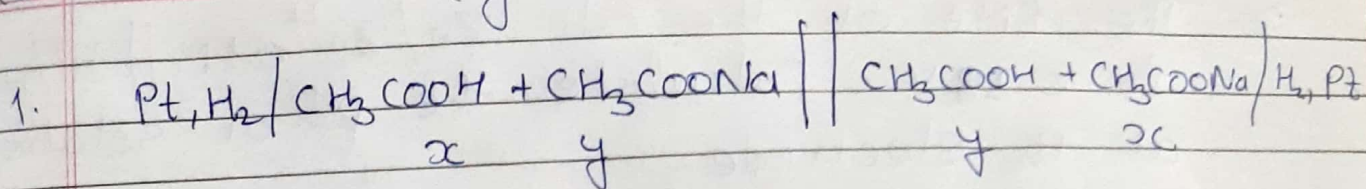


24/03/20

12th Syllabus 45 questions

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what will be E_{cell} ?

$$1. \quad E_{\text{cell}} = 0.12 \log \frac{y}{x}$$

$$2. \quad E_{\text{cell}} = 0.06 \log \left(\frac{y}{x} \right)^{1/2}$$

$$3. \quad E_{\text{cell}} = 0.03 \log \frac{y K_{a1}}{x K_{a2}}$$

$$4. \quad E_{\text{cell}} = 0.015 \log \frac{y}{x}$$

Solution mixture of $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ forms acidic buffer

$$\Rightarrow [\text{H}^+] = K_a \frac{[\text{acid}]}{[\text{salt}]}$$

$$= K_a \frac{x}{y}$$

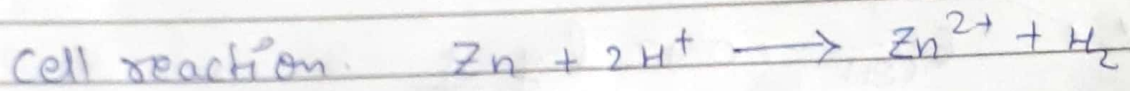
$$\Rightarrow C_1 = K_a \frac{x}{y} \quad C_2 = K_a \frac{y}{x}$$

$$\frac{C_2}{C_1} = \frac{K_a \frac{y}{x}}{K_a \frac{x}{y}} = \frac{y^2}{x^2}$$

$$\begin{aligned} E_{\text{cell}} &= \frac{0.06}{1} \log \frac{C_2}{C_1} \\ &= 0.06 \log \left(\frac{y}{x} \right)^2 \\ &= 0.12 \log \frac{y}{x} \end{aligned}$$

2. The EMF of the cell $Zn/Zn^{2+} 0.1M // H^+/H_2, Pt$ is 0.28V. Calculate the pH of solution at H_2 electrode.

1. ~~6.5~~ 2. 7.5 3. ~~8.5~~ 4. 9.5



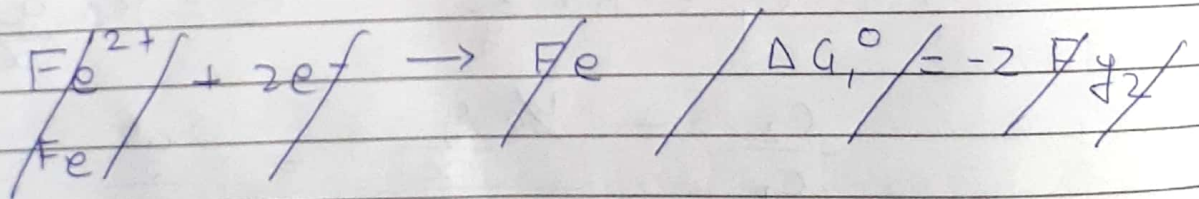
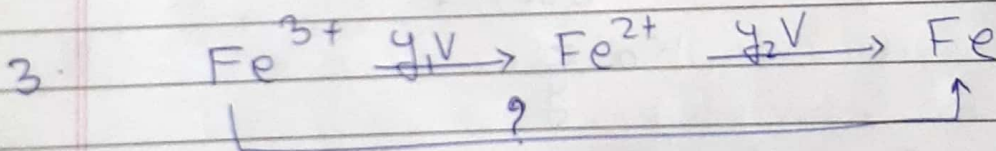
$$E_{cell} = E_{cell}^0 - \frac{0.06}{2} \log \frac{[Zn^{2+}] P_{H_2}}{[H^+]^2}$$

$$0.28 = 0.76 - 0.03 \log \frac{0.1 \times 1}{[H^+]^2}$$

$$-\log [H^+]^2 = 17$$

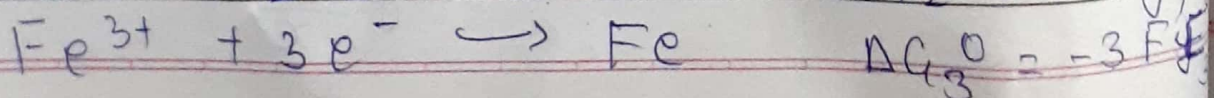
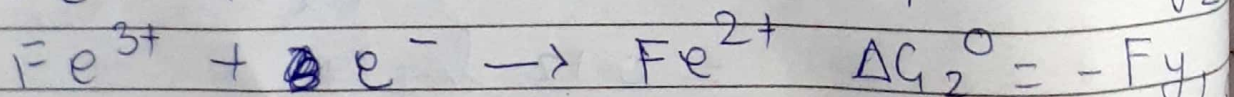
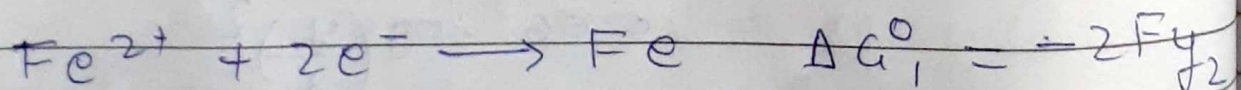
$$2 \text{ pH} = 17$$

$$\text{pH} = 8.5$$



1. $2y_1 - y_2$ 2. $3y_1 - 2y_2$

3. $\frac{2}{3}y_2 + \frac{1}{3}y_1$ 4. $\frac{1}{2}y_2 - \frac{1}{2}y_1$



$$\Delta G_3^0 = \Delta G_1^0 + \Delta G_2^0$$

$$-3FE_3^0 = -2Fy_2 - Fy_1$$

$$3E_3^0 = 2y_2 + y_1$$

$$E_3^0 = \frac{2}{3}y_2 + \frac{1}{3}y_1$$

4. $E_{Cu^{2+}/Cu}^0 = +0.34V$ $E_{Fe^{2+}/Fe}^0 = -0.44V$

1. Cu oxidises Fe^{2+}
2. ~~Cu²⁺ oxidises Fe~~
3. Cu reduces Fe^{2+}
4. ~~Cu²⁺ reduces Fe.~~

~~2.2~~ Higher SRP value oxidises the lower one.

5. The molar conductance of $BaSO_4$ at infinite dilution at a certain temp is $300 \Omega^{-1} cm^2 mol^{-1}$ the specific conductance of a saturated solution after connecting the ~~two~~ ~~leads~~ is $4 \times 10^{-6} \Omega^{-1} cm^{-1}$ the solubility ~~at~~ ~~the~~ ~~new~~ product of $BaSO_4$ is

1. 1.33×10^{-5}
2. ~~1.7×10^{-10}~~
3. 3.5×10^{-7}
4. 2.5×10^{-6}

$$3 \times 10^2 = \frac{4 \times 10^{-6} \times 1000}{s}$$

$$s = 1.33 \times 10^{-5}$$

$$K_{sp} = s^2 = 1.7 \times 10^{-10}$$

6. What mass of the non volatile solute urea needs to be dissolved in 100g of water in order to decrease the vapour pressure of water by 25%. What will be the molality of the solution?

1. 8.50 2. 12.50 3. 15.50 18.50

$$p^0 = p \cdot P_s = 75\% \text{ of } p = \frac{3p}{4}$$

$$\frac{p - \frac{3}{4}p}{p} = \frac{w}{60}$$

$$\frac{w}{60} = \frac{100}{18}$$

$$w = 111g$$

$$m = \frac{111 \times 10^3}{60 \times 100} = 18.5m$$

7. The depression in freezing point for 1M urea, 1M glucose & 1M NaCl are in the ratio

1. 1:2:2 2. 1:2:1 3. 1:1:1

4. 1:1:2

as NaCl dissociates no. of particles are ~~not~~ doubled

$$\Rightarrow 1:1:2$$

8. The rate constant for the 1st order reaction at 45°C is twice that at 35°C. Find the energy of activation of the reaction.

1. 13.5 Kcal 2. 60 Kcal 3. 14.45 Kcal

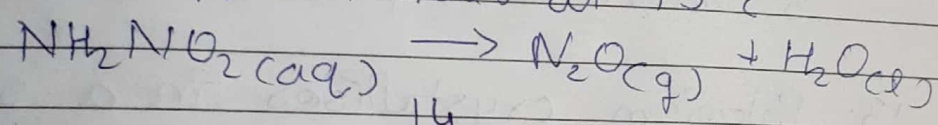
4. 20.3 Kcal

$$\log \frac{k_2}{k_1} = \frac{E_a}{2.3R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$$

$$\log 2 = \frac{E_a}{2.3 \times 2} \frac{318 - 308}{318 \times 308}$$

$$E_a = 13.49 \text{ kcal}$$

9. The half life of 1st order decomposition of nitramide is 2.1 hours at 15°C



- 1. 14.5 hr \rightarrow ~~14.5 hr~~ ¹⁴ hr
- 2. 12.8 hr
- 3. 10.6 hr
- 4. 10.6 hr

$$t_{99\%} = \frac{2.0}{3} \times t_{1/2}$$

$$= \frac{2.0}{3} \times 2.1 = 1.4 \text{ hr}$$

10. For a reaction of the type $A + B + C$ going to product, the following observations are made. Doubling the concentration of A double the rate, doubling the concentration of B has no effect on the rate & tripling the conc. of C increases the rate by a factor of 9. what is the rate law for the reaction?

- 1. $k[A]^2[B][C]^2$
- 2. $k[A][C]^2$
- 3. $k[A]^2[B][C]$
- 4. $k[A][B][C]$

$$r_1 = k[A]^x[B]^y[C]^z$$

$$2r_1 = k[2A]^x[B]^y[C]^z$$

$$9r_1 = k[A][B]^y[3C]^z$$

On comparing $\Rightarrow k[A][C]^2$

11. An Arsenic sulphide sol is prepared by
 1. reduction 2. oxidation 3. hydrolysis
 4. double decomposition.

12. Langmuir Isotherms holds at low pressure but fails at
 1. Low temperature 2. High pressure
 3. Intermediate pressure 4. none of these

13. Polonium crystallises in a simple cubic unit cell it has atomic mass = 209 & density = 91.5 kg/m^3 . The edge length of unit cell will be
 1. 15.6 \AA 2. 10.99 \AA 3. 6.06 \AA
 3. 21.45 \AA

no. of Po per unit cell = 1

$$\begin{aligned} \text{mass of 1 Po atom} &= \frac{209}{6 \times 10^{23}} \\ &= 34.72 \times 10^{-23} \text{ g} \end{aligned}$$

$$\begin{aligned} D &= 91.5 \text{ kg/m}^3 \\ &= 0.0915 \text{ g/cm}^3 \end{aligned}$$

$$0.0915 = \frac{34.72 \times 10^{-23}}{a^3}$$

$$\begin{aligned} a^3 &= \sqrt[3]{3744.27 \times 10^{-24}} \\ &= 15.6 \times 10^{-8} \text{ cm} \\ &= 15.6 \text{ \AA} \end{aligned}$$

14. A forms hcp B is present in $\frac{2}{3}$ octahedral void & $\frac{1}{4}$ tetrahedral void ~~void~~ C is present in remaining voids the formula will be?

1. A B C 2. $A_5 B_6 C_5$ 3. ~~$A_6 B_5 C_5$~~

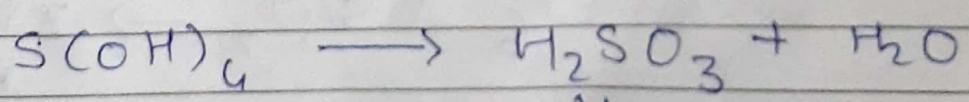
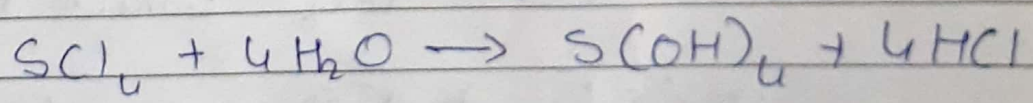
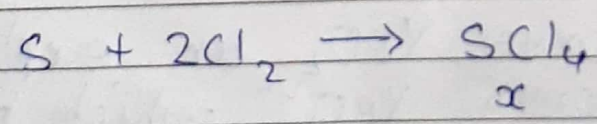
4. $A_6 B_3 C_4$

A_6	$B_6 \times \frac{2}{3}$	$C_3 \times \frac{1}{4}$
	$= 4$	$= \frac{3}{4}$
	$+ 12 \times \frac{1}{4}$	$+ 6 \times \frac{1}{3}$
	$= 3$	$= 2$

$A_6 B_5 C_5$

15. S reacts with Cl_2 in 1:2 ratio & forms X. Hydrolysis of X gives a S compound Y. What is the structure & hybridisation of anion of Y?

1. tetrahedral, sp^3 2. linear, sp
~~3. pyramidal, sp^3~~ 4. trigonal planar, sp^2



$SO_3^{2-} \Rightarrow sp^3$ one lone pair \Rightarrow Pyramidal

16. Which one of the following is the correct decreasing order of boiling point?

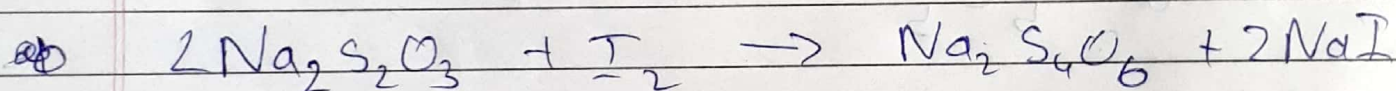
1. $H_2Te > H_2O > H_2Se > H_2S$
2. $H_2O > H_2S > H_2Se > H_2Te$
3. $H_2Te > H_2Se > H_2S > H_2O$
4. $H_2O > H_2Te > H_2Se > H_2S$

17. Shape of O_2F_2 is similar to that of

1. C_2F_2
2. H_2O_2
3. H_2F_2
4. C_2H_2

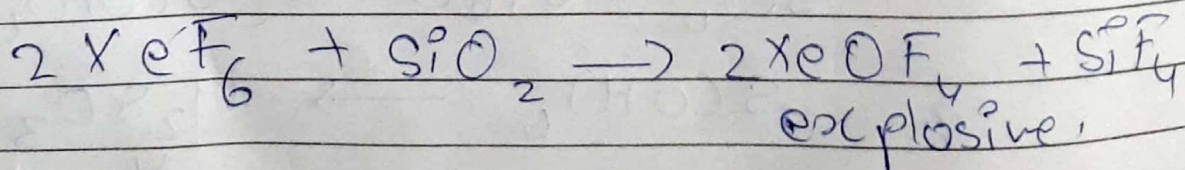
18. Hypo on treatment with I_2 produces:

1. H_2S
2. Na_2SO_4
3. Na_2SO_3
4. $Na_2S_4O_6$



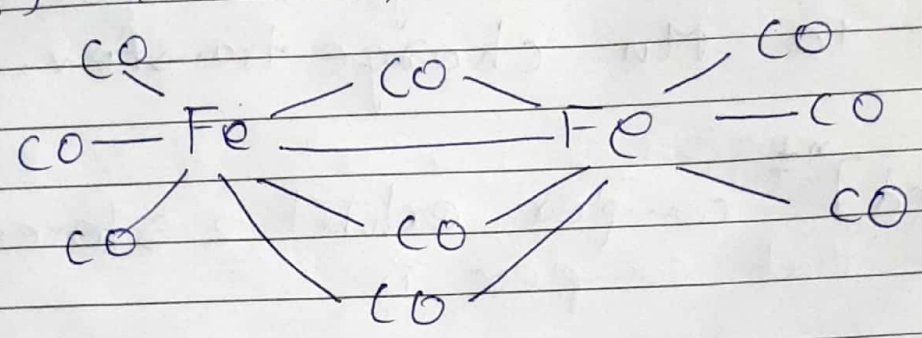
19. ~~The reason~~ The reason for not storing XeF_6 in a glass or a quartz vessel is that.

1. it forms an explosive having the formula XeO_2F_2
2. ~~it~~ it forms an explosive having formula $XeOF_4$
3. it forms XeO_2 an explosive substance
4. it forms XeO_6^{4-} which is explosive



20. No. of bridged carbonyl ligands present in $[Fe_2(CO)_9]$ complex.

- 1) 1 2) 2 3) 3 4) 4



21. Which of the following configuration when present in high spin complex will have CFSE equal to zero.

- 1) d^5 2) d^{10} 3) d^6 4) Both ① & ②

Pairing Energy $> \Delta_0$
 $\Rightarrow d^5$ eg² t_{2g}³ & d^{10} eg⁴ t_{2g}⁶
~~while~~ while d^6 eg³ t_{2g}³

22. Identify the labile complex from the following:

1. $[Sc(H_2O)_6]^{2+}$ 2. $Fe(CO)_5$
 3. $[V(NH_3)_6]^{2+}$ 4. $K_3[Fe(CN)_6]$

weak field ligands usually forms labile complexes

23. $KMnO_4$ exhibit colour due to

1. d-d transition
2. Mn to O charge transfer
3. O to Mn charge transfer.
4. K to Mn charge transfer.

24. $[Mabcd]^{n+}$ complex exhibit 2 stereoisomers then that complex is

1. square planar
2. tetrahedral
3. both.
- 4) none.

tetrahedral forms a 2 optical isomers.

25. ~~Two~~ Two stable ions of 1st T.S. which are diamagnetic.

- 1) Sc^{3+} & Ti^{3+}
 - 2) Cu^{2+} & Zn^{2+}
 - 3) Cu^+ & Zn^{2+}
 - 4) Co^{2+} & Zn^{2+}
- d^{10} configuration.

26. The highest O.S. exhibited by actinide element is

- 1) +4
- 2) +5
- 3) +6
- 4) +7

27. Which of the following pairs are known as noble metals?

- 1) Sc, Y 2) Zr, Hf 3) Pt, Au
4) Cr, Fe

28. Which of the following will exhibit color

- ~~1) Ce^{4+}~~ ~~2) Yb^{2+}~~ ~~3) Nd^{2+}~~ ~~4) La^{3+}~~
~~5) Eu^{3+}~~
- ~~Nd^{2+} Ce^{4+} shows~~

- 1) Ce^{4+} 2) Yb^{2+} 3) Eu^{3+} 4) La^{3+}
- Eu^{3+} $4f^6$ shows pink color

~~29. The items in Cu.~~

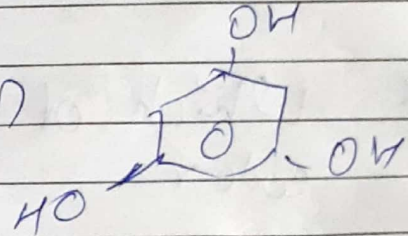
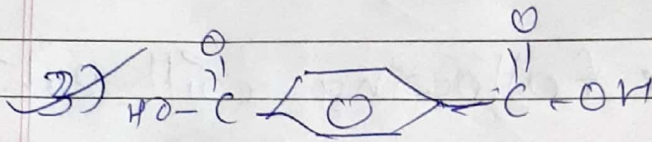
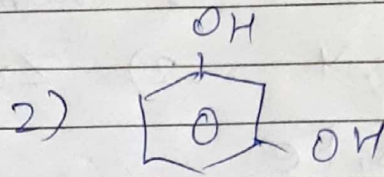
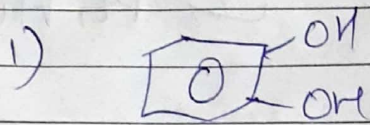
29. Copper matte contains.

- 1) sulphides of copper (II) & Fe(II)
2) sulphides of copper (II) & Fe(III)
 3) sulphides of copper (I) & Fe(II)
4) sulphides of copper (I) & Iron(III)

30. Cupellation process in metallurgy is for

- 1) Cu ~~2) Ag~~ 3) Al 4) Fe

31. The monomeric unit of terylene are glycol and.



32. Which of the following is ~~not~~ a branched polymer.

1) Polyester.

2) HDPE

3) Nylon

~~4) LDPE~~

33. Morphine is

~~1) An alkaloid~~

2) An enzyme

3) A carbohydrate

4) A protein.

34. The drug which is effective in curing malaria is.

~~1) Quinine~~

2) Aspirin

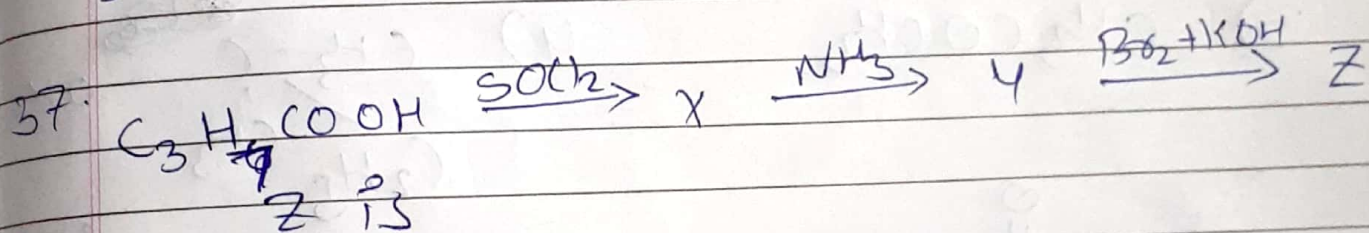
3) Analgin

4) Equanil

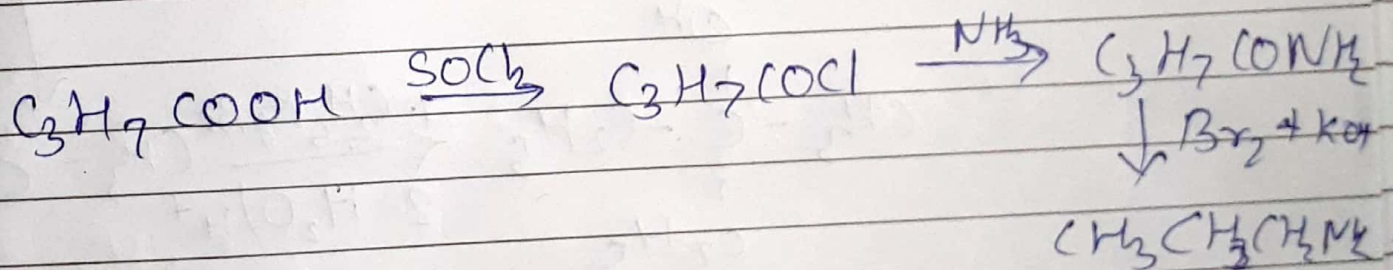
35. The base adenine occurs in
 1) DNA 2) RNA
 3) DNA & RNA 4) Protein.

36. Glucose and mannose are.

- 1) epimers 2) anomers
 3) ~~position isomers~~ 4) stereoisomers

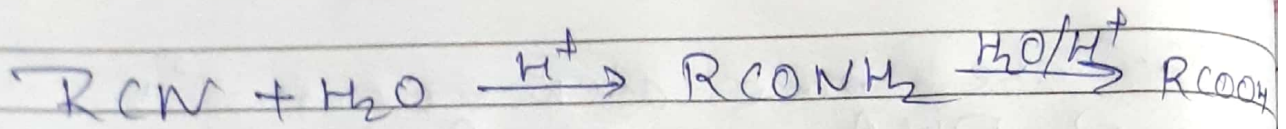


- 1) $CH_3CH_2CH_2Br$ 2) $CH_3CH_2CH_2NH_2$
 3) $CH_3CH_2CH_2COBr$ 4) $CH_3CH_2CH_2CH_2NH_2$

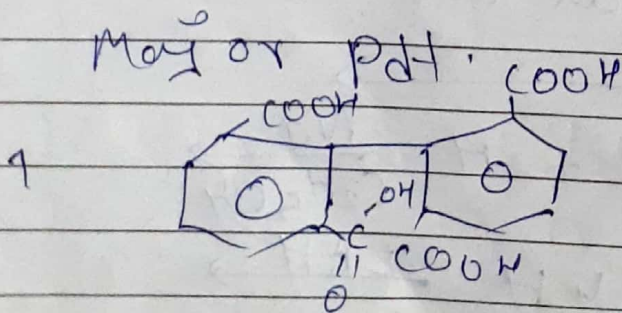
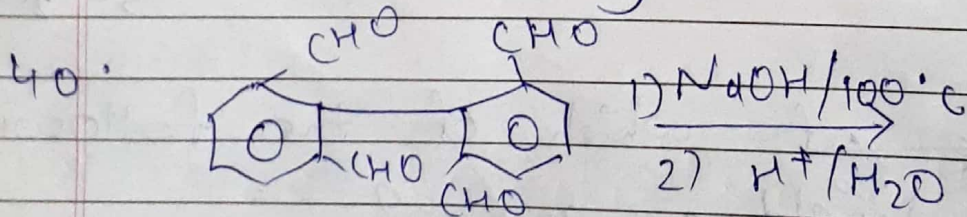
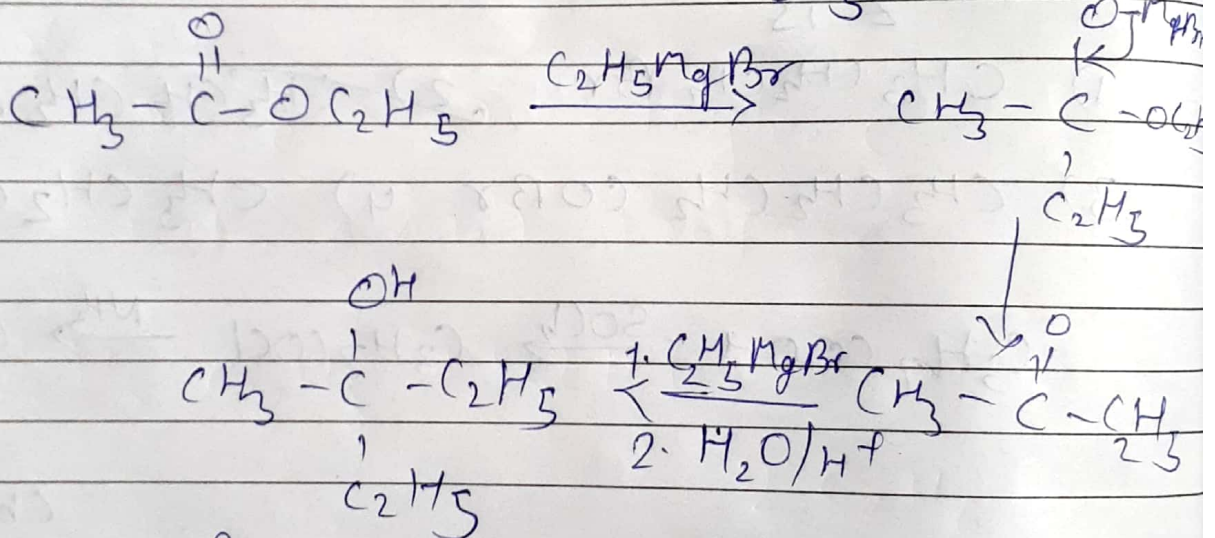
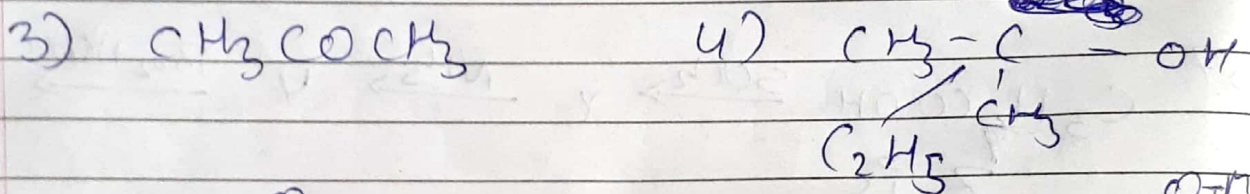
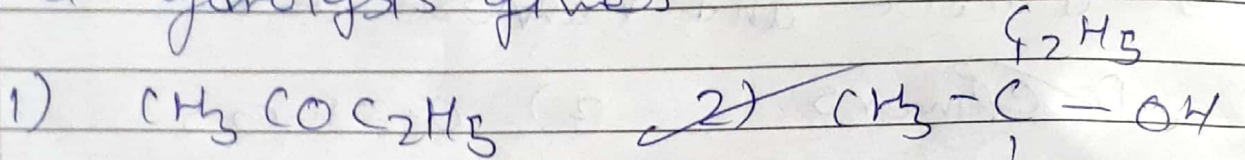


38. ~~Leakage~~ of which of the following reactions not yield an amine?

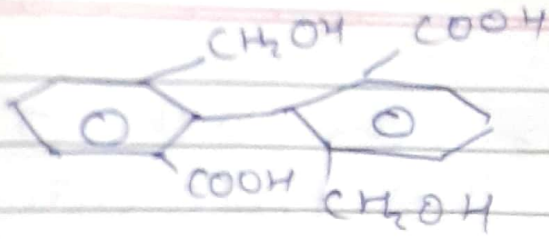
- 1) $RX + NH_3 \longrightarrow$
 2) $RCH=NOH + H \xrightarrow[C_2H_5OH]{Na}$
 3) $RCO NH_2 + 4H \xrightarrow{LiAlH_4}$
 4) $RCN + H_2O \xrightarrow{H^+}$



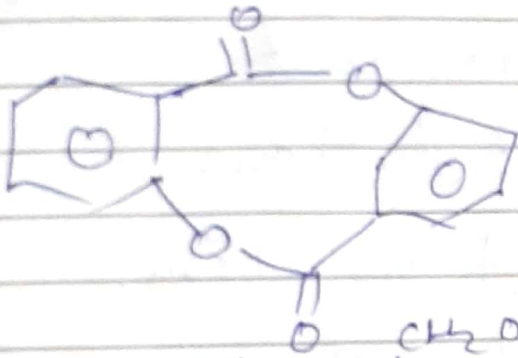
39. $CH_3COOC_2H_5$ with excess of C_2H_5MgBr & hydrolysis gives:



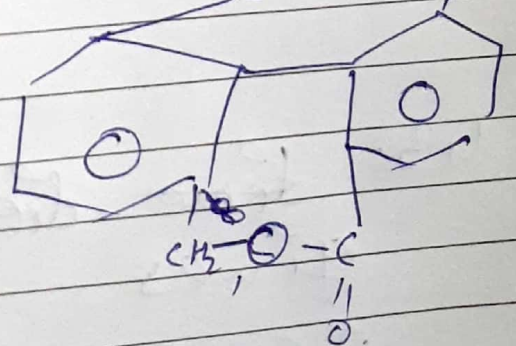
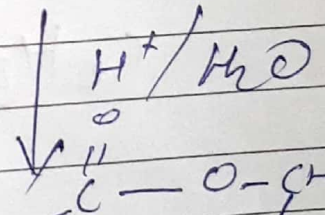
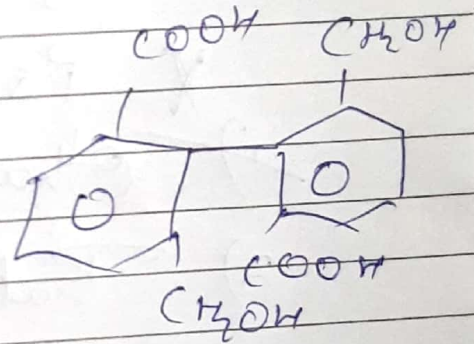
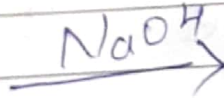
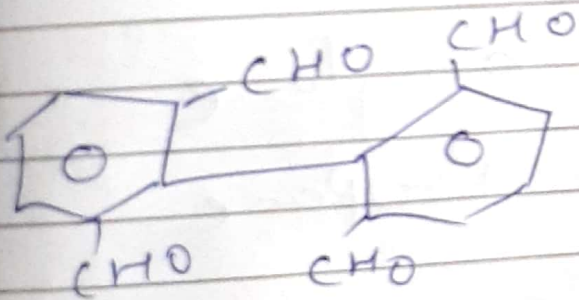
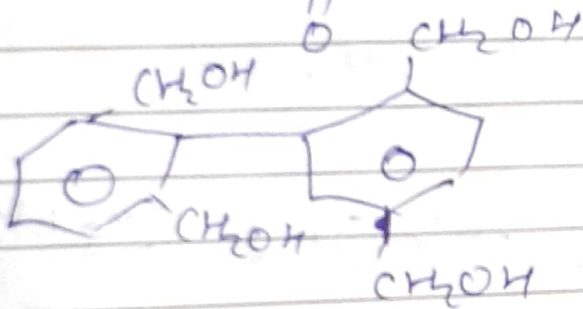
2)



3)

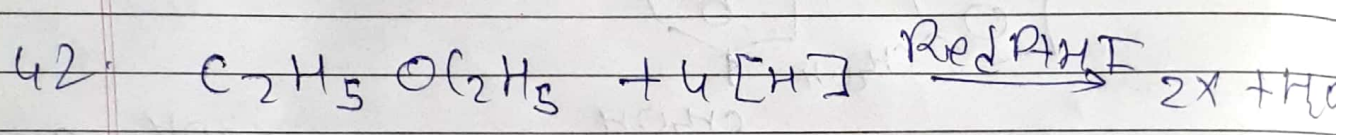


4)



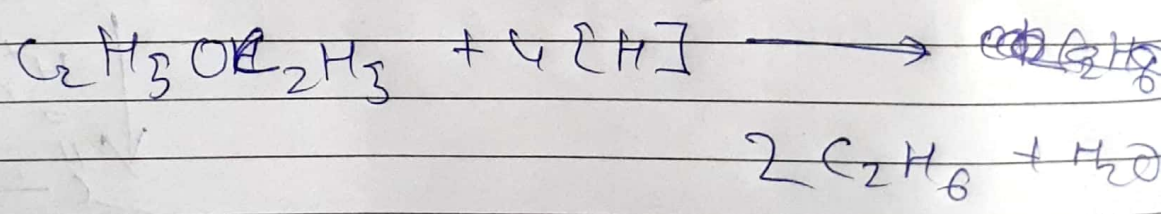
41. Aldehydes can be oxidised by which of the following

- 1) Tollen's reagent
- 2) Fehling solution.
- 3) Benedict solution.
- 4) All of these.



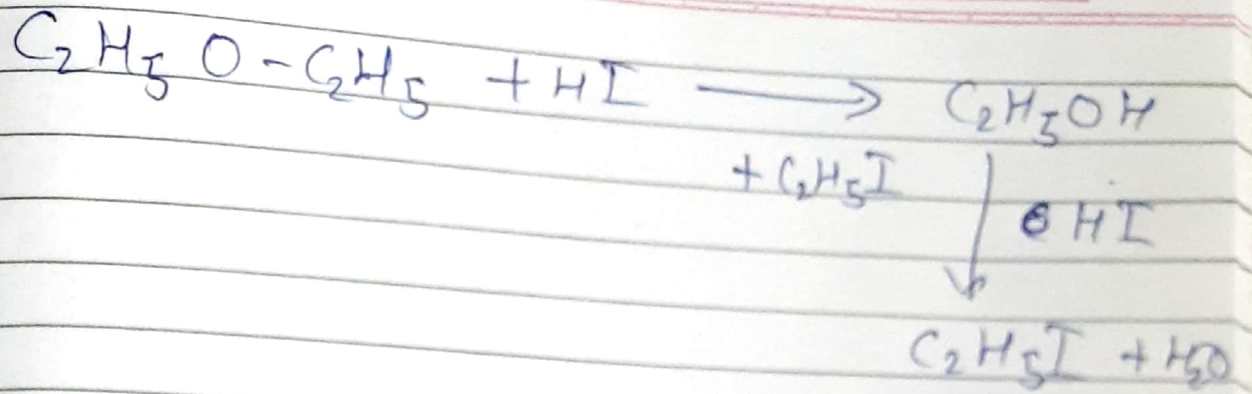
X is

- 1) Ethane
- 2) Ethylene
- 3) Butane
- 4) Propane



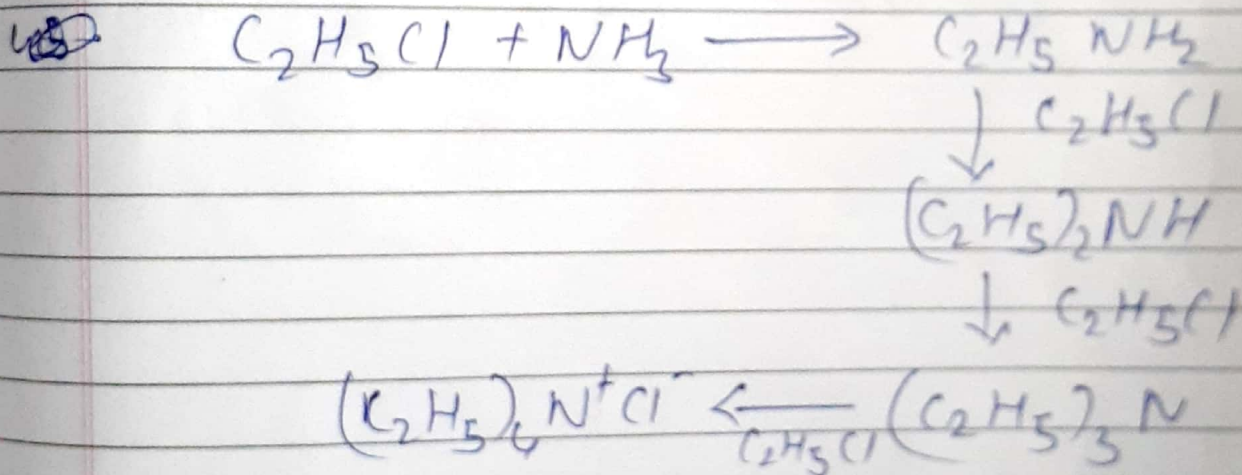
43. ~~di~~ diethyl ether with excess H_2 gives

- 1) CH_3CH_2I & CH_3CH_2OH
- 2) CH_3I & H_2O
- 3) C_2H_6 & CH_3CH_2OH
- 4) CH_3CH_2I & H_2O



44. Treatment of NH_3 with $\text{C}_2\text{H}_5\text{Cl}$ excess. will form major product as.

- 1) diethyl amine.
- 2) ethane
- 3) tetraethyl ammonium chloride
- 4) methyl amine.



45. The catalyst used is Roshig Process is.

- 1) LAH
- 2) Copperchloride
- 3) sunlight
- 4) Ethanol/Na.