**Sample Paper (2023-24)**

**Class 12th (Sr. Secondary)** **Code: CHE-856**

**Roll No.** | | | | | | | | | | |

# Chemistry

**(English Medium)**

**Academic / Open**

**[Time allowed: 3 hours]** **[Maximum Marks: 70]**

## General Instructions:-

Read the following instructions carefully and strictly follow them.

(i) This question paper is divided into five sections A, B, C, D and E.

(ii) This question paper contains 35 questions. All questions are compulsory.

(iii) In Section A – Question No. 1 to 18 are multiple choice (MCQ) type questions carrying 1 mark each.

(iv) In Section B – Question No. 19 to 25 are very short answer (VSA) type questions carrying 2 marks each.

(v) In Section C – Question No. 26 to 30 are short answer (SA) type questions carrying 3 marks each.

(vi) In Section D – Question No. 31 and 32 are case based questions carrying 4 marks each.

(vii) In Section E – Question No. 33 to 35 are long answer (LA) type questions carrying 5 marks each.

(viii) There is no overall choice. However an internal choice has been provided in two questions in Section B, two questions in Section C, two questions in Section D and two questions in Section E.

(ix) Use of calculators is not allowed.

## SECTION-A

Question No. 1 to 18 are multiple choice (MCQ) type questions, carrying 1 mark each. (18x1=18)

1. The deficiency of which of the following Vitamins causes pernicious anemia.

   (a) Vitamin $B_1$ (b) Vitamin $B_2$

   (c) Vitamin $B_6$ (d) Vitamin $B_{12}$

2. In comparison to 0.01 M solution of glucose, the depression in freezing point of 0.01 M $MgCl_2$ solution is

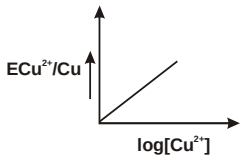
   (a) the same (b) about twice

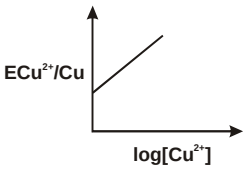
   (c) about three times (d) about six times

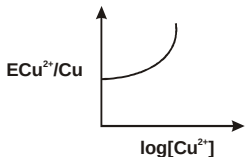
3. Electrode potential for Cu electrode varies according to the equation.

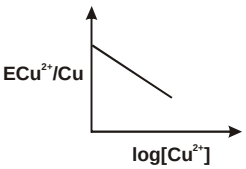
   $ECu^{2+}/Cu = E°cu^{2+/cu} - \frac{0.0591}{2} \log \frac{1}{[Cu^{2+}]}$

   The graph of E $cu^{2+/cu}$ vs log $[cu^{2+}]$ is

   (a) 


   (b) 


   (b) 


   (d) 


4. For a first order reaction, the time taken to reduce the initial concentration by a factor of $\frac{1}{4}$th is 20 minutes. The time required to reduce initial concentration by a factor of $\frac{1}{16}$th is

   (a) 20 min (b) 10 min

   (c) 80 min (d) 40 min

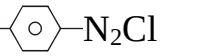
5. Glucose on treatment with sodium amalgam gives.

   (a) n-heptanoic acid (b) Sorbitol

   (c) Gluconic acid (d) Glucaric acid

6. The reaction of chloroform with alcoholic KOH and p-toluidine forms.

(a)  (b) 

(c)  (d) 

7. When 1mol $CrCl_3.6H_2O$ is treated with excess of $AgNO_3$, 3 mol of AgCl are obtained. The Formula of Complex is

(a) $[CrCl_3(H_2O)_3].3H_2O$ (b) $[CrCl_3(H_2O)_4]Cl.2H_2O$

(c) $[CrCl(H_2O)_5]Cl_2.H_2O$ (d) $[Cr\ (H_2O)_6]Cl_3$

8. Monochlorination of toluene in sunlight followed by hydrolysis with aqueous NaOH yield.

(a) o-cresol (b) m-cresol

(c) 2,4 – dihydroxy toluene (d) Benzyl alcohol

9. At PH=11, $Cr_2O_7^{2-}$ ion changes to

(a) $CrO_3$ (b) $CrO_4^{2-}$

(c) $Cr^{3+}$ (d) $CrO_2^{2+}$

10. Ethanol on warming with Conc $H_2SO_4$ at 413 K gives

(a) Ethene (b) Diethyl ether

(c) Dimethyl ether (d) Ethyl hydrogen sulphate

11. Which of the following compound will dissolve in an alkali solution after it undergoes reaction with Hinsberg's reagent.

(a) $CH_3\ NH_2$ (b) $(CH_3)_2\ NH$

(c) $C_6H_5NHC_6H_5$ (d) $(CH_3)_3\ N$

12. The end product in the following sequence is

$$\text{phenol} \xrightarrow{NaOH} A \xrightarrow[140°C]{CO_2} B \xrightarrow{H^+/H_2O} C \xrightarrow{(CH_3CO)_2O} D$$

(a) Salicylic Acid (b) Salicylaldehyde

(c) Phenyl acetate (d) Aspirin

13. Aniline on oxidation with $Na_2Cr_2O_7$ and $H_2SO_4$ gives

(a) Benzoic acid (b) m-amino benzoic acid

(c) Schiff's base (d) p-Benzoquinone

14. We are having three aqueous solutions of $K_2SO_4$ labelled as 'X', 'Y' and 'Z' with the concentration of 0.001M, 0.01 M, 0.1 M respectively. The value of Van't Hoff factor for these solutions will be in the order.

(a) $i_x < i_y < i_z$ (b) $i_x > i_y > i_z$

(c) $i_x = i_y = i_z$ (d) $i_x < i_y > i_z$

For Questions 15 to 18 two statements are given-one labeled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(a) Both Assertion (A) and Reason (R) are true and the Reason (R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of the Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

15. Assertion (A): For $CH_3COOH$ the Molar conductance of 0.1 M $CH_3COOH$ and equivalent conductance of 0.1 N $CH_3COOH$ is same.

Reason (R): These do not depend upon concentration.

16. Assertion (A): For an exothermic reaction activation energy for the backward reaction is more than the activation energy of the forward reaction.

Reason (R): If the activation energy is high, the reaction is slow.

17. Assertion (A): Lanthanoids show a limited number of oxidation states where as Actinoids show a large number of oxidation states.

Reason (R): Energy gap between 4f, 5d and 6s subshell is small where as that between 5f, 6d and 7s subshell in large.

18. Assertion (A): Aniline is more basic than ethylamine.

Reason (R): The lone pair on N atom is present in Conjugation with benzene ring and becomes less available for protonation because of resonance.

## SECTION-B

19. Account for the following:-

(a) Aniline does not undergo Friedal craft reaction.

(b) Methylamine is water reacts with ferric chloride to precipitate hydrated ferric oxide. (2x1=2)

20. Among the isomeric alkanes of molecular formula $C_5H_{12}$, identify the one which on photochemical chlorination yields

(a) a single monochloride

(b) four isomeric monochlorides (2x1=2)

OR

Explain:

(a) Why Grignard reagent should be prepared under anhydrous conditions.

(b) Why the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride. (2x1=2)

21. (a) Give one structural difference between amylase and amylopectin.

(b) What type of bonding helps in stabilising the $\propto$-helix structure of proteins. (2x1=2)

22. Draw all the isomers (geometrical and optical) of $[COCl_2(en)_2]^+$ (2)

23. How many electrons flow through a metallic wire if a current of 0.5A is passed for 4 hours. (2)

24. (a) Explain the following through example

(i) Azeotropic mixture

(ii) Isotonic solutions (2x1=2)

OR

(b) Derive relationship between mole fraction and vapour pressure of components of an ideal solution in liquid phase and vapour phase. (2)

25. What is the effect of adding a catalyst on

(i) Activation Energy (Ea) of the reaction

(ii) Gibbs free energy ($\Delta G$) of the reaction. (2x1=2)

## SECTION-C

26. Define the following as related to protein

(a) Peptide linkage

(b) Denaturation

(c) Primary structure (3x1=3)

OR

How do you explain the amphoteric behaviour of amino acid. (3)

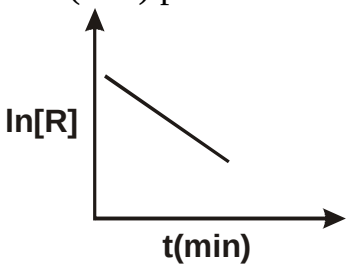
27. Give equations of the following reactions.

(a) Oxidation of propano1 with alkaline $KMnO_4$ solution

(b) Bromine in $CS_2$ with phenol

(c) Propanone with methyl magnesium bromide. (3x1=3)

28. For a certain chemical reaction, variation in the concentration, ln[R] vs time(min) plot is shown below.




For this reaction

(a) What is the order of reaction?

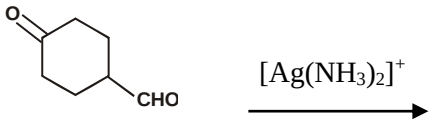
(b) What are the units of rate constant K for this reaction?

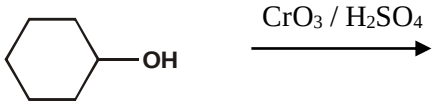
(c) Give the relationship between K and t½ of this reaction. (3x1=3)

29. Two elements A and B form compounds having formula $AB_2$ and $AB_4$ when dissolved in 20gm of benzene ($C_6H_6$), 1 gm of $AB_2$ lowers the freezing point by 2.3K where as 1.0 gm of $AB_4$ lowers it by 1.3K. The molal depression constant for benzene is 5.1Kkg./mol. Calculate atomic masses of A and B.(3)

30. Write the product of the following reactions:-

(a) $C_6H_5CHO \xrightarrow{H_2NCONHNH_2}$

(b) 


(c) 


(3x1=3)

OR

Do the following conversions:-

(a) Ethanal to But-2-enal

(b) Benzaldehyde to 3-phenyl propan-l-ol

(c) Benzone acid to Benzaldehyde (3x1=3)

## SECTION-D

The following questions are case based questions. Read the case carefully and answer the questions that follow:-

31. One of the latest theory to explain bonding in coordination compounds is crystal field theory which consider metal ligand bond to be ionic unlike valence bond theory. It considers the effect of ligands on the relative energy of d orbitals of the central metal atom/ion. In free transition metal ion, all the d-orbitals are degenerate. However this degeneracy split in the presence of ligands which may be anions or polar molecules like $H_2O$, $NH_3$ etc. The pattern of splitting depends upon the nature of crystal field generated by the ligands around the metal ion.

Answer the following questions:-

(a) What is the crystal field splitting energy? (1)

(b) Draw crystal field splitting diagram for Octahedral field. (2)

OR

(b) The hexaaqua manganese(II) ion contains five unpaired electrons while the hexacyano ion contain only one unpaired electron. Explain using crystal field theory. (2)

(c) How does the magnitude of $\Delta o$ decide the actual configuration of d-orbital in a coordination entity. (1)

32. Alkyl halides undergo two types of nucleophillic substitution reactions $SN_1$ and $SN_2$. $SN_1$ reactions are two step reactions which proceed through the

formation of carbocation while $SN_2$ are one step reactions proceed through the formation of transition state.

Answer the following questions:-

(a) Out of $C_6H_5CH_2Cl$ and $C_6H_5CHClC_6H_5$ which is more easily hydrolysed by aqueous KOH following $SN_1$ mechanism. (1)

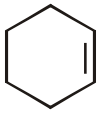
(b) Arrange the following compounds in the order of reactivity towards $SN_2$ displacement (1)

2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane

(c) Why allyl chloride is hydrolysed through $SN_1$ mechanism. (1)

(d) Why 1-Jodobutane is more reactive than 1-Chlorobutane towards nucleophilic substitution reaction. (1)

OR

(d)  $+ Br_2 \xrightarrow[\text{UV light}]{\text{heat}}$ predict the product of this reaction. (1)

## SECTION-E

33. (a) Describe the preparation of potassium dichromate from iron chromite ore. Write reactions involved in the preparation. (3)

(b) Describe the oxidizing action of potassium dichromate on

i. Iodide ion

ii. Iron (II) solution.

Write Ionic equation for the reactions. (2)

OR

(a) Describe the preparation of potassium permanganate. (2)

(b) Compare the chemistry of actinoids with that of lanthanoids with special reference to

i. Electronic Configuration

ii. Atomic and Ionic size

iii. Chemical reactivity (3)

34. (a) Write the Nernst equation and calculate emf of the following cells at 298K

$Mg(s) \mid Mg^{2+}(0.001M) \parallel Cu^{2+}(0.0001M)/Cu(s)$

$E°Mg^{2+}/Mg$ -2.36V $E°\ Cu^{2+}/Cu$ 0.34V (3)

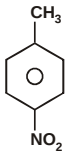
(b) Why does the conductivity of a solution decrease with dilution? (2)

OR

(a) Write the chemistry of recharging of the lead storage battery highlighting all the material that are involved during recharging. (3)

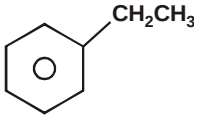
(b) Can we store copper sulphate solution in a zinc pot? (2)

35. Write the structures of product of the following reactions:-

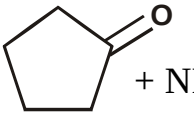
(a) 


(a) $CrO_2Cl_2$

(b) $H_3O^+$

(b) 


$\xrightarrow[KOH,\ heat]{KMnO_4}$

(c) 


$+ NH_2OH \longrightarrow$

(d) $HCHO + Conc.\ NaOH \longrightarrow$

(e) $CH_3CHO + CH_3CH_2CHO \xrightarrow[NaOH]{Dil}$ (5x1=5)

OR

(a) Give chemical test to distinguish between phenol and benzoic acid. (1)

(b) Out of acetaldehyde and acetone which is more reactive towards nucleophillic addition reaction and why? (1)

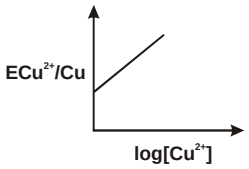
(c) An organic compound with the molecular formula $C_9H_{10}O$ forms $2_1$4-DNP derivative, reduces tollen's reagent and undergoes eannizaro reaction. On vigorous oxidation it gives 1,2-benzene dicarboxylic acid. Identify the compound. Write the reactions involved. (3)

**Marking Scheme**

**Sample Paper (2023-24) CHEM-856 Class: 12th**

## SECTION-A

1. (d) Vitamin $B_{12}$ (1)
2. (c) About three times (1)
3. (b) (1)




4. (d) 40 min (1)
5. (b) Sorbitol (1)
6. (a) $CH_3$—⬡—NC (1)
7. (d) $[Cr(H_2O)_6]Cl_3$ (1)
8. (d) Benzyl alcohol (1)
9. (b) $CrO_4^{2-}$ (1)
10. (b) Diethyl ether (1)
11. (a) $CH_3NH_2$ (1)
12. (d) Aspirin (1)
13. (d) P-Benzoquinone (1)
14. (c) $i_x = i_y = i_z$ (1)
15. (c) Assertion (A) True, Reason (R) False (1)
16. (b) Assertion (A) True, Reason(R) True (1)
    But Reason(R) not true explanation
17. (c) Assertion (A) True, Reason (R) False (1)
18. (d) Assertion (A) False, Reason (R) True (1)

## SECTION-B

19. (a) Aniline being lewis base react with Anhydrous $AlCl_3$ which is lewis acid to form salt. (1)

(b) Methylamine accept proton from water and liberate $OH^-$ ion which combine with $Fe^{3+}$ ion to form hydrated ferric oxide $Fe(OH)_3$ or (1)

$Fe_2O_3.3H_2O$

20. (a) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3$ or 2,2-dimethyl propane (1)

(b) $CH_3-\underset{\displaystyle CH_3}{\overset{|}{CH}}-CH_2-CH3$ or 2-methyl butane (1)

OR

(a) Because Grignard reagent reacts with moisture and form Alkane. (1)

(b) C-Cl bond in chloro benzene acquire some double bond character due to delocalization of ions pair on chlorine so bond length decreases

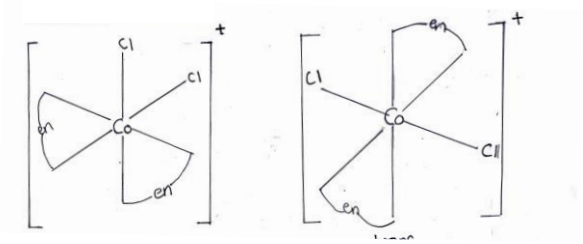
OR

any other relevant answer. (1)

21. (a) amylose is water soluble linear polymer of ∝-D glucose whereas amylopectin is water insoluble branched ($C_1$-$C_6$) glycosidic linkage carrying branched polymer. (1)

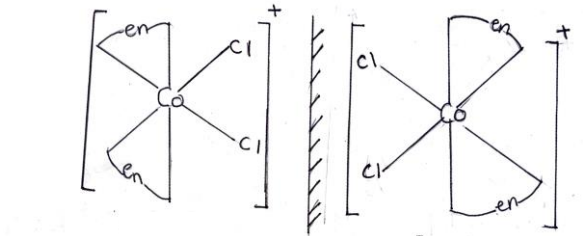
(b) Intra molecular H-Bonding (1)

22. Geometrical Isomers (1)




Cis Trans

Optical isomers (1)




dextro(+) laevo(-)

23. Q =I x t

= 0.5 x 4 x 60 x 60
= 20x360

= 7200C (1)

96500 corresponds to 6.02 x $10^{23}$ $e^-$

7200 C gives = $\frac{6.02x10^{23}}{96500}$ x 7200

= 4.49 x $10^{22}$ $e^-$ (1)

24.(a)(i) Azeotropic mixture is type of liquid mixture having definite composition and boiling like a pure liquid (½)

eg. 95.37% $C_2H_5OH$ + 4.63% $H_2O$ (½)

OR

Any other relevant example

(ii) Solutions which have the same osmotic pressure at same temperature (½)

eg. 0.9% solution of pure NaCl is isotonic with RBC (½)

OR

Any other relevant example

OR

(b) If we have two completely miscible volatile liquid A and B having mole fraction $x_A$ and $x_B$ Then at certain temperature partial pressures $P_A$ and $P_B$ and vapour pressure in pure state PA° and PB° are expressed as

$P_A=P_A°.x_A$

$P_B=P_B°.x_B$

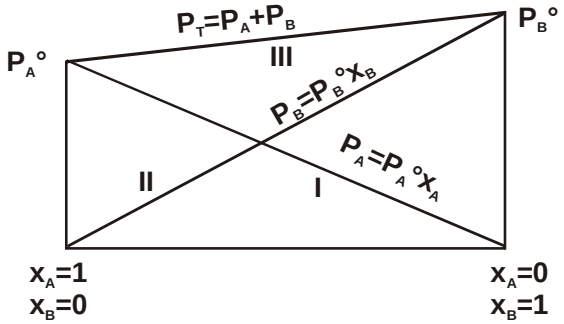
$P_T=P_A+P_B$ (½)

$P_T=P_A°.x_A+ P_B°.x_B$

$P_T=P_A°(1-x_B)+P_B°x_B$

when $x_A=1$ $P_T= P_A°.x_A$

when $x_B=1$ $P_T=P_B°x_B$ (½)




(½)

$y_A=\frac{P_A}{P_T}$ $y_B=1-y_A$ (½)

25. (i) Ea decrease (1)
(ii) No effect on $\Delta G$ (1)

## SECTION-C

26. (a) It is the amide linkage present between – COOH group of one ∝ amino acid and $NH_2$ group of other amino acid. (1)

(b) When protein in native form is subjected to physical changes like change in temperature or pH then hydrogen bonds are broken, it looses its biological activity and all structures are destroyed and only primary structure remain intact. (1)

(c) It is the sequence in which various ∝-amino acids present in a protein are linked to one another. (1)

OR

Amino acids contain acidic and basic group within same molecule. In aqueous solution they neutralize each other, carboxyl group loses a proton and amino group accept it. (1)

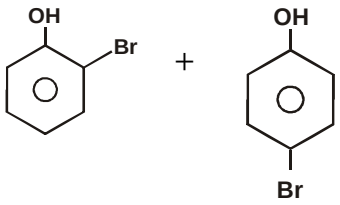
$NH_2$-CH(R)-COOH → $NH_3^+$-CH(R)-$COO^-$

(Zwitter ion)

$NH_3^+$-CH(R)-COOH $\underset{OH^-}{\overset{H^+}{\rightleftharpoons}}$ $NH_3^+$-CH(R)-$COO^-$ $\underset{H^+}{\overset{OH^-}{\rightleftharpoons}}$ $NH_2$-CH(R)-$COO^-$ (1)

$NH_3^+$ group act as acid — Amphoteric react with acid and base — $COO^-$ group act as base (1)

27.(a) $CH_3CH_2COOH$ (1)

(b)  (1)

(c) $CH_3\text{-}\underset{\underset{O}{||}}{C}\text{-}CH_3 + CH_3MgBr \rightarrow CH_3\text{-}\underset{\underset{CH_3}{|}}{\overset{\overset{OMgBr}{|}}{C}}\text{-}CH_3 \xrightarrow{H^+ / H_2O} CH_3\text{-}\underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}}\text{-}CH_3$ (1)

28.(a) 1st order (1)

(b) $min^{-1}$ (1)

(c) $t½ = \frac{0.693}{K}$ (1)

29. For $AB_2$

$M_{AB_2} = \frac{Kf.W_B.1000}{W_A.\Delta Tf}$ (½)

$= \frac{5.1\ x\ 1\ x\ 1000}{20\ x\ 2.3}$

$= 110.87u$ (½)

$M_{AB_4} = \frac{5.1\ x\ 1\ x\ 1000}{20\ x\ 1.3}$

$= 196.5u$

Atomic mass of A=a and Atomic mass of B is b

$\therefore$ a+2b = 110.87 (i) (1)

a+4b = 19.65 (ii)

(ii) – (i)

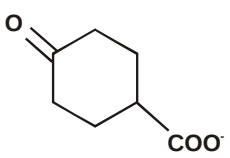
196.5 – 110.87 = a+46 – a-2b

85.28 = 2b (1)

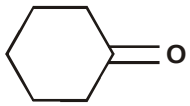
b = 42.64u

a+2b=110.87
a+2x42.64=110.87
∴ a = 110.8→ - 8528
= 25.29u
i.e. atomic mass of A = 25.59 u
atomic mass of B = 42.64 u

30.(a) $C_6H_5CH=N\ NHCONH_2$ (1)

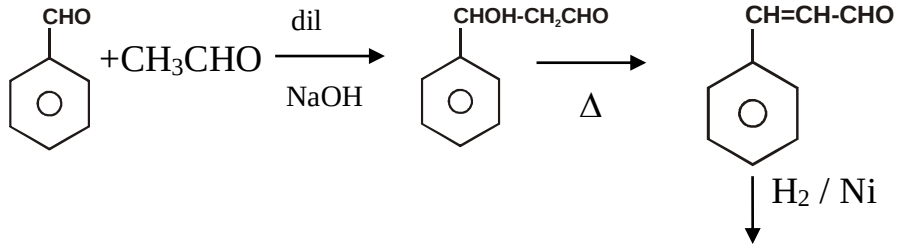
(b) 

4- Oxocyclohexane (1)
Carboxylate anion (1)

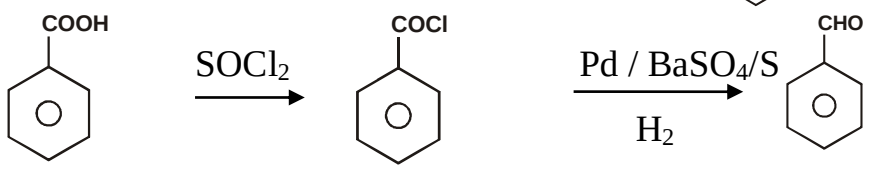
(c) 


OR

(a) $2CH_3CHO \xrightarrow{OH^-} CH_3\text{-}CH(OH)\text{-}CH_2\text{-}CHO \xrightarrow{\Delta} CH_3\text{-}CH=CH\text{-}CHO$ (1)

(b) 

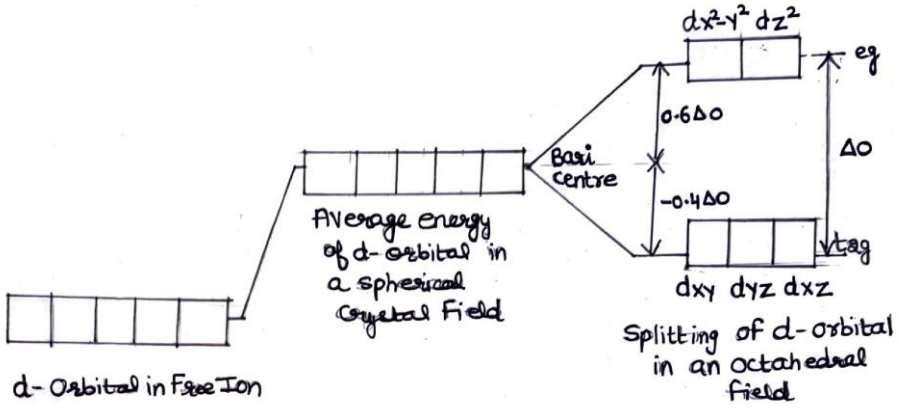
(1)

(c) 

(1)

31.(a) The difference of energy between the two sets of a orbitals is called as crystal field splitting energy. (1)

(b)




(2)

OR

$Mn^{2+}=4s^\circ\ 3d^5$

$H_2O$ being weak ligand, don't cause pairing 5 unpaired e (1)

$\therefore t_2g^3\ eg^2$

$CN^-$ strong ligand, cause pairing so there is 1 unpaired $e^-$ (1)

i.e. $t_2g^5\ eg^\circ$

(c) $\Delta_O > P$ pairing occurs (1)

$\Delta_O < P$ No pairing occurs

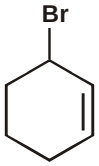
32. (a) $C_6H_5CHClC_6H_5$ (1)

(b) 1-Bromo pentane>2-Bromopentane>2-Bromo-2-methylbutane (1)

(c) Allylic carbocation is stable (1)

(d) $I^-$ is better leaving group than $Cl^-$ (1)

OR

(d) 

Allylic substitution (1)

33.(a) (i) $4\ FeOCr_2O_3 + 8\ Na_2CO_3 + 7O_2 \rightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8CO_2$ (1)

(ii) $2Na_2CrO_4 + H_2SO_4 \rightarrow Na_2Cr_2O_7 + Na_2SO_4 + H_2O$ (1)
(Conc)

(iii) $Na_2Cr_2O_7 + 2KCl \rightarrow K_2Cr_2O_7 + 2NaCl$ (1)

(b) (i) $Cr_2O^{2-}_7 + 14H^+ + 6I^- \rightarrow 2Cr^{3+} + 7H_2O + 3I_2$ (1)

(ii) $Cr_2O^{2-}_7 + 6Fe^{2+} + 14H^+ \rightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$ (1)

OR

(a)(i) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ (1)

(ii) $2K_2MnO_4 + Cl_2 \rightarrow 2KMnO_4 + 2KCl$ (1)

OR

any other relevant answer.

| (b) Lanthanoids | Actinoids | |
|---|---|---|
| (i) Electronic Configuration $[xe]4f^{1-14}5d^{0-1}6s^2$ | $[Rn]\ 5f^{1-14}\ 6d^{0-1}7s^2$ | (1) |
| (ii) Regular decrease in size from left to right known as lanthanoid contraction | Regular decrease in size from left to right is known as Actinoid contraction | (1) |
| (iii) ⇒Lanthanoids react with dilute acid to liberate $H_2$ gas | ⇒ Actinoids are highly reactive in divided state | |
| ⇒ Form oxide and hydroxides of type $M_2O_3$ / $M(OH)_3$ | ⇒ React with boiling water to give mixture of oxide and hydride | |
| ⇒ With C form carbides | ⇒ Attacked by HCl but the effect of $HNO_3$ is very small. | |
| ⇒ With halogen form halides | ⇒ No action of alkalies | |

OR

any other relevant difference

34.(a) $E°cell = E°cathode - E°Anode$

$= E°Cu^{2+}/Cu - E°Mg^{2+}/Mg$

$= 0.34 - (-2.36)$ (½)

$= 2.70V$

$Mg_{(s)} + Cu^{2+} \longrightarrow Mg^{2+} + Cu_{(s)}$

(0.0001M) (0.001M)

$Ecell = E°cell - \frac{0.0591}{2} \log \frac{[Mg^{2+}]}{[Cu^{2+}]}$

$= 2.70 - \frac{0.0591}{2} \log \frac{0.001]}{0.0001}$

= 2.70 – 0.0295 log 10 (1)
= 2.70 – 0.0295 x 1
= 2.6705V

(b) Because the number of ions per unit volume decreases. (2)

OR

(a) (i) During recharging, cell is operated like electrolytic cell.

(ii) Electrical energy is supplied to it from external source.
(iii) Electrode reactions are reverse of that of discharging. (1)
(iv) At cathode (Reduction) (1)

$PbSO_4(s) + 2e^- \longrightarrow Pb(s) + SO_4^{2-}(aq)$

At Anode (oxidation)

$PbSO_4(s) + 2H_2O \longrightarrow PbO_2(s) + SO_4^{2-}(aq) + 4H^+ + 2e^-$

Overall reaction

$2PbSO_4 + 2H_2O \longrightarrow Pb(s) + PbO_2(s) + 4H(aq)^+ + 2SO_4^{2-}(aq)$ (1)

(b) E° $Zn^{2+}/Zn$ = -0.76V

E° $Cu^{2+}/Cu$=0.34V

$Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$

Red

$Zn(s) + Cu^{2+} \longrightarrow Zn^{2+} + Cu(s)$

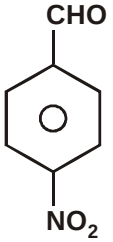
oxid

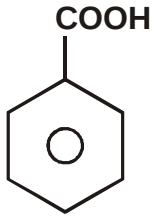
E°cell=0.34 – (-0.76)

= 1.10V

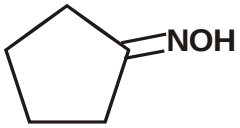
(c) E°cell +ve means reaction is spontaneous and in this reaction zinc is oxidised ∴ we can't store $CuSO_4$ in zinc pot. (2)

35. (a) (1)



(b) 

(1)

(c) 

(1)

(d) $HCHO + HCHO \xrightarrow[NaOH]{conc} CH_3OH + HCOONa$ (1)

(e) $CH_3\,CHOH\text{-}CH(CH_3)\text{-}CHO \xrightarrow[-H_2O]{\Delta} CH_3CH{=}\,C(CH_3)\text{-}CHO$ (1)

OR

(a) Phenol gives violet colouration with neutral $FeCl_3$ solution but benzoic acid does not. (1)

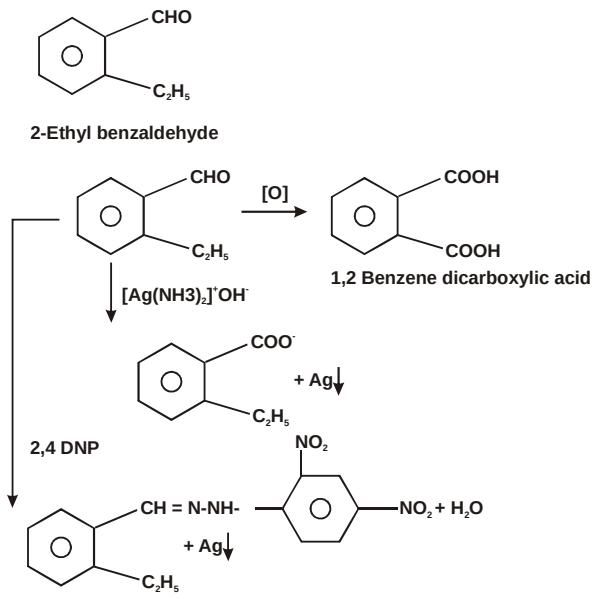
OR

any other relevant test

(b) Acetaldehyde is more reactive towards nucleophillic addition reaction because of stearic hindrance in acetone. (1)

(c)

(1)



(1)