



MOTION

18 YEARS OF LEGACY

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CHEMISTRY PAPER - 3

SAMPLE QUESTION PAPERS

CBSE CLASS 12th

Class XII Session 2025-26

Subject - Chemistry

Sample Question Paper - 3

Time Allowed: 3 hours

Maximum Marks: 70

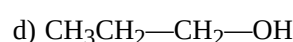
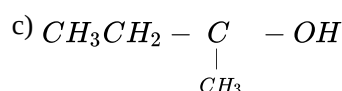
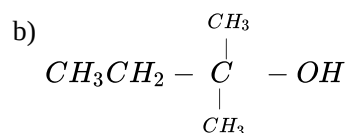
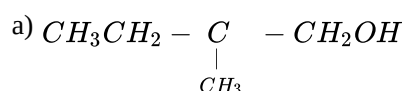
General Instructions:

Read the following instructions carefully.

1. There are **33** questions in this question paper with internal choice.
2. SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 5 very short answer questions carrying 2 marks each.
4. SECTION C consists of 7 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 case-based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. **All questions are compulsory.**
8. **Use of log tables and calculators is not allowed.**

Section A

1. Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature? [1]



2. Progesterone is responsible for [1]

a) development of secondary male characteristics.

b) development of secondary female characteristics.

c) controlling menstrual cycle.

d) preparing the uterus for implantation of fertilised egg.

3. Alcoholic compounds react: [1]

a) both as nucleophiles and electrophiles.

b) None of these

c) only as electrophiles.

d) only as nucleophiles.

4. The following reaction is: [1]



a) Wolff – Kishner reduction

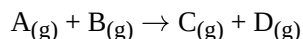
b) catalytic hydrogenation

c) Clemens reduction

d) catalytic ionisation

5. The following experimental rate data were obtained for a reaction carried out at 25°C:

[1]



Initial $[A_{(g)}]/\text{mol dm}^{-3}$	Initial $[B_{(g)}]/\text{mol dm}^{-3}$	Initial rate/ $\text{mol dm}^{-3}\text{s}^{-1}$
3.0×10^{-2}	2.0×10^{-2}	1.89×10^{-4}
3.0×10^{-2}	4.0×10^{-2}	1.89×10^{-4}
6.0×10^{-2}	4.0×10^{-2}	7.56×10^{-4}

What are the orders with respect to $A_{(g)}$ and $B_{(g)}$?

a) Order with respect to $A_{(g)}$ - Zerob) Order with respect to $A_{(g)}$ - FirstOrder with respect to $B_{(g)}$ - SecondOrder with respect to $B_{(g)}$ - Zeroc) Order with respect to $A_{(g)}$ - Secondd) Order with respect to $A_{(g)}$ - SecondOrder with respect to $B_{(g)}$ - FirstOrder with respect to $B_{(g)}$ - Zero

6. Match the item given in Column I with expression given in Column II.

[1]

Column I	Column II
(a) Osmotic Pressure	(i) $p = K_H \cdot \chi_B$
(b) Relative lowering of vapour pressure	(ii) $\frac{\Delta P}{P_A^0} = \chi_B$
(c) Henry Law	(iii) $\Delta T_b = K_b \cdot m$
(d) Elevation in boiling point	(iv) $p = iCRT$

a) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i).

b) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv).

c) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i).

d) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii).

7. Chlorine reacts with cold and dilute NaOH to give

[1]

a) NaClO and NaClO₃

b) NaCl and NaClO

c) NaCl and NaClO₃d) NaCl and NaClO₄

8. Which forms protective and non-corrosive oxide layer?

[1]

a) Ni

b) Cu

c) Zn

d) Cr

9. If the initial concentration is reduced to $\frac{1}{4}$ th in a zero order reaction, then the time taken for half the reaction to complete:

[1]

a) doubles

b) remains the same

c) increases four times

d) reduces to one-fourth

10. The reagent that can be used to distinguish acetophenone and benzophenone is

[1]

a)

b)

- aqueous NaHSO_3 I_2 and NaOH
- c) Fehling solution d) 2, 4-dinitrophenyl hydrazine
11. Aspirin is obtained by the acetylation of which of the following compounds? [1]
- a) Phenol b) Acetyl salicylic acid
- c) Salicylaldehyde d) Salicylic acid
12. Aniline upon heating with conc. HNO_3 and conc. H_2SO_4 mixture gives: [1]
- a) o-and p-nitroaniline b) No reaction
- c) The mixture of o, p, and m nitroaniline: d) o-nitroaniline
13. **Assertion (A):** Primary structure of proteins gives an idea about the conformation of the molecule. [1]
Reason (R): The differences in chemical and biological properties of various proteins arise due to the difference in primary structure.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.
14. **Assertion:** p- $\text{O}_2\text{N} - \text{C}_6\text{H}_5\text{COCH}_3$ is prepared by Friedel Crafts acylation of nitrobenzene. [1]
Reason: Nitrobenzene easily undergoes electrophilic substitution reaction.
- a) If both Assertion & Reason are true and the reason is the correct explanation of the assertion. b) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion.
- c) If Assertion is true statement but Reason is false. d) If both Assertion and Reason are false statements.
15. **Assertion (A):** Chlorobenzene is resistant to electrophilic substitution reaction. [1]
Reason (R): C-Cl bond in chlorobenzene acquires partial double bond characters due to resonance.
- a) Both (A) and (R) are true and (R) is the correct explanation of (A). b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- c) (A) is true, but (R) is false. d) (A) is false, but (R) is true.
16. **Assertion (A):** The pK_a of $\text{O}_2\text{N}-\text{CH}_2-\text{COOH}$ is lower than that of CH_3-COOH . [1]
Reason (R): $-\text{NO}_2$ group shows electron withdrawing effect which increases the acidic character of $\text{O}_2\text{N}-\text{CH}_2-\text{COOH}$.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false. d) A is false but R is true.

Section B

17. 45 g of ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$) is mixed with 600 g of water. Calculate [2]
- i. the freezing point depression and
- ii. the freezing point of the solution.

OR

Why is osmotic pressure of 1 M KCl higher than that of 1 M urea solution?

18. a. On the basis of crystal field theory write the electronic configuration for d^5 ion with a strong field ligand for which $\Delta_0 > P$. [2]
 b. $[\text{Ni}(\text{CO})_4]$ has tetrahedral geometry while $[\text{Ni}(\text{CN})_4]^{2-}$ has square planar yet both exhibit diamagnetism. Explain. [2]
 [Atomic number : Ni = 28]
 19. Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with oxalic acid? Write the ionic equations for the reactions. [2]
 20. **Answer the following:** [2]
 (a) For which reaction, the rate of reaction does not decrease with time? [1]
 (b) For a reaction $A + B \rightarrow \text{Products}$, the rate law is - Rate = $k[A][B]^{3/2}$ Can the reaction be an elementary reaction? Explain. [1]
 21. Illustrate the Clemmensen reduction reaction giving a suitable example. [2]

Section C

22. In the button cell, widely used in watches, the following reaction takes place [3]

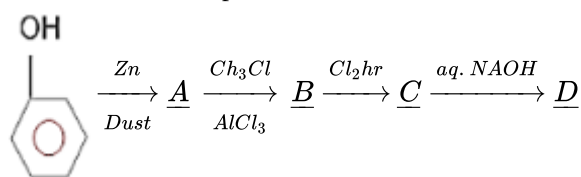
$$\text{Zn}(s) + \text{Ag}_2\text{O}(s) + \text{H}_2\text{O}(l) \rightarrow \text{Zn}^{2+}(aq) + 2\text{Ag}(s) + 2\text{OH}^-(aq)$$
 Given that $E^\ominus_{(\text{Ag}^+/\text{Ag})} = 0.80\text{V}$, $E^\ominus_{(\text{Zn}^{2+}/\text{Zn})} = -0.76\text{V}$
 Calculate standard emf and standard free Gibbs energy of the cell.
 23. For a reaction, [3]

$$2\text{NH}_3(g) \xrightarrow{\text{Pt}} \text{N}_2(g) + 3\text{H}_2(g)$$

 Rate = k
 i. Write the order and molecularity of this reaction.
 ii. Write the unit of k .
 24. Explain why is ortho nitrophenol more acidic than ortho methoxyphenol? [3]

OR

What will come in place of A, B, C and D. In the following reaction



25. Two moles of compound (A) on treatment with a strong base gives two compounds (B) and (C). The compound (B) on dehydrogenation with Cu gives (A) while acidification of (C) gives carboxylic acid (D) having molecular formula CH_2O_2 . Identify (A) to (D). [3]
 26. Write the Nernst equation and calculate the emf of the following cell at 298 K: [3]
 $\text{Zn} | \text{Zn}^{2+} (0.001\text{ M}) || \text{H}^+ (0.01\text{ M}) | \text{H}_2 (g) (1\text{ bar}) | \text{Pt} (s)$
 Given : $E^\ominus_{\text{Zn}^{2+}/\text{Zn}} = -0.76\text{V}$
 $E^\ominus_{\text{H}^+/\text{H}_2} = 0.00\text{V}$
 $[\log 10 = 1]$
 27. How can you convert the following? [3]
 i. But-1-ene to 1-iodobutane
 ii. Benzene to acetophenone

iii. Ethanol to propanenitrile

28. A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. [3]
What mass of Ni is deposited at the cathode?

Section D

29. Read the following text carefully and answer the questions that follow: [4]

The actinoids include the fourteen elements from Th to Lr. The actinoids are radioactive elements and the earlier members have relatively long half-lives, the latter ones have half-life values ranging from a day to 3 minutes for lawrencium. The latter members could be prepared only in nanogram quantities. Actinoids show a greater range of oxidation states. The elements, in the first half of the series frequently exhibit higher oxidation states. The actinoids resemble the lanthanoids in having more compounds in +3 state than in the +4 state. All the actinoids are believed to have the electronic configuration of $7s^2$ and variable occupancy of the 5f and 6d subshells. The magnetic properties of the actinoids are more complex than those of the lanthanoids. The variation in the magnetic susceptibility of the actinoids with the number of unpaired 5f electrons is roughly parallel to the corresponding results for the lanthanoid.

- Actinoid contraction is greater from element to element than lanthanoid contraction. Why? (1)
- Actinoids show irregularities in their electronic configuration. Justify? (1)
- The actinoid metals are all silvery in appearance but display a variety of structures than lanthanoid give reason. (2)

OR

The magnetic properties of the actinoids are more complex than those of the lanthanoids. Why? (2)

30. Read the following text carefully and answer the questions that follow: [4]

Aariv Sharma is very fond of a special drink made by his grandmother using different fruits available in their hometown. It has an outstanding taste and also provide great health benefits of natural fruits. He thought of utilizing his grandmother recipe to create a new product in the beverage market that provide health benefits and also contain fizziness of various soft drinks available in the market.

- How he can add fizz to the special drink made by his grandmother? (1)
- What is the law stated in the chapter that can help Aariv to make his drink fizzy? (1)
- What precautions he should take while bottling so that his product does not lose fizz during storage and handling across long distances? (2)

OR

The mole fraction of helium in a saturated solution at 20°C is 1.2×10^{-6} . Find the pressure of helium above the solution. Given Henry's constant at 20°C is 144.97 kbar. (2)

Section E

31. Attempt any five of the following: [5]

- What happens when D-glucose is treated with the following? Give equations to support your answer. [1]
 - HI
 - HNO_3
- Give one example each for water-soluble vitamins and fat-soluble vitamins. [1]
- Write the reactions of glucose with: [1]
 - $\text{H}_2\text{N} - \text{OH}$
 - Br_2 water

- (d) i. Name any two bases which are common to both DNA and RNA. [1]
 ii. Which vitamin deficiency causes:
 1. Bone deformities in children?
 2. Pernicious anaemia?

(e) What is the basic structural difference between glucose and fructose? [1]

(f) Give the reaction of glucose with acetic anhydride. Presence of which group is confirmed by this reaction? [1]

(g) Define denaturation of protein. What is the effect of denaturation on the structure of protein? [1]

32. i. Ratio of $[Ar(NH_3)_2]^+$ and $[Ar^+]$ in 0.1 M NH_3 solution. [5]
 ii. Ratio of $[Ag(S_2O_3)_2]^{3-}$ and $[Ag^+]$ in 0.1 M $S_2O_3^{2-}$ solution Given that the stability/ formation constant (k_f) for $[Ag(NH_3)_2]^+$ and $[Ag(S_2O_3)_2]^{3-}$ are 1.7×10^7 and 1.0×10^{13} respectively.

OR

Write the formulas for the following coordination compounds:

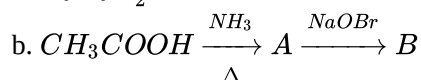
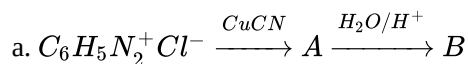
- Tetraammineaquachloridocobalt(III) chloride
- Potassium tetrahydroxidozincate(II)
- Potassium trioxalatoaluminate(III)
- Dichloridobis(ethane-1, 2-diamine)cobalt(III)
- Tetracarbonylnickel(0)

33. Giving an example for each describe the following reactions : [5]

- Hofmann bromamide reaction.
- Gattermann reaction.
- Coupling reaction.

OR

- i. Write the structures of A and B in the following reactions:

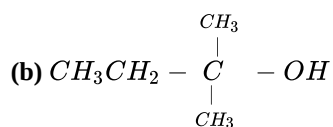


- Write the chemical reaction of methyl amine with benzoyl chloride and write the IUPAC name of the product obtained.
- Arrange the following in the increasing order of their pK_b values: $C_6H_5NH_2$, NH_3 , $C_2H_5NH_2$, $(C_2H_5)_2NH$

Solution

Section A

1.



Explanation:

Alkyl halides can be obtained by treating alcohol with haloacids. The reactivity of tertiary alcohols with the haloacids is the highest and primary alcohols are the lowest. Formation of alkyl chloride using primary and secondary alcohols requires the usage of a catalyst ZnCl_2 , where dry hydrogen chloride gas is passed through a solution of alcohol or by heating a mixture of alcohol and concentrated aqueous halogen acid. Reaction with tertiary alcohols does not require a catalyst and can be carried out by using tertiary alcohols. the reaction is conducted by simply shaking with concentrated HCl at room temperature.

2.

(d) preparing the uterus for implantation of fertilised egg.

Explanation:

The combination of ovum and sperm forms the fertilized egg which further gets implanted in the uterus. This is brought about by the hormone progesterone which prepares uterus for this process.

3. (a) both as nucleophiles and electrophiles.

Explanation:

Alcohols as nucleophile: The bond between O-H is broken when alcohol react as nucleophiles.

Alcohols as electrophile : The bond between C-O is broken when alcohol reacts as electrophiles

4. (a) Wolff – Kishner reduction

Explanation:

This is Wolff Kishner reduction of Carbonyls to alkanes. Wolff kishner reaction uses hydrazine ($\text{NH}_2\text{-NH}_2$) and conc base like NaOH or KOH for reduction of carbonyl to alkanes.

5.

(d) Order with respect to $A_{(g)}$ - Second

Order with respect to $B_{(g)}$ - Zero

Explanation:

Order with respect to $A_{(g)}$ - Second

Order with respect to $B_{(g)}$ - Zero

6.

(d) (a) - (iv), (b) - (ii), (c) - (i), (d) - (iii).

Explanation:

(a) - (iv), (b) - (ii), (c) - (i), (d) - (iii).

7.

(b) NaCl and NaClO

Explanation:

Chlorine reacts with cold and dilute NaOH to produce a mixture of sodium chloride (NaCl) and sodium hypochloride (NaOCl).



8.
(d) Cr
Explanation:
Oxygen combines with chromium to create a protective film of chromium oxide (Cr_2O_3) on the surface.
9.
(d) reduces to one-fourth
Explanation:
For a zero order reaction, reduce to one-fourth
10.
(b) I_2 and NaOH
Explanation:
 I_2 and NaOH
11.
(d) Salicylic acid
Explanation:
Salicylic acid
12.
(c) The mixture of o, p, and m nitroaniline:
Explanation:
Mixture of ortho, meta, and para nitroaniline is formed because of the formation of anilinium ion which is formed by direct nitration of aniline.
13.
(d) A is false but R is true.
Explanation:
The primary structure of a protein gives only the nature of linkages of α -amino acids in a protein chain.
14.
(d) If both Assertion and Reason are false statements.
Explanation:
In an electrophilic substitution reaction, the nitro group strongly deactivates the benzene ring. Nitrobenzene does not undergo Friedel Craft acylation reaction.
15.
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation:
Both (A) and (R) are true, but (R) is not the correct explanation of (A).
16. **(a) Both A and R are true and R is the correct explanation of A.**
Explanation:
Both A and R are true and R is the correct explanation of A.

Section B

17. Given, $W_1 = 600 \text{ g}$, $K_f = 1.86 \text{ K kg mol}^{-1}$

$W_2 = 45 \text{ g}$, $M_2 = 62.0 \text{ g mol}^{-1}$

$T_f^\circ (\text{water}) = 273 \text{ K}$

$$\begin{aligned} \text{i. } \Delta T_f &= \frac{K_f \times W_2 \times 1000}{M_2 \times W_1} \\ &= \frac{1.86 \text{ K kg mol}^{-1} \times 45 \text{ g} \times 1000}{62 \text{ g mol}^{-1} \times 600 \text{ g}} \end{aligned}$$

$$\Delta T_f = 2.25 \text{ K}$$

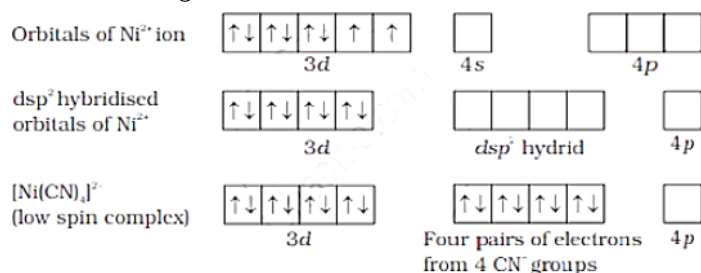
$$\text{ii. } \Delta T_f = T_f^\circ - T_f$$

$$T_f = 273 \text{ K} - 2.25 \text{ K} = 270.75 \text{ K}$$

OR

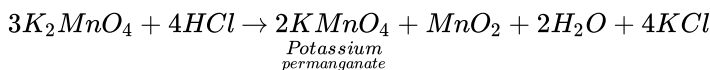
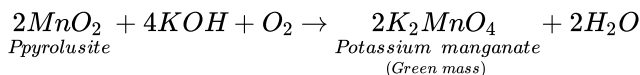
1 M KCl solution dissociates in solution to give K^+ and Cl^- ions. $\text{KCl} \rightarrow \text{K}^+ + \text{Cl}^-$ Therefore its osmotic pressure (which depends on number of solute particles) is higher than that of 1 M solutions of urea which does not dissociate or associate in solution.

18. a. If $\Delta_0 > P$, it becomes more energetically favourable for the fourth electron to occupy a t_{2g} orbital with electronic configuration $t_{2g}^5 e_g^0$. Ligands which produce this effect are known as strong field ligands and form low-spin complexes.
- b. In $[\text{Ni}(\text{CN})_4]^{2-}$, nickel is in a +2 oxidation state and the ion has the electronic configuration $3d^8$. The hybridisation scheme is shown in the diagram.

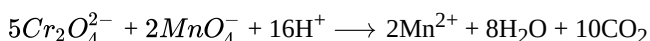


Whereas in $[\text{Ni}(\text{CO})_4]$, Ni has +2 oxidation state and shows sp^2 hybridisation due to which its geometry is tetrahedral hence diamagnetic.

19. **Preparation of KMnO_4** It is prepared by the fusion of pyrolusite ore (MnO_2) with an alkali metal hydroxide and an oxidising agent like KNO_3 . Dark green K_2MnO_4 is obtained which on disproportionation in neutral or acidic solution gives potassium permanganate.



Reaction between acidified KMnO_4 and oxalic acid: Oxalate ions or oxalic acid is oxidised.



20. Answer the following:

(i) For zero order reaction, the rate of reaction does not decrease with time because it does not depend on concentration of reactants.

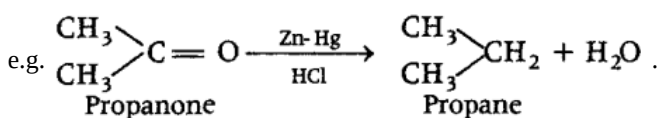
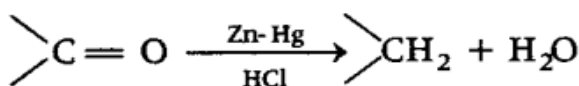
(ii) An elementary reaction is a chemical reaction in which one or more chemical species react directly to form a product.

$$\text{Rate} = k[\text{A}][\text{B}]^{3/2}$$

$$\text{Order} = 1 + \frac{3}{2} = \frac{5}{2}$$

The order of elementary reaction cannot be fractional.

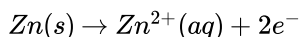
21. **Clemmensen reduction:** The carbonyl group of aldehydes and ketones is reduced to $-\text{CH}_2$ group on treatment with zinc-amalgam and concentrated hydrochloric acid. This reaction is known as Clemmensen reduction.



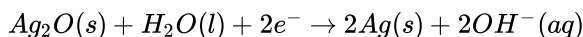
Section C

22. For the button cell, chemical reactions are:

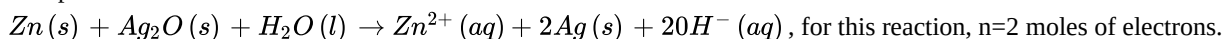
At anode:



At Cathode:



Complete reaction is:



Now,

$$E_{\text{cell}}^{\ominus} = E_{\text{Ag}^{+}/\text{Ag}}^{\ominus} - E_{\text{Zn}^{2+}/\text{Zn}}^{\ominus}$$

$$= 0.80 - (-0.76) = 1.56\text{V}$$

We know that

$$\Delta_r G^{\ominus} = -nFE_{\text{cell}}^{\ominus}$$

Here, $n = 2$

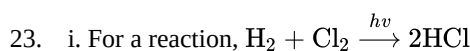
$$F = 96500 \text{ C mol}^{-1}$$

$$\Delta G^{\ominus} = -2 \times 1.56 \text{ V} \times 96000 \text{ C mol}^{-1}$$

$$= -301080 \text{ J mol}^{-1}$$

$$= -301.08 \text{ kJ mol}^{-1}$$

$$\therefore \Delta G^{\ominus} = -308.08 \text{ kJ mol}^{-1}$$



Rate = k , suggests that the reaction is of zero order. Further, the molecularity of a given reaction is 2 as two molecules are participating in the reaction.

Hence, order = zero and molecularity = two.

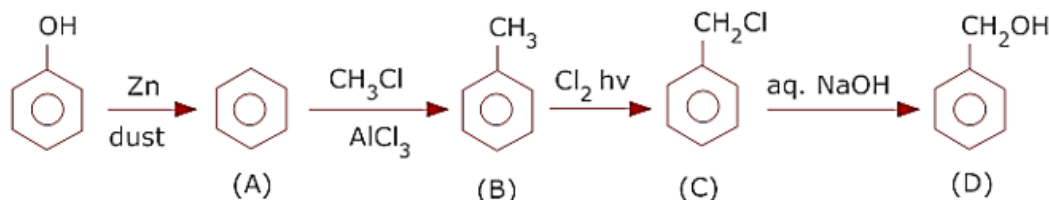
ii. The unit of k for zero order reaction is equal to the rate of a reaction which is $\text{mol L}^{-1}\text{s}^{-1}$.

Hence, the unit of k for the given reaction is $\text{mol L}^{-1}\text{s}^{-1}$.

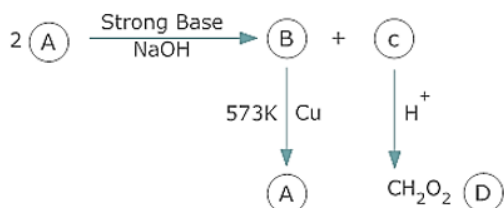
24. The nitro-group is an electron-withdrawing group. The presence of this group in the ortho position decreases the electron density in the O-H bond. As a result, it is easier to lose a proton. Also, the o-nitrophenoxide ion formed after the loss of protons is stabilized by resonance. Hence, ortho nitrophenol is a stronger acid.

On the other hand, methoxy group is an electron-releasing group. Thus, it increases the electron density in the O-H bond and hence, the proton cannot be given out easily. For this reason, ortho-nitrophenol is more acidic than ortho-methoxyphenol.

OR

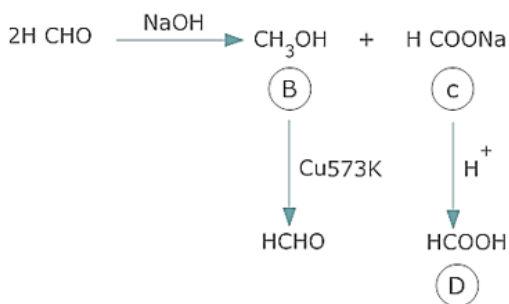


25.



Since (D) is a carboxylic acid with one carbon only, it is HCOOH. As it is obtained from (C) acidification, (C) COONa and (A) is HCHO which on treatment with strong base (NaOH) gives CH₃OH & HCOONa. This is Cannizzaro reaction in which formaldehyde undergoes self oxidation and reduction (disproportion) on treatment with concentrated alkali. The reactions are as

follows:-



$$26. E_{\text{cell}} = E_{\text{cell}}^0 - \frac{0.059}{2} \log \frac{[\text{Zn}^{2+}]}{[\text{H}^+]^2}$$

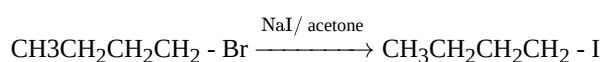
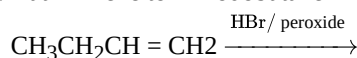
$$E_{\text{cell}}^0 = 0.0 - (-0.76) = 0.76 \text{ V}$$

$$= 0.76 - \frac{0.059}{2} \log \frac{[0.001]}{[0.01]^2}$$

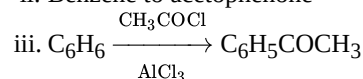
$$= 0.76 - 0.0295 \times 1$$

$$= 0.7305 \text{ V}$$

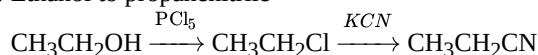
27. i. But - 1 - ene to 1 - iodobutane



ii. Benzene to acetophenone

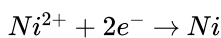


iv. Ethanol to propanenitrile



28. given that Quantity of electricity passed = $5\text{A} \times 20 \times 60\text{s}$

$$= 6000 \text{ C time} = 20 \text{ min}$$



Thus, 2 F i.e. $2 \times 96500 \text{ C}$ deposit Ni = 1 mole i.e. 58.7 g

(at mass of Ni = 58.7)

Thus 2 F i.e. $2 \times 96500 \text{ C}$ deposit Ni = 1 mole

6000 C will deposit Ni

$$= \frac{58.7}{2 \times 96500} \times 6000\text{g} = 1.825 \text{ g}$$

Section D

29. i. This is because of relatively poor shielding by 5f electrons in actinoids in comparison with shielding of 4f electrons in lanthanoids.

ii. Actinoids have irregularities in the electronic configuration because of almost equal energy of 5f, 6d and 7s orbitals.

Therefore, there are some irregularities in the filling of 5f, 6d, and 7s orbitals. The electron may enter either of these orbitals.

iii. The structural variability in actinoids is obtained due to irregularities in metallic radii which are far greater than in lanthanoids.

OR

Magnetic properties of actinoid complexes are borne by 5f open shell orbitals. These orbitals have a marked inner shell character, as in lanthanides, but interact more with the chemical environment than the 4f of lanthanides, leading to unique magnetic properties.

30. i. Carbondioxide is a gas which provide fizz and tangy flavour. He can dissolve Carbondioxide gas in the drink.

ii. Henry's law which states that solubility of a gas in liquid is directly proportional to partial pressure of the gas.

iii. Bottles should be sealed under high pressure of CO_2 and capping should be done perfectly to avoid leakage of CO_2 as any loss of partial pressure will result into decrease in solubility.

OR

$$p_{\text{He}} = K_{\text{Hx}} \times X_{\text{He}}$$

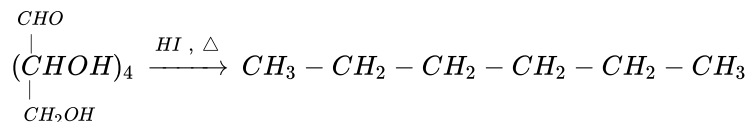
$$= (144.97 \times 10^3 \text{ bar}) (1.2 \times 10^{-6})$$

$$= 0.174 \text{ bar}$$

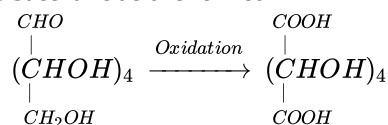
Section E

31. Attempt any five of the following:

- (i) a. n-hexane is formed



- b. Saccharic acid is formed



- (ii) Water soluble - Vitamin B / C

Fat soluble - A, D, E, K (Any one)



- (iv) i. Adenine, Guanine

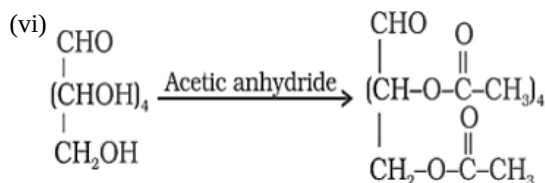
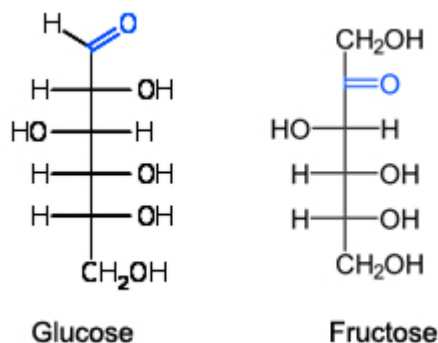
ii. 1. Vitamin D

2. Vitamin B₁₂

- (v) Glucose has aldehydic group. Glucose is called as aldose

Fructose has ketonic group. Fructose is called as ketose.

Structures:

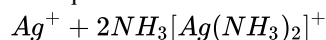


It confirms the presence of -OH groups/five -OH groups.

- (vii) When a protein is subjected to a change in temperature or chemical change then it loses its biological activity.

2^o and 3^o structures are destroyed but 1^o structure remains intact.

32. i. The equilibrium is:



∴ Stability constant,

$$K_f = \frac{[\text{Ag}(\text{NH}_3)_2]^+}{[\text{Ag}^+][\text{NH}_3]^2}$$

$$= 1.7 \times 10^7 \text{ (Given)}$$

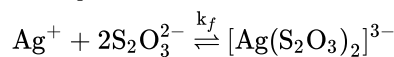
$$\text{or } \frac{[\text{Ag}(\text{NH}_3)_2]^+}{[\text{Ag}^+]}$$

$$= 1.7 \times 10^7 \times [\text{NH}_3]^2$$

$$= 1.7 \times 10^7 \times (0.1)^2$$

$$= 1.7 \times 10^5$$

ii. The equilibrium is



∴ Stability constant,

$$\therefore \frac{[\text{Ag}(\text{S}_2\text{O}_3)_2]^{3-}}{[\text{Ag}^+]} = 1.0 \times 10^{13} \times [\text{S}_2\text{O}_3^{2-}]^2 = 1.0 \times 10^{13} (0.1)^2 = 1 \times 10^{11}$$

$$\therefore \frac{[\text{Ag}(\text{S}_2\text{O}_3)_2]^{3-}}{[\text{Ag}^+]} = 1.0 \times 10^{13} \times [\text{S}_2\text{O}_3^{2-}]^2 = 1.0 \times 10^{13} (0.1)^2 = 1 \times 10^{11}$$

OR

a. The formula of Tetraammineaquachloridocobalt(III) chloride is $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}_2$.

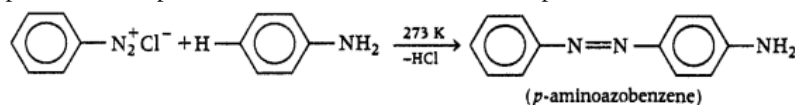
b. The formula of Potassium tetrahydroxidozincate(II) is $\text{K}_2[\text{Zn}(\text{OH})_4]$.

c. The formula of potassium trioxalatoaluminate(III) is $\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3]$.

d. The formula of Dichloridobis(ethane-1, 2-diamine)cobalt(III) is $[\text{CoCl}_2(\text{en})_2]^+$.

e. The formula of Tetracarbonylnickel(0) is $[\text{Ni}(\text{CO})_4]$.

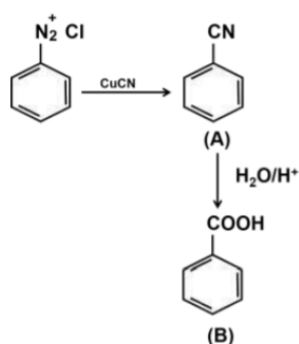
33. i. Hofmann bromamide degradation reaction It is a method for the preparation of primary amines by treating an amide with bromine in an aqueous or ethanolic solution of sodium hydroxide. The amines so formed contain one carbon less than that present in the parent amide.
- ii. Gattermann reaction When benzene diazonium chloride is treated with Cu/HCl or Cu/HBr , chlorobenzene or bromobenzene is obtained. This reaction is known as Gattermann reaction
- iii. Coupling reaction Arenediazonium salts react with highly reactive (i.e. electron rich) aromatic compounds such as aniline, phenols to form brightly coloured azo compounds, $\text{Ar}-\text{N}=\text{N}-\text{Ar}$. This reaction is called coupling reaction. e.g. Benzene diazonium chloride reacts with aniline in faintly acidic medium (pH 4-5) at 273-278K, in which the molecule at its para-position is coupled with the diazonium salt to form p-aminoazobenzene. This is an example of coupling reaction.



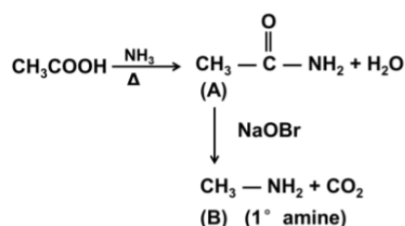
OR

i. The structure of A and B on following reaction is:

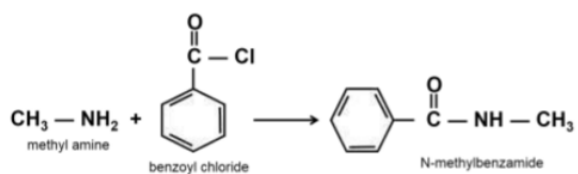
a.



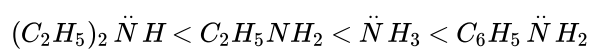
b.



ii. The chemical reaction of methyl amine with benzoyl chloride and IUPAC name of the product form is as follows:



iii. Increasing order of pK_b values



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