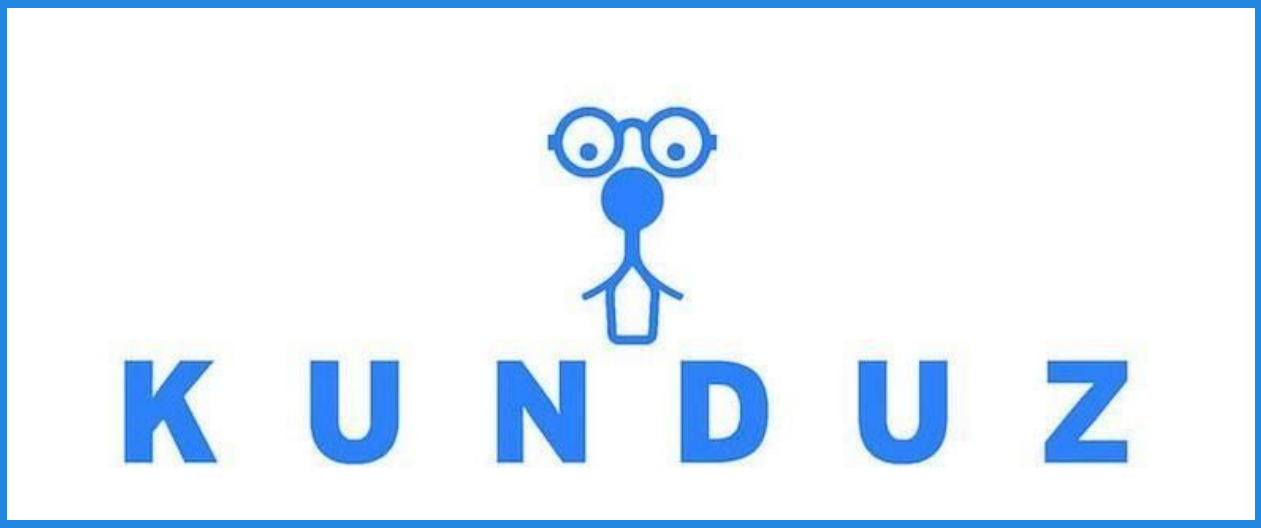

Jan 8 2020 shift 2 Chemistry prepared by KUNDUZ tutors

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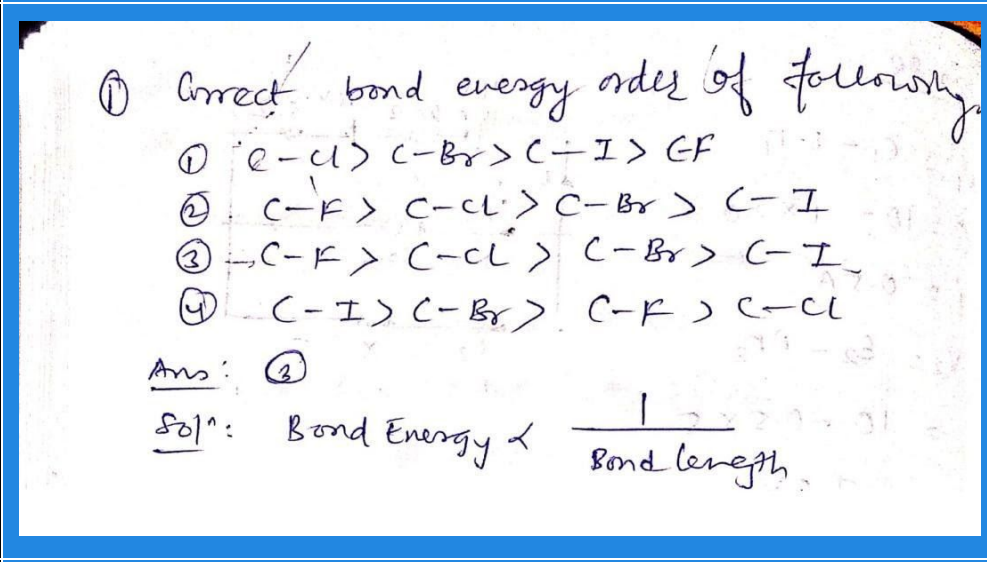
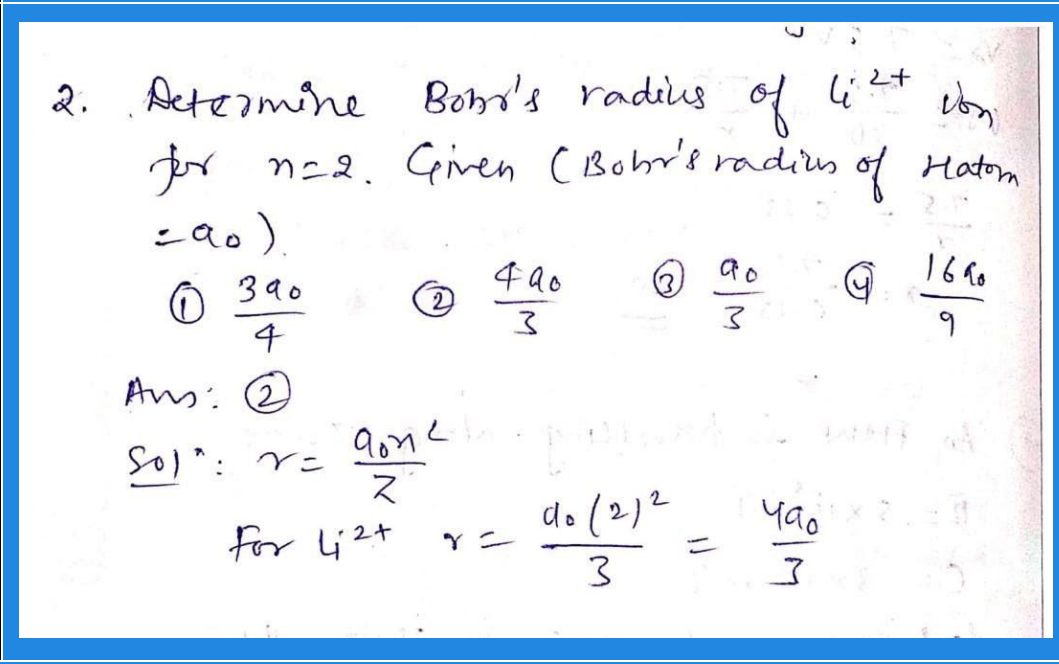
Question no.	Questions and Answers
1	
2	

3	3. Given the following reaction sequence. $A + N_2 \longrightarrow \text{Nitride} \xrightarrow{H_2O} NH_3$ (easy) Blue colour A and B are respectively: (1) Mg, Mg_3N_2 (2) Na, Mg_3N (3) $Mg, Mg(NO_3)_2$ (4) $Na, NaNO_3$ Ans: (1) Sol^n: $3Mg + N_2 \longrightarrow Mg_3N_2 \xrightarrow{H_2O} Mg(OH)_2 + NH_3$
4	4. Correct order of magnetic moment (spin only) for the following complexes. (a) $[Pd(PPh_3)_2Cl_2]$ (b) $[Ni(CO)_4]$ (c) $[Ni(CN)_4]^{2-}$ (d) $[Ni(H_2O)_6]^{2+}$ (1) $a=b=c<d$ (2) $a<b<c<d$ (3) $a>b>c>d$ (4) $a=b>c>d$. Ans: (1) Sol^n: $[Pb(PPh_3)_2Cl_2]$ $Pd^{2+} = 4d^8$ $M=0$ $[Ni(CO)_4]$ $Ni = 3d^8 4s^2$ (SFL) $M=0$ $[Ni(H_2O)_6]^{2+}$ $Ni^{2+} = 3d^8$ (WFL) . . . 2 unpaired electrons. $[Ni(CN)_4]^{2-}$ $Ni^{2+} = 3d^8$ (WFL) $M=0$

5

5. Determine total number of neutrons in three isotopes of hydrogen.

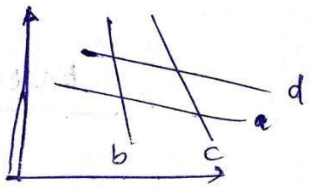
(1) 1 (2) 2 (3) 3 (4) 4

Ans: (3)

Sol: Number of Neutrons 0 + 1 + 2 = 3

6

6. Compare E_a (Activation E.) for a, b, c and d.



(1) $E_b > E_c > E_d > E_a$

(2) $E_a > E_d > E_c > E_b$

(3) $E_c > E_b > E_a > E_d$

(4) $E_d > E_a > E_b > E_c$

Ans: (1)

Sol: $\log K = \log A - \frac{E_a}{2.303 RT}$

$\Rightarrow E_b > E_c > E_d > E_a$ as

Slope $= \frac{-E_a}{2.303 R}$

7

7. Which of the following exhibits both Frenkel and Schottkey defect?

(1) AgBr (2) KCl (3) CsCl (4) ZnS

Ans: (1)

Sol: Only AgBr can exhibit both Schottkey and frenkel defect.

8

8. Given: $P_4 + NaOH + H_2O \longrightarrow PH_3 + A$

$A \xrightarrow{HCl} B$

Basicity of B is

(1) 1 (2) 2 (3) 3 (4) 4

Sol: $P_4 + NaOH + H_2O \longrightarrow PH_3 + NaH_2PO_2$

$NaH_2PO_2 \xrightarrow{HCl} H_3PO_2$

Basicity = 1

9

9. Which reaction doesnot occurs in the blast furnace in the metallurgy of fe.

(a) $CaO + SiO_2 \longrightarrow CaSiO_3$

(b) $Fe_2O_3 + CO \longrightarrow Fe_3O_4 + CO_2$

(c) $FeO + SiO_2 \longrightarrow FeSiO_3$

(d) $FeO \xrightarrow{\Delta} Fe + \frac{1}{2}O_2$

(1) a & b (2) a, b & c, (3) c & d (4) a, b, c, d

Ans: (3)

Sol: Based on theory.

10

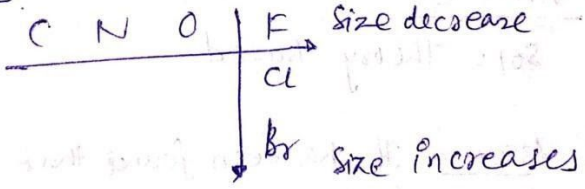
10. Correct order of radius of elements is C, O, F, Cl Br :

(1) Br > Cl > C > O > F (2) Br < Cl < C < O < F

(3) Cl < C < O < F < Br (4) C > F > O > Br > Cl

Ans: (1)

Sol:



11

11. Among the following which will show geometric isomerism.

(a) $[Ni(NH_3)_5Cl]^+$ (b) $[Ni(NH_3)_4ClBr]$

(c) $[Ni(NH_3)_3Cl]^+$ (d) $[Ni(NH_3)_2(NO_2)_2]$

(1) b,d (2) a,b (3) a,b & c (4) a,b,c & d.

Ans : (1).

Sol : Ma_4bc can show GI — 2.

Ma_2b_2 can show 2 GI.

12

12. Assertion : pH of water increases on increasing temperature.

Reason : $H_2O \longrightarrow H^+ + OH^-$ is an exothermic reaction.

(1) Both Assertion & reason are correct and reason is correct explanation of assertion.

(2) Both assertion & reason are correct and reason is not correct explanation of assertion.

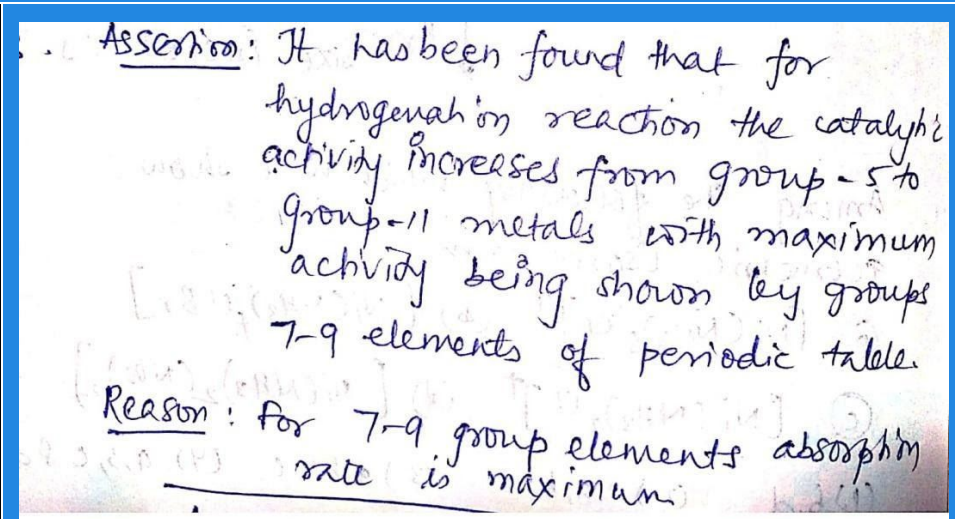
(3) Assertion is true & reason is false

(4) Both Assertion and reason are incorrect

Ans : (4).

Sol : Theory Based.

13


Assertion: It has been found that for hydrogenation reaction the catalytic activity increases from group-5 to group-11 metals with maximum activity being shown by groups 7-9 elements of periodic table.

Reason: for 7-9 group elements absorption rate is maximum.

(1) Both Assertion & reason are correct and reason is correct explanation of assertion.

(2) Both assertion & reason are correct and reason is not correct explanation of assertion.

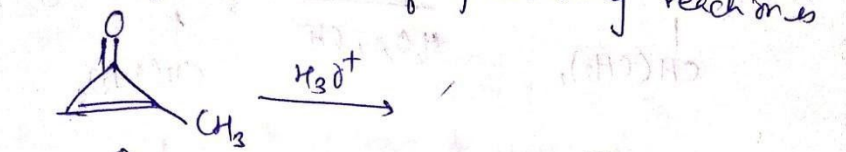
(3) Assertion is true & reason is false

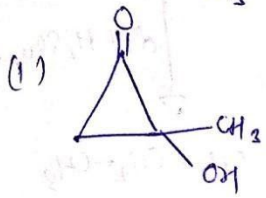
(4) Both Assertion and reason are incorrect

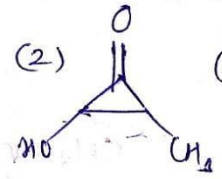
Ans: (1)
Theory Based.

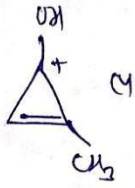
14

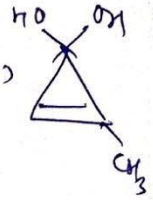
14. The Major product of following reaction is



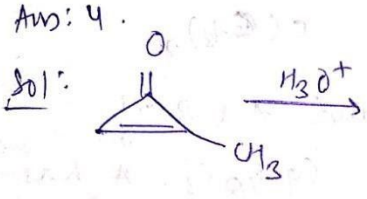
(1) 

(2) 

(3) 

(4) 

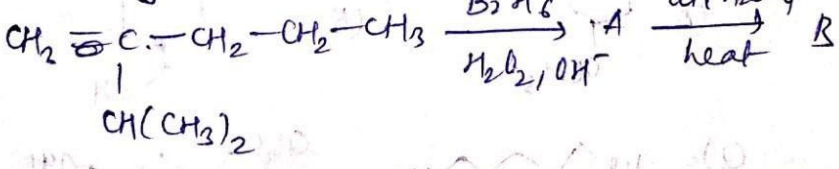
Ans: 4.

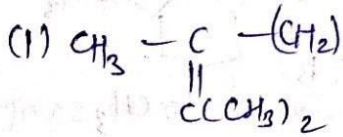
Sol: 

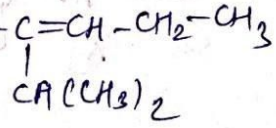
(Aromatic)

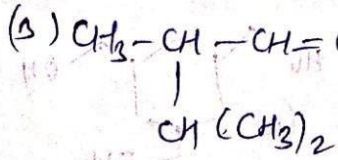
15

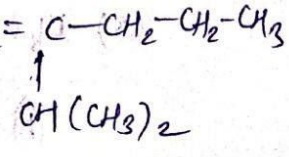
15. Find the Major product of the following reactions.

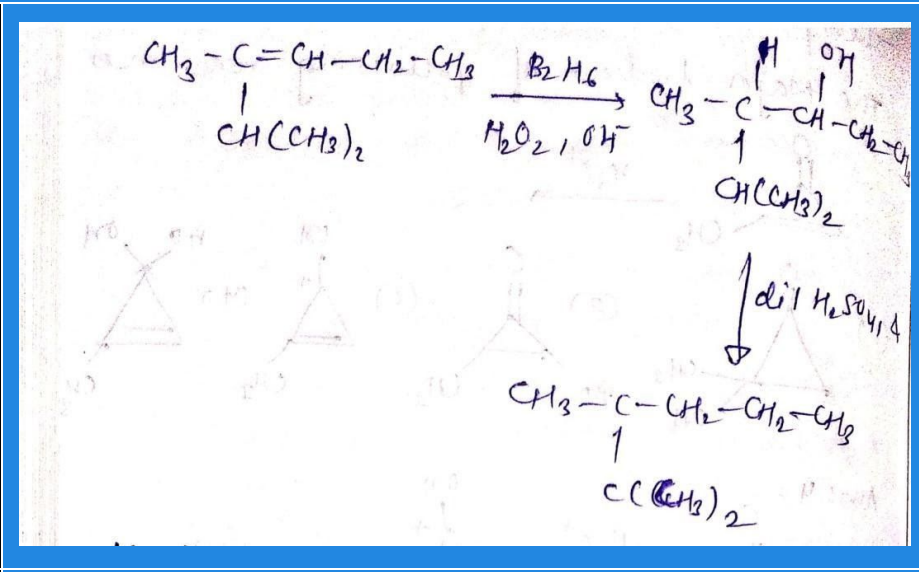


(1) 

(2) 

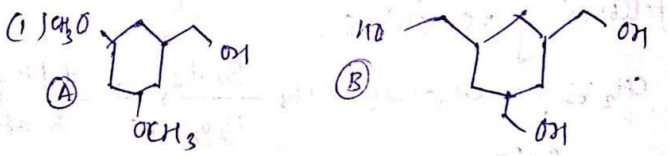
(3) 

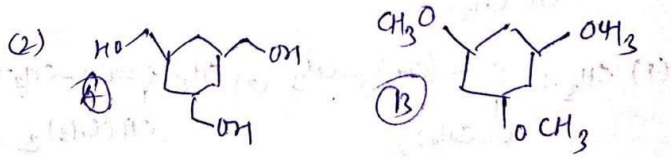
(4) 

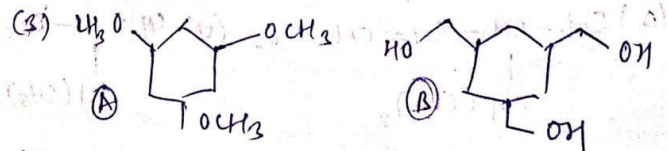


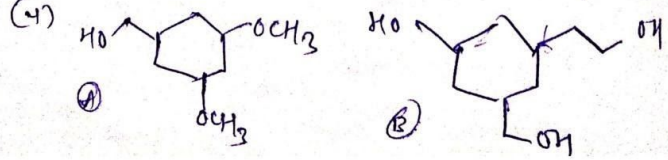
16

16. There are two compounds A & B of molecular formula $C_9H_{10}O_3$. A has higher B.P. than B.

(1) 

(2) 

(3) 

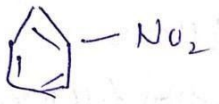
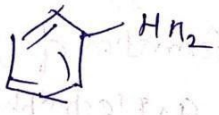
(4) 

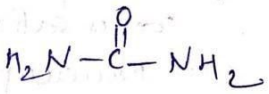
Ans : (2)

Sol : In (A), extensive intermolecular H-bonding is possible while in (B) there is no intermolecular H-Bonding.

17

17. KJeldahl method can be used for :

(1)  (2) 

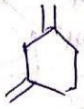
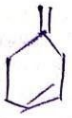
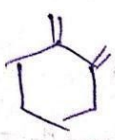
(3)  (4) 

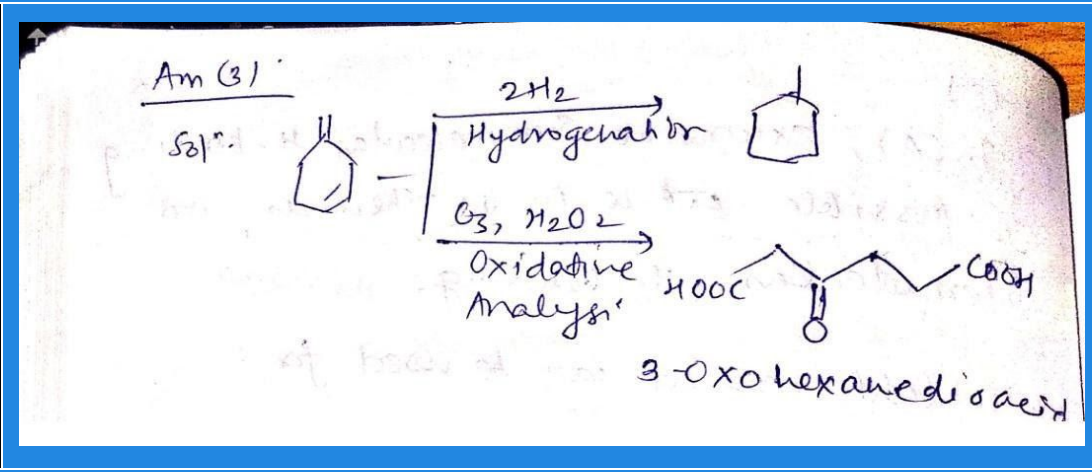
Ans :(1)

Sol : KJeldahl method is not applicable to nitro or diazo groups present in the ring, as nitrogen atom can't be converted to ammonium sulfate under the reaction conditions.

18

18. A compound X that adds 2 hydrogen molecules on dehydrogenation. The compound X also gives 3-oxohexanedioic acid on oxidative analysis. The compound 'X' is ____.

(1)  (2)  (3)  (4) 


Am (3)
Sol".
$2H_2$
Hydrogenation
O_3, H_2O_2
Oxidative
Analysis
HOOC
COOH
3-Oxohexanedioic

19

19. formation of Bakelite follows:

(1) Electrophilic substitution followed by condensation.

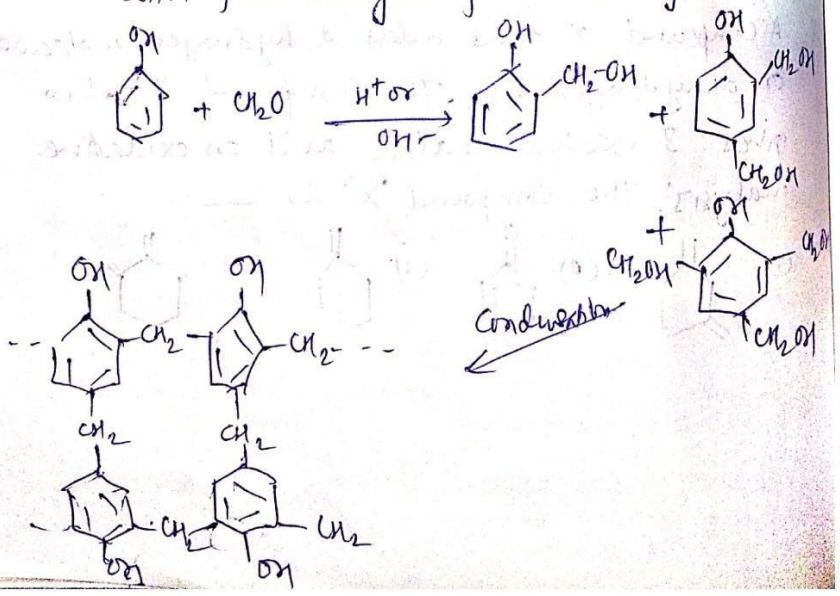
(2) Nucleophilic addition followed by dehydration.

(3) Electrophilic addition followed by dehydration.

(4) Hydration followed by condensation.

Ans: (1)

Sol: formation of Bakelite follows electrophilic substitution reaction of phenol with formaldehyde followed by condensation



20

Products formed by hydrolysis of maltose are.

(1) α-D-Glucose, α-D-Glucose

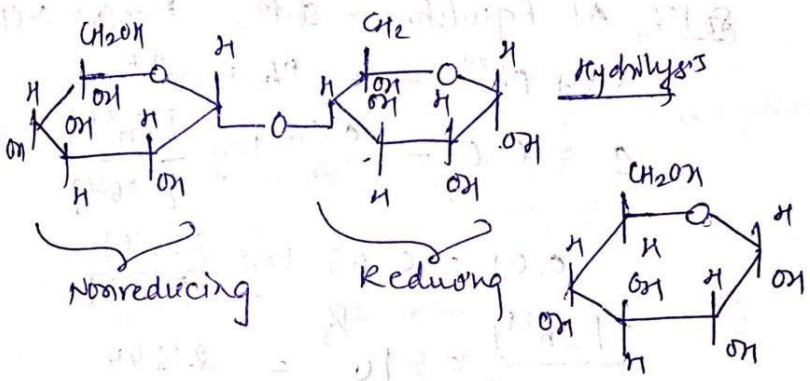
(2) α-D-Glucose, β-D-Glucose

(3) α-D-Galactose, β-D-Glucose

(4) β-D-Galactose, α-D-Glucose

Ans: (1)

Sol: Maltose on hydrolysis gives 2 mole of α-D-Glucose



21

24. Temperature of 4 moles of gas increases from 300K to 500K find C_v. If $\Delta U = 5000$ J.

Ans: 06.25.

Sol: $\Delta U = n C_v \Delta T$

$5000 = 4 \times C_v \times (500-300)$

$C_v = 6.25 \text{ JK}^{-1}\text{mol}^{-1}$

22

22. Given: $E^{\circ}_{Sn^{2+}/Sn} = -0.14\,V$

$E^{\circ}_{Pb^{2+}/Pb} = -0.13\,V$

Determine $\frac{[Sn^{2+}]}{[Pb^{2+}]}$ at equilibrium

for cell reaction, $Sn|Sn^{2+}||Pb^{2+}|Pb$

take, $\frac{2.303RT}{F} = 0.06\,V$

Ans: 0 2.15.

Sol': At Equilibrium state, $E^{\circ}_{cell} = 0.01$

$Sn + Pb^{2+} \longrightarrow Pb + Sn^{2+}$

$0 = 0.01 - \frac{0.06}{2} \log \frac{[Sn^{2+}]}{[Pb^{2+}]}$

$0.01 = 0.03 \log \frac{[Sn^{2+}]}{[Pb^{2+}]}$

$\frac{[Sn^{2+}]}{[Pb^{2+}]} = 10^{1/3} = 2.1544$

23

23. Given following reaction,

$NaClO_3 + Fe \longrightarrow O_2 + FeO + NaCl$

In the above reaction 492 L of O_2 is obtained at 1atm & 300K temperature. Determine mass of $NaClO_3$ required (in Kg).

$R = 0.082\ L\ mol^{-1}\ K^{-1}\ atm$

Ans: 02:13

Sol: mol of $NaClO_3$ = mol of O_2

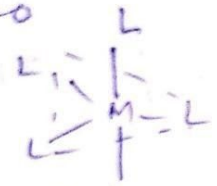
$$\text{mol of } O_2 = \frac{PV}{RT} = \frac{1 \times 492}{0.082 \times 300} = 20\ mol$$

24

24. Complex $[ML_5]$ can exhibit trigonal bipyramidal and square pyramidal geometry. Determine total numbe of 180°, 90° & 120° LML bond angles.

Ans: 20

Sol



∠120 = 3, ∠90 = 6, ∠180 = 1

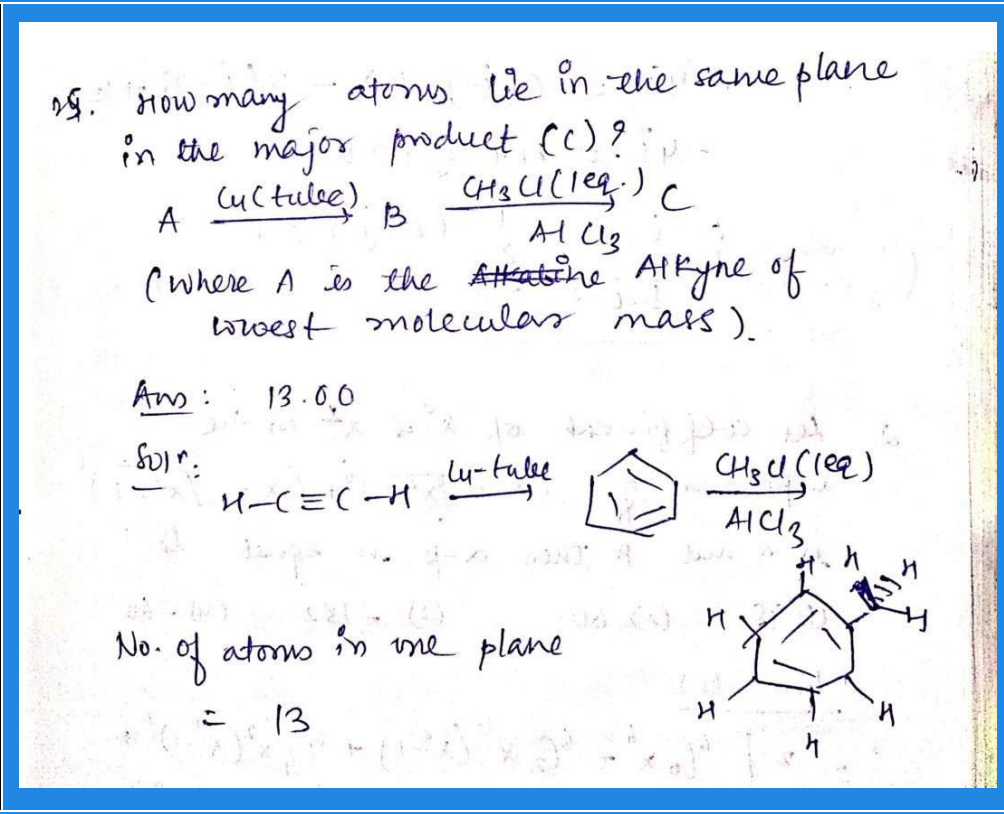
Total = 10



∠120 = 0, ∠90 = 8, ∠180 = 2

Total = 10

25



Q. How many atoms lie in the same plane in the major product (C)?

A $\xrightarrow{Cu\ (tube)}$ B $\xrightarrow[AlCl_3]{CH_3Cl\ (1\ eq.)}$ C

(where A is the ~~Alkaline~~ Alkyne of lowest molecular mass).

Ans: 13.00

Soln:

$H-C\equiv C-H \xrightarrow{Cu\text{-}tube}$ $\xrightarrow[AlCl_3]{CH_3Cl\ (1\ eq)}$

No. of atoms in the plane

= 13

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