RITS- 36
JEE ADVANCED-2018
ANSWER KEY
Paper-I
Code: 108676

PHYSICS		CHEMISTRY		MATHEMATICS	
1	D	1	ACD	1	BCD
2	A	2	ABC	2	ACD
3	ABD	3	B	3	AC
4	B	4	BCD	4	ABCD
5	D	5	BD	5	BC
6	B	6	ABD	6	ABCD
7	C	7	ABD	7	BC
8	BC	8	BD	8	AD
9	BC	9	AC	9	D
10	ABC	10	ABC	10	BCD
1	A - s B - p C - r D - q	1	A - p,r B - s C - p,r D - q	1	A - s B – s,t C - p D – q,r,s,t
2	A - q B - p C - s D - s	2	A - q,r B - q,r C - q,r D – r,s	2	A – s,t B - p C – p,q,r D - t
1	4	1	6	1	7
2	5	2	1	2	2
3	8	3	3	3	4
4	2	4	1	4	5
5	5	5	5	5	6
6	5	6	3	6	6
7	2	7	5	7	2
8	5	8	5	8	6

Solutions
Mathematics

1 BCD

$\left(P-Q^2\right)\left(P^2+Q\right)=0 \Rightarrow P=Q^2$

$P=Q^2$

$PQ=Q^3$

$Q^2P^2=Q^3$

$P^5=Q^4$

2 ACD

3 ACD

4 ABCD

${}^{17}C_9=10\times13\times17\times11$

5 BC

$g(x)=\dfrac{f'(x)}{f(x)}$

$g'(x)<0 \Rightarrow \dfrac{f'(x)}{f(x)}\downarrow \qquad g(2)=0$

$g(x)>0 \quad \forall x<2$

$g(x)<0 \quad \forall x>2$

But $f(x)>0 \quad \forall x\in R$

$\Rightarrow f'(x)<0 \quad \forall x>2$

$f'(x)>0 \quad \forall x<2$

(C) correct

6 ABD

Sol. $P\left(A/B\right)=2/3 \quad P\left(\bar{A}/B\right)=1/3$

$P(B)P\left(\bar{A}/B\right)=\dfrac{1}{4}$

$P(B)=3/4 \qquad P\left(A\cap B\right)=\dfrac{1}{2}$

(A) $P\left(A\cup B\right)=P(A)+\dfrac{1}{4}$ (B) $P\left(A\cap B/B\right)=\dfrac{P\left(A\cap B\right)}{P(B)}$

$=\dfrac{1/2}{3/4}=\dfrac{2}{3}$

(D) $P\left(A\cup\bar{B}\right)=P(A)+P(\bar{B})-P\left(A\cap\bar{B}\right)$

$1-P(B)+P\left(A\cap B\right)=\frac{3}{4}$

7 B

A = 7, B = 8

8 ACD

Sol. $g(x)=e^{-x2}f'(x)$

$g'(x)=<0$ given $\forall x\in R$

$g(0)>g(1)$

$g(2)>g(1)$

$g(\sqrt{2})<g(1)$

$g(-1)>g(1)$

9 ACD

10

1

2

1 7

2 2

3 6

4 5

5 6

6

7 2

8 6

Solutions (Set I - Paper I) Chemistry

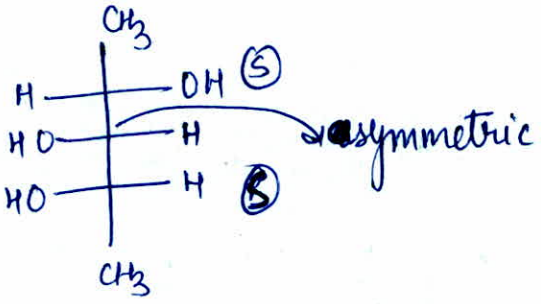
(1) At T_B $Z \to 1$ $\left(\frac{\partial Z}{\partial P}\right)_T = 0$ as $P \to 0$

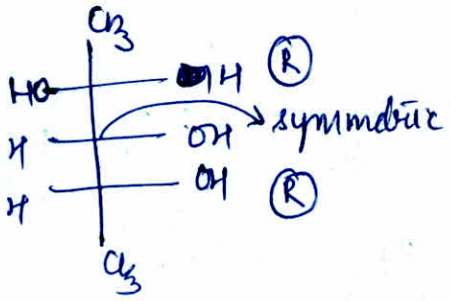
Above T_B $P \to 0$ $\left(\frac{\partial Z}{\partial P}\right)_T > 0$

Below T_B $P \to 0$ $\left(\frac{\partial Z}{\partial P}\right)_T < 0$

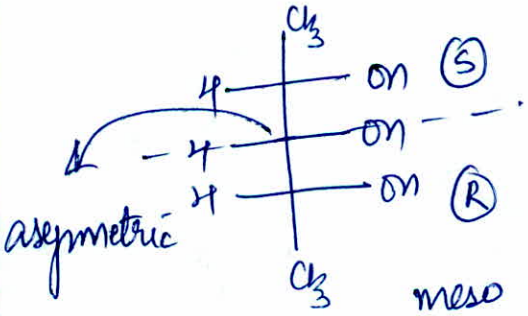
$$Z = \frac{PV_{real}}{RT} = \frac{PV_{real}}{\left(P + \frac{a}{V^2_{real}}\right)(V_{real} - b)} = \frac{PV_{real}}{P(V_{real} - b)} = \frac{V_{real}}{V_{real} - b}$$

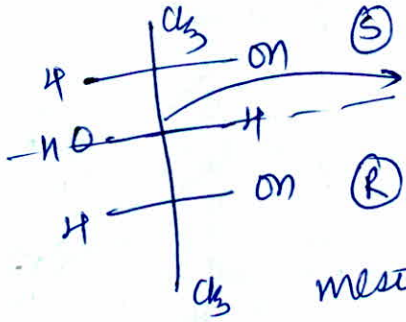
(2)





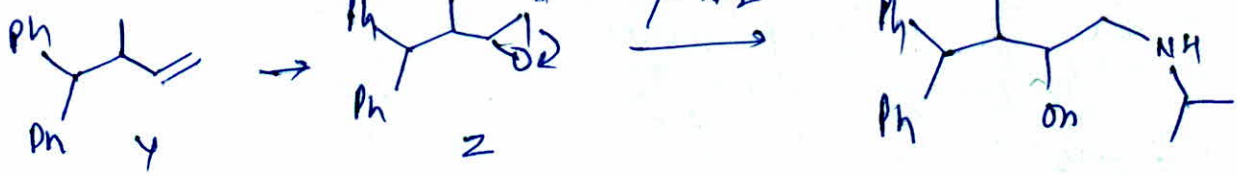
~~meso~~ dl pair

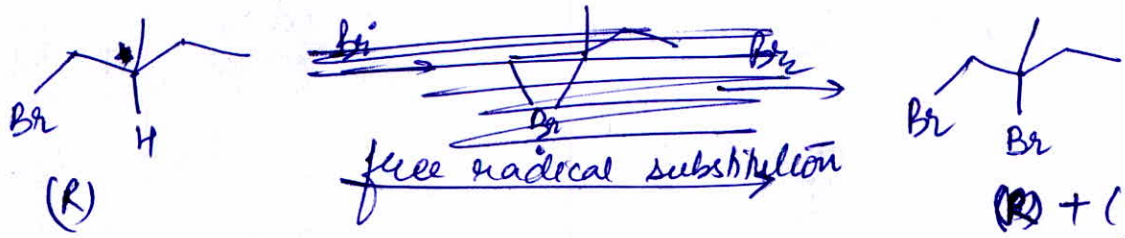




Total stereoisomers = (4)

(3)



④ 

⑤ $\frac{r_A}{r_B} = \frac{n_1\sqrt{M_2}}{n_2\sqrt{M_1}} \Rightarrow \frac{16}{3} = \frac{2 \times M_2}{M_1 \times 3} \Rightarrow \frac{M_2}{M_1} = 4.$

$\frac{n_1}{n_2} = \frac{2}{3} \times \frac{M_2}{M_1} = 8/3$

⑥ A, B, D involve neighbouring group participation

⑦ ~~IE~~ $IE\left(\frac{1}{1^2} - \frac{1}{2^2}\right) = 24 \quad IE = 32\ eV.$

$B.E_{2nd} = \frac{32}{3^2} = 3.55eV \qquad IP_3 = 32\left(\frac{1}{1^2} - \frac{1}{4^2}\right) = 32 \times \frac{15}{16} V.$

⑧ Apply Le Chatelier's principle.

⑨ $mE_{H_2O_2} = 25 \times 0.5 \times 2 = 25 \qquad mE_{KMnO_4}\ left = 25$

$mE_{KMnO_4} = 50 \times 0.2 \times 5 = 50 \qquad mE_{O_2} = 25 = \frac{25}{1000} \times 8\ g = 0.2g.$

⑩ $T \propto V^{-1/2} \quad TV^{1/2} = constant$

$(\gamma - 1) = 1/2 \quad \gamma = 3/2.$

$T \propto V^{-1/2}$

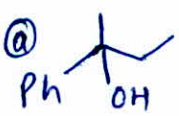
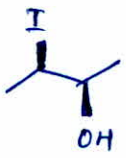
$PV \propto V^{-1/2}$

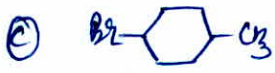
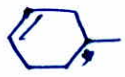
$V \propto P^{-2/3}$

$T \propto V^{-1/2}$

$T \propto \left(\frac{T}{P}\right)^{-1/2} \qquad P \propto T^3$

Matrix Match.

① (a)  $\xrightarrow{HCl}$ S_N1 (b)  $\xrightarrow[S_N2]{NaOH}$  meso

(c)  $+ C_2H_5ONa \xrightarrow{C_2H_5OH}$ 

(d)  $\xrightarrow{conc.H_2SO_4}$ 2-butene cis/trans

② Apply Le Chatelier's principle.

Single digit integer.

① $5Fe^{+2} + MnO_4^- + 8H^+ \rightarrow 5Fe^{+3} + Mn^{+2} + 4H_2O$

$5C_2O_4^{2-} + 2MnO_4^- + 16H^+ \rightarrow 10CO_2 + 8H_2O + Mn^{+2}$

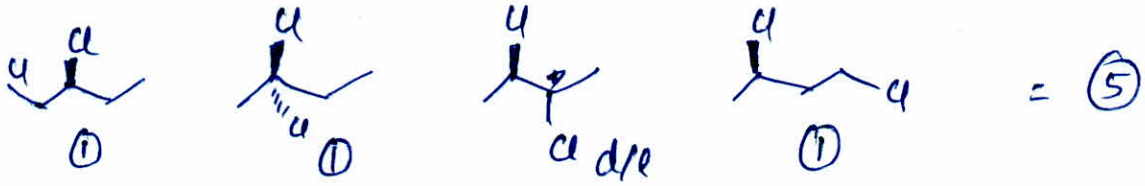
$5FeC_2O_4 \equiv 3MnO_4^-$

$1 mole\ FeC_2O_4 \equiv 0.6\ mol\ MnO_4^-$

② Calculate n factor

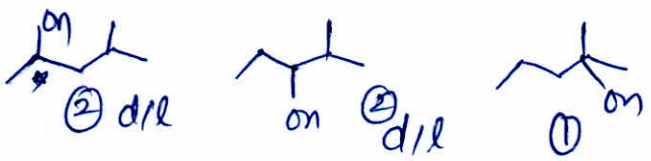
③ $k = \frac{2.303}{9} \log \frac{10}{1.25}$ $\quad t_{1/2} = \frac{0.693}{k}$

④ $2LiNO_3 \xrightarrow{\Delta} Li_2O + 2NO_2 + \frac{1}{2}O_2$

⑤  = ⑤

① ① ② d/l ①

⑥  = ③

⑦  = ⑤

② d/l ② d/l ①

⑧ $5\ mmol\ H_2SO_4 \equiv 10\ mmol\ NH_3$

$10\ mmol\ NH_3 = 40\ ml\ of\ 0.25\ M\ NH_3$

$[NH_4^+] = \frac{10}{50} = 0.2M$ Total volume = 50 ml.

$K_h = \sqrt{\frac{K_w}{K_b}}$

$[H^+] = \sqrt{K_h C}$