x^4+x^5+x^6)^4$$

Q.21



Question No. 1 can

be printed in $5!$ ways

||ly

Question No.2 can be printed $5!$ ways and so on

\therefore Total ways $(5!)^{20}$ Ans.]

Q.22 Possible cases if the product of four numbers

$$a \cdot b \cdot c \cdot d = 144 \quad (1 \leq a, b, c, d \leq 6)$$

$$6, 6, 2, 2; 6, 6, 4, 1; 6, 4, 3, 2$$

$$\text{and } 4, 4, 3, 3$$

$$= \frac{4!}{2! \cdot 2!} + \frac{4!}{2!} + 4! + \frac{4!}{2! \cdot 2!} = 48 \text{ Ans.]}$$

Q.23 $P(W) = 1/3; P(B) = 2/3 \Rightarrow p = 1/3;$

$$q = 2/3 \text{ and } r = 4 \text{ or } 5 \text{ and } n = 5$$

$$\text{Use } P(r) = {}^nC_r p^r q^{n-r} \text{]}$$

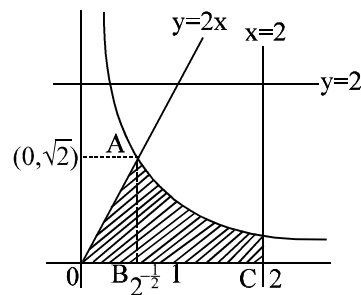
Q.24 $x \geq 0; y \geq 0; x \leq 2; y \leq 2$

$$A: xy \leq 1$$

$$B: y \leq 2x; n(S) = 4$$

$n(A)$ = Area of shaded region.

$$\text{Shaded area OAB} = \sqrt{2} \cdot \frac{1}{\sqrt{2}} \cdot \frac{1}{2} = \frac{1}{2}$$



$$\text{Shaded area ABC} = \int_{\frac{1}{\sqrt{2}}}^2 \frac{1}{x} dx = \ln x \Big|_{\frac{1}{\sqrt{2}}}^2$$

$$= \ln 2 + \ln \sqrt{2} + 3/2 \ln 2$$

$$\text{Total area} = \frac{3 \ln 2}{2} + \frac{1}{2} = \frac{3 \ln 2 + 1}{2}$$

$$\therefore p = \frac{3 \ln 2 + 1}{8} \text{ Ans.]}$$

Q.25 $n(A) = 3$

\therefore Total number of relation in set

$$A = 2^{3 \times 3} = 2^9$$

and maximum number of cartesian product

= 9 out of which 3 ordered pair is necessary for reflexive.

So, for remaining 6 ordered pair

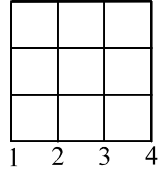
Number of ordered pair required

$$= {}^6C_0 + {}^6C_1 + {}^6C_2 + \dots + {}^6C_6 = 2^6 \text{]}$$

PHYSICS

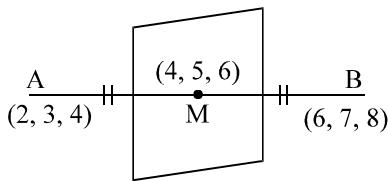
Q.26 $\therefore p = T$
 $\therefore \sim p = F$
 $\therefore (\sim p \vee q) = F$
 $\sim r = F$
 $\therefore (\sim p \vee q) \wedge \sim r = F$ and $p = T$
 $\therefore (\sim p \vee q) \wedge \sim r \Rightarrow p = T$]

Q.27 ${}^{16}C_3 - 2[2 \cdot {}^3C_3 + {}^4C_3] - 8 \cdot {}^4C_3$
 $= {}^{16}C_3 - 12 - 32$



$560 - 44 = 516$ Ans.]

Q.28 $M \equiv (4, 5, 6)$
 plane passes through 4, 5, 6
 $\therefore A(x-4) + B(y-5) + C(z-5) = 0$



A, B, C are 4, 4, 4
 \therefore equation is $x - 4 + y - 5 + z - 6 = 0$
 $\Rightarrow x + y + z = 15$]

Q.29 Answer is $[\sqrt{z_1}]^2 + [\sqrt{z_2}]^2]$

Q.30 $x^4 - 2x^3 - 2x^2 + 4x + 3 \equiv (x-\alpha)(x-\beta)(x-\gamma)(x-\delta)$
 substituting $x=i$
 $1 - 2i - 3 + 2i + 4 = (i-\alpha)(i-\beta)(i-\gamma)(i-\delta) = 2$ (1)

substituting $x=-i$
 $1 + 2i - 3 - 2i + 4 = (-i-\alpha)(-i-\beta)(-i-\gamma)(-i-\delta) = 2$ (2)

Multiplying (1) and (2)
 $(1+\alpha^2)(1+\beta^2)(1+\gamma^2)(1+\delta^2) = 4.$

Q.31 $\delta_1 = (\mu_2 - 1)\theta$
 $\delta_2 = -(\mu_1 - 1)\theta$
 $\delta = (\mu_2 - \mu_1)\theta$

Q.34 $\frac{hc}{\lambda} = \phi + c \cdot (3v_0)$ in case I

$\frac{hc}{2\lambda} = \phi + c \cdot v_0$ in case II

where $\frac{hc}{\lambda_0} = \phi$ (λ_0 - threshold wavelength)

Q.35 $1.8 = \frac{f}{f+10}$

$1.8f + 18 = f$

$18 = -0.8f$

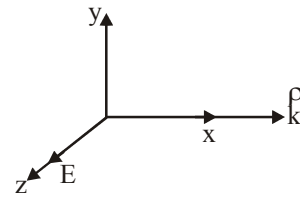
$f = -22.5$ cm

in second case, $u = -50$

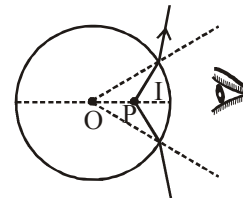
\Rightarrow Obj. is beyond C.

\Rightarrow Image is inverted and diminished.

Q.36 $\vec{E} \times \vec{B} \rightarrow \hat{k}$



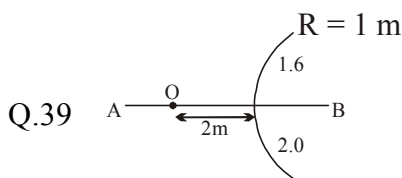
Q.37



Q.38 $P = \frac{nhc}{\lambda t}$

$i = \left(\frac{n}{t}\right) \text{ex}\% = \frac{p\lambda_e}{hc} \text{x}\%$

$= \frac{1.55 \times 10^{-3} \times 4 \times 10^{-7}}{6.63 \times 10^{-34} \times 3 \times 10^8}$



$$I_1 \Rightarrow \frac{1.6}{v} - \frac{1}{-2} = \frac{1.6-1}{+1} \Rightarrow v_1 = 16$$

$$I_2 \Rightarrow \frac{2.0}{v} - \frac{1}{-2} = \frac{2-1}{1} \Rightarrow v_2 = 4$$

$$|v_1 - v_2| = 12 \text{ m}$$

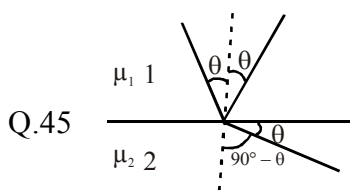
Q.44 Infront of upper slint

$$\text{On screen} = \Delta x = d \left(\frac{d/2}{D} \right) - (\mu - 1)t = 0$$

$$\Delta x = d \frac{(d/2)}{D} - (\mu - 1)t = 0$$

at centre on the screen

$$\Delta x = (\mu - 1)t = \frac{d^2}{2D}$$



$$\mu_1 \sin \theta = \mu_1 \times \sin (90^\circ - \theta)$$

$$\Rightarrow \frac{\mu_2}{\mu_1} = \tan \theta$$

$$\text{for } \theta_C \Rightarrow \mu_1 \times \sin \theta_C = \mu_2 \times \sin (90^\circ)$$

$$\sin \theta_C = \frac{\mu_2}{\mu_1} = \tan \theta$$

$$\Rightarrow \theta_C = \sin^{-1} (\tan \theta)$$

Q.47 According to Malus law, $I = I_0 \cos^2 \theta$

$$\text{After 2nd Polaroid, } I = \frac{I_0}{2} \cos^2 60^\circ = \frac{I_0}{8}$$

$$\text{After 3rd Polaroid, } I = \frac{I_0}{8} \cos^2 30^\circ = \frac{3I_0}{32}$$

Q.53 $eV = \frac{hc}{\lambda} \Rightarrow V = \frac{12400}{\lambda(\text{in}\text{\AA})}$

Q.57
$$V = \frac{kQ}{R} = \frac{k \times 32 \times 1.6 \times 10^{-19}}{R_0(40)^{1/3}}$$

$$= \frac{9 \times 10^9 \times 32 \times 1.6 \times 10^{-19}}{1.2 \times 10^{-15} \times (64)^{1/3}} = 96 \times 10^5 \text{V}$$

Q.59 $\Delta t = 4t$

$$\frac{N_0}{16} = \frac{dN}{dt} = N_0 e^{-\lambda \times 4t}$$

$$\frac{1}{16} = e^{-4\lambda t}$$

$$4 \ln 2 = 4\lambda t$$

$$\lambda = \frac{\ln 2}{t}$$

Q.60 1. Due to emission of β -particles mass will almost remain unchanged.

2. No. of β -particles decayed = 3×10^{22} , so charge = $3 \times 10^{22} \times 1.6 \times 10^{-19} = 4800 \text{C}$

CHEMISTRY

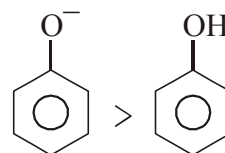
Q.61 Molarity = $\left(\frac{34/34}{2} \right) M = \frac{1}{2} M$

\therefore Volume strength of the solution =

$$\frac{1}{2} \times 11.2 \text{V} = 5.6 \text{V}$$

Q.62 Syn gas or water gas $\Rightarrow \text{CO} + \text{H}_2$

Q.63 Negative charged O-atom has more electron donating power than neutral O-atom therefore resonance energy.



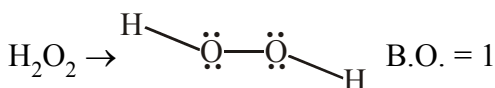
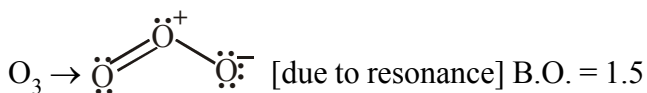
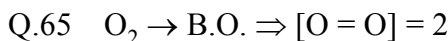
Q.64 Let, % of C be $7.5x\%$ and H be $x\%$

$$\therefore 7.5x + x + 32 = 100$$

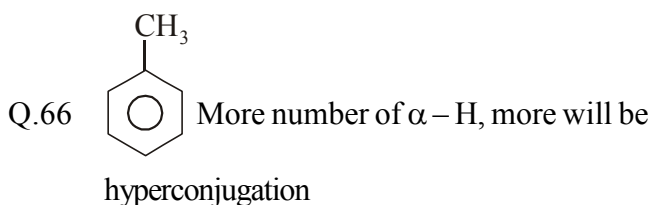
$$\therefore x = 8$$

\therefore % of C = 60%, H = 8% and O = 32%

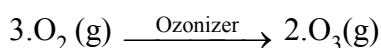
$$\therefore \text{E.F.} = \frac{\text{C}_{60} \text{H}_8 \text{O}_{32}}{12 \quad 1 \quad 16} = \text{C}_5 \text{H}_8 \text{O}_2$$



Bond length $\propto \frac{1}{B.O.}$ $H_2O_2 > O_3 > O_2$



$V_{N_2} = y$ mL $\therefore x + y = 3000$ (i)

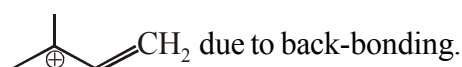
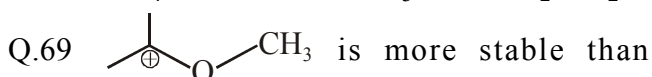
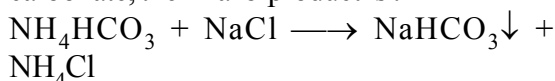
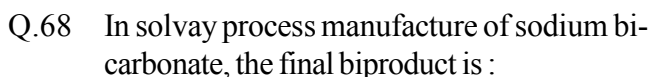


$t = 0$ $x = mL$ 0
 $t = t_f$ $(x-3u)mL$ $(2u)mL = 600mL$
 $\therefore u = 300$

$\Rightarrow x - 3 \times 300 = 1100$

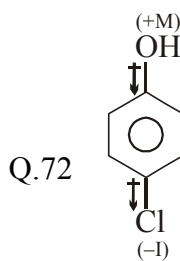
$\therefore x = 2000$ \therefore Eqn (1) $\Rightarrow y = 1000$

$V_{O_2} = 2$ L and $V_{N_2} = 1$ L **Ans.**



Q.70 $d = \frac{15}{5L} = 3$ g/L = 3 kg/m³

$\therefore v_{rms} = \sqrt{\frac{3P}{d}} = \sqrt{\frac{3 \times 10^4}{3}}$ m/s = 100 m/s



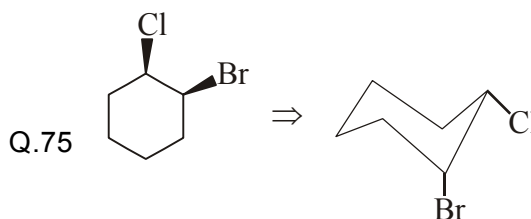
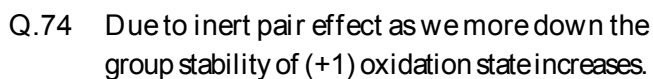
Q.73 $\frac{5L}{300K} = \frac{(5 + \Delta V)L}{(T)K}$ (i)

and $\frac{1.5L}{240K} = \frac{(\Delta V)L}{(T)K}$ (ii)

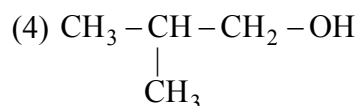
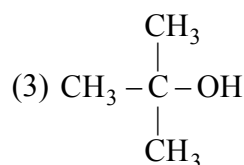
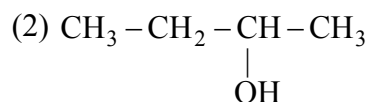
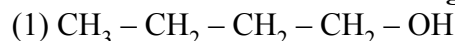
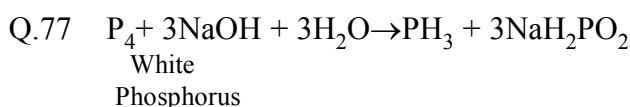
(i) / (ii) $\Rightarrow \frac{5/300}{1.5/240} = \left(\frac{5 + \Delta V}{\Delta V} \right)$

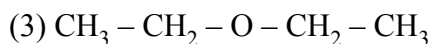
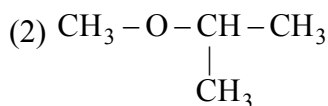
$\therefore \Delta V = 3$

\therefore eqⁿ. (ii) $\Rightarrow T = 480$

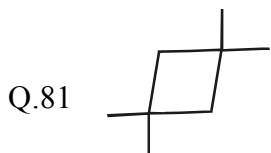
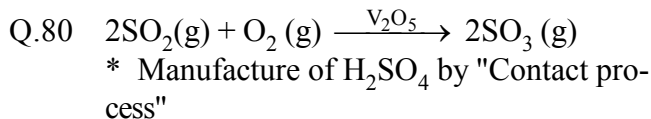


Chlorine atom lies at equatorial position because of its smaller size, bond length is shorter than Bromine to avoid 1,3 diaxial repulsion.

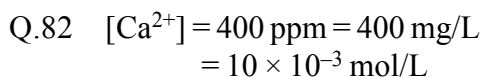




Q.79 Theory based.



At both position same groups are present



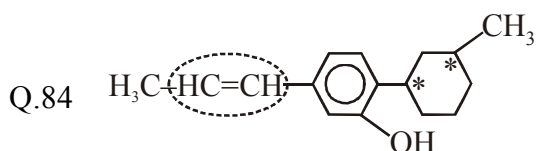
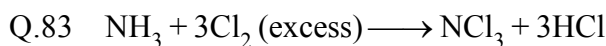
$\therefore [\text{H}^+] = 20 \times 10^{-3} \text{ mol/L}$

$\therefore n_{\text{H}^+} = 20 \text{ mmol}$



20 mmol 1M

$\therefore V_{\text{NaOH}} = \left(\frac{20}{1}\right) \text{ mL} = 20 \text{ mL Ans.}$



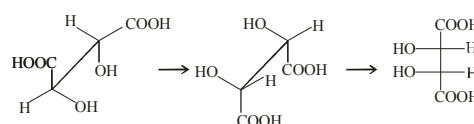
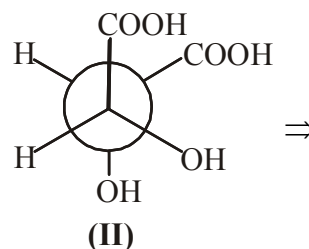
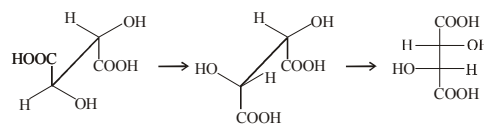
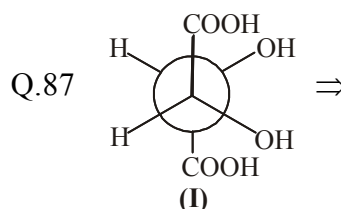
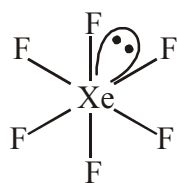
4-stereogenic centres

stereoisomers = $2^n \Rightarrow n = 3$

$2^3 = 8$

Q.85 $\left(P + \frac{a}{V_m^2}\right) V_m = RT \Rightarrow Z = 1 - \frac{a}{V_m RT}$

$\Rightarrow Z = 1 - \frac{96}{20 \times 0.08 \times 300} = 0.8 \text{ Ans.}$

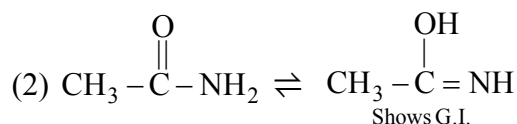
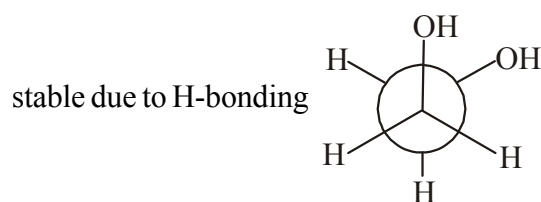
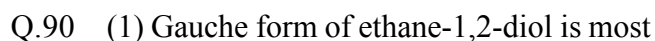
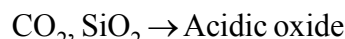
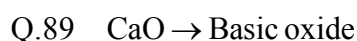


I and II are diastereomers

Q.88 $3 \times n_{\text{FeC}_2\text{O}_4} = 5 \times 50 \times 0.1$

$\therefore n_{\text{FeC}_2\text{O}_4} = \frac{25}{3} \text{ mmol.}$

$\therefore m_{\text{FeC}_2\text{O}_4} = \frac{25}{3} \times \frac{144}{1000} \text{ g} = 1.2 \text{ g Ans.}$



(3) In methyl cyclohexane, methyl group lies at equatorial position than axial position to avoid 1,3-diaxial repulsion.