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ANSWER KEY
DATE: 19-11-2018

COURSE
NUCLEUS

JEE-MAIN MOCK TEST-1
XII

TEST CODE
11258

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
$x + 2y + z = 3$;

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

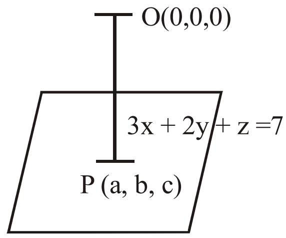
Q.2 $\left(\vec{a}\times\vec{b}\right)\times\vec{V} - \vec{u}\times\left(\vec{d}\times\vec{a}\right) = [\vec{a}\ \vec{c}\ \vec{d}\,]\vec{b}$

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

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

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

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



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

(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 $\vec{V}_1 \cdot \vec{V}_2 = 3a + 2b + c = 7 \le |\vec{V}_1|\,|\vec{V}_2|$

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

$\Rightarrow (a^2 + b^2 + c^2) \ge \dfrac{49}{14}$

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

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

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

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

Q.5 Answer is 0]

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

(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 ${}^{13}C_5 - {}^{6}C_5$; $13 \begin{cases} 6B \\ 7G \end{cases}$]

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

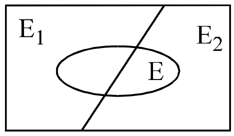
E : event of drawing a red ball;

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

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

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

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



Using the law of total probabilities,

$P\,(\text{red ball}) = \dfrac{2}{6}\cdot\dfrac{9}{20} + \dfrac{4}{6}\cdot\dfrac{12}{15} = \dfrac{41}{60}$ 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 $P(B_2) = 1/2$

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

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

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

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

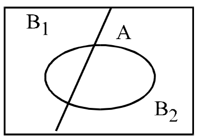
Q.10 Let B_1 : Taxi is black 0.85

B_2 : Taxi is white 0.15

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

$P(A/B_1) = 0.2$

$P(A/B_2) = 0.8$



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

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

Q.11 Arrange the data in increasing order as,

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

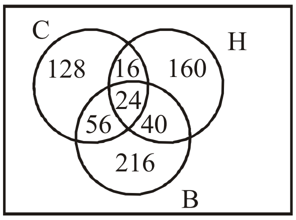
$p+4$, $p+5$.

As, number of observations = 8

So, median =

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

Q.12



V = 800

Total playing game = 640

800 – 640 = 160]

Q.13 Since, root mean square ≥ arithmetic mean

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

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

Q.14

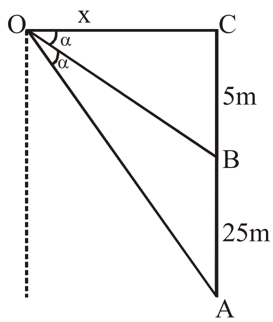
p	q	$q\to p$	$p\to(q\to p)$	$p\vee q$	$p\to(p\vee q)$
T	T	T	T	T	T
T	F	T	T	T	T
F	T	F	T	T	T
F	F	T	T	F	T

Q.15 In ΔOBC, we have

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

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

Dividing (ii) by (i), we have



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

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

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

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

Q.16 Equation of the line is

$$\vec r=\vec a+t(\vec p\times\vec q)\ \ ....(1)$$

now (1) intersects $\vec r\cdot\vec n=d$ ....(2)

substituting $\vec r$ from (1) in (2)

$$\left(\vec a+t(\vec p\times\vec q)\right)\cdot\vec n=d$$

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

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

hence the position vector of R is

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

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

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

Q.18

$S \quad = w + 2w^2 + 3w^3 + ... + 9w^9$

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

where $w^9 = (\cos 40° + \sin 40°)^9 = 1$

and $| w | = 1$

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

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

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

$= \dfrac{1}{9}| \cos 40° + i \sin 40° - 1|$

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

$= \dfrac{1}{9}\ | 2 \sin 20°\ i (\cos 20° + i \sin 20°) | = \dfrac{2}{9} \sin 20°$

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

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

0 0 0 0 0 0 Ø Ø Ø = ${}^9C_3 = 84$

or co-eff. of x^6 in

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

Q.21 $Q1 \begin{cases} a \\ b \\ c \\ d \\ e \end{cases}$; 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

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

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

and 4, 4, 3, 3

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

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

q = 2/3 and r = 4 or 5 and n = 5

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

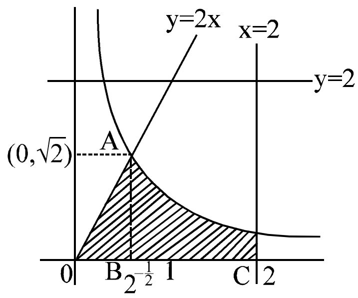
Q.24 $x \ge 0$; $y \ge 0$; $x \le 2$; $y \le 2$

A : $xy \le 1$

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

n (A) = Area of shaded region.

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



Shaded area ABC = $\displaystyle\int_{1/\sqrt{2}}^{2} \frac{1}{x}\,dx = \ln x\Big]_{1/\sqrt{2}}^{2}$

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

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

$\therefore \ p = \dfrac{3\ln 2 + 1}{8}$ 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 .

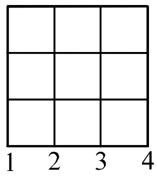
So, for remaining 6 ordered pair

Number of ordered pair required

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

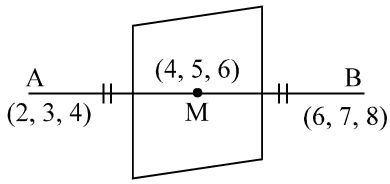
Q.26 $\because\ p = T$
$\therefore\ \sim p = F$
$\therefore\ (\sim p \vee q) = F$
$\sim r = F$
$\therefore\ (\sim p \vee q) \wedge \sim r = F$ and $p = T$
$\therefore\ (\sim p \vee q) \wedge \sim r \Rightarrow p = T$]

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



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 $\left|\sqrt{z_1}\right|^2 + \left|\sqrt{z_2}\right|^2$]

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

PHYSICS

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

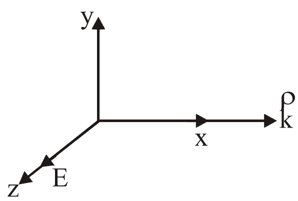
Q.34 $\frac{hc}{\lambda} = \phi + c\,.\,(3v_0)$ in case I

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

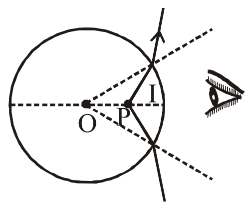
where $\frac{hc}{\lambda_0} = \phi$ (λ_0 – threshold wavelength)

Q.35 $1.8 = \frac{f}{f+10}$
$1.8 f + 18 = f$
$18 = -0.8 f$
$f = -22.5$ cm
in second case, $u = -50$
$\Rightarrow$ Obj. is beyond C.
$\Rightarrow$ Image is invereted and diminished.

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



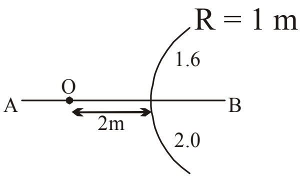
Q.37



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

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

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

Q.39 

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

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

$|v_1 - v_2| = 12$ m

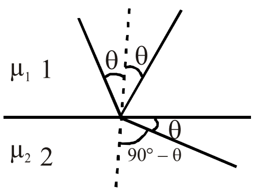
Q.44 Infront of upper slint

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

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

Q.45 

$\mu_1 \sin\theta = \mu_1 \times \sin(90° - \theta)$

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

for $\theta_C \Rightarrow \mu_1 \times \sin\theta_C = \mu_2 \times \sin(90°)$

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

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

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

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

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

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

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

$= \frac{9\times10^9 \times 32 \times 1.6 \times 10^{-19}}{1.2\times10^{-15} \times (64)^{1/3}} = 96 \times 10^5$V

Q.59 $\Delta t = 4t$

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

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

$4\ln 2 = 4\lambda t$

$\lambda = \frac{\ell n 2}{t}$

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 = $3 \times 10^{22} \times 1.6 \times 10^{-19} = 4800$C

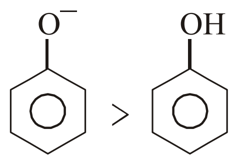
CHEMISTRY

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

∴ Volume strength of the solution = $\frac{1}{2} \times 11.2V = 5.6V$

Q.62 Syn gas or water gas $\Rightarrow CO + H_2$

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



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

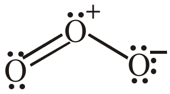
∴ 7.5 x + x + 32 = 100

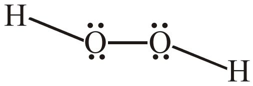
∴ x = 8

∴ % of C = 60%, H = 8 % and O = 32 %

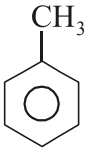
∴ E.F. = $C_{\frac{60}{12}}H_{\frac{8}{1}}O_{\frac{32}{16}} = C_5H_8O_2$

Q.65 $O_2 \rightarrow$ B.O. $\Rightarrow [O = O] = 2$

$O_3 \rightarrow$  [due to resonance] B.O. = 1.5

$H_2O_2 \rightarrow$  B.O. = 1

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

Q.66  More number of $\alpha -$H, more will be hyperconjugation

Q.67 Let, $V_{O_2} = x$ mL, and

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

$3.O_2(g) \xrightarrow{\text{Ozonizer}} 2.O_3(g)$

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

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

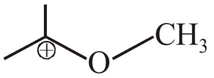
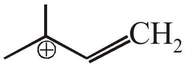
$\therefore x = 2000 \therefore$ Eqn (1) $\Rightarrow y = 1000$

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

Q.68 In solvay process manufacture of sodium bicarbonate, the final biproduct is :

$NH_4HCO_3 + NaCl \longrightarrow NaHCO_3\downarrow + NH_4Cl$

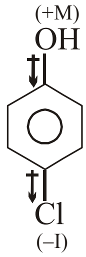
$NH_4Cl + CaO \longrightarrow NH_3\uparrow + CaCl_2 + H_2O$

Q.69  is more stable than  due to back-bonding.

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

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

Q.71 Be and Mg does not impart colour to the flame due to their high Ionisation energy

Q.72 

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

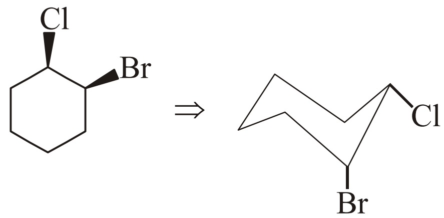
and $\frac{1.5L}{240K} = \frac{(\Delta V)L}{(T)K}$ ....(ii)

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

$\therefore \Delta V = 3$

$\therefore$ eq^n. (ii) $\Rightarrow T = 480$

Q.74 Due to inert pair effect as we more down the group stability of (+1) oxidation state increases.

Q.75 

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

Q.76 Theory based

Q.77 $\underset{\text{White Phosphorus}}{P_4} + 3NaOH + 3H_2O \rightarrow PH_3 + 3NaH_2PO_2$

Q.78 **4 isomers with alcohol functional group**

(1) $CH_3 - CH_2 - CH_2 - CH_2 - OH$

(2) $CH_3 - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3$

(3) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}} - OH$

(4) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - OH$

3 isomers with ether functional group

(1) $CH_3-O-CH_2-CH_2-CH_3$

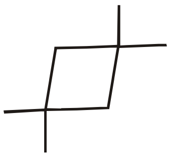
(2) $CH_3-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$

(3) $CH_3-CH_2-O-CH_2-CH_3$

Q.79 Theory based.

Q.80 $2SO_2(g) + O_2(g) \xrightarrow{V_2O_5} 2SO_3(g)$

* Manufacture of H_2SO_4 by "Contact process"

Q.81 

At both position same groups are present

Q.82 $[Ca^{2+}] = 400\ ppm = 400\ mg/L$

$= 10 \times 10^{-3}\ mol/L$

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

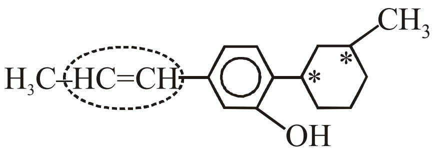
$\therefore n_{H^+} = 20\ mmol$

$H^+ \quad + \quad NaOH \rightarrow Na^+ + H_2O$

20 mmol $\quad$ 1M

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

Q.83 $NH_3 + 3Cl_2\ (excess) \longrightarrow NCl_3 + 3HCl$

Q.84 

4-stereogeneic centres

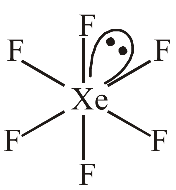
stereoisomers $= 2^n \Rightarrow n = 3$

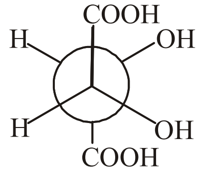
$2^3 = 8$

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

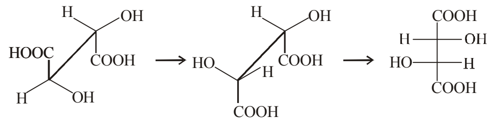
$\Rightarrow Z = 1 - \frac{96}{20 \times 0.08 \times 300} = 0.8$ **Ans.**

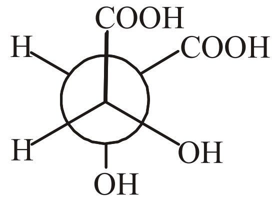
Q.86 $XeF_6\ (sp^3d^3)$ Distorted octahedral $\rightarrow$



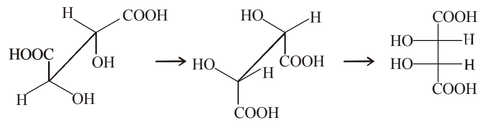
Q.87 

(I)





(II)



I and II are diastereomers

Q.88 $3 \times n_{FeC_2O_4} = 5 \times 50 \times 0.1$

$\therefore n_{FeC_2O_4} = \frac{25}{3}$ mmol.

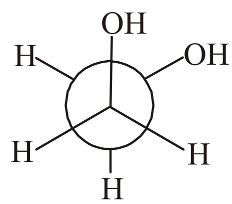
$\therefore m_{FeC_2O_4} = \frac{25}{3} \times \frac{144}{1000}\ g = 1.2\ g$ **Ans.**

Q.89 $CaO \rightarrow$ Basic oxide

$CO_2, SiO_2 \rightarrow$ Acidic oxide

$SnO_2 \rightarrow$ Amphoteric oxide

Q.90 (1) Gauche form of ethane-1,2-diol is most stable due to H-bonding



(2) $CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-NH_2 \rightleftharpoons CH_3-\overset{\displaystyle OH}{\overset{|}{C}}=NH$

Shows G.I.

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