Class XII Session 2024-25
Subject - Chemistry
Sample Question Paper - 2

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. The order of reactivity of following alcohols with halogen acids is _____.   **[1]**

A. $CH_3CH_2 —CH_2—OH$

B. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{CH} - OH$

C. $CH_3CH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

    a) (A) > (C) > (B)   b) (C) > (B) > (A)

    c) (B) > (A) > (C)   d) (A) > (B) > (C)

2. DNA fingerprinting means the   **[1]**

    a) sequencing the nucleotides in DNA   b) sequencing the bases present in double helix

    c) information regarding the unique sequence   d) information reagrding the unique imprints

       of bases on DNA for a person   on the fingertip for a person

3. One mole of an organic compound 'A' with the formula C_3H_8O reacts completely with two moles of HI to form   **[1]** X and Y. When 'Y' is boiled with aqueous alkali forms Z. Z answers the iodoform test. The compound 'A' is _____.

    a) methoxyethane   b) ethoxyethane

    c) Propan – 2 – o1   d) Propan – 1 – o1

4. The common name for pentanedioic acid is: **[1]**

    a) Succinic acid   b) Pimelic acid

    c) Oxalic acid   d) Glutaric acid

5. If 75% of a first order reaction was completed in 32 min, then 50% of the reaction was completed in_____. **[1]**

    a) 24 min   b) 4 min

    c) 16 min   d) 8 min

6. Match the items of column I with appropriate entries of column II. **[1]**

Column I	Column II
(a) $\frac{\triangle P}{P^o{}_A}$	(i) $\frac{\triangle T_b}{m}$
(b) K_b	(ii) mol fraction of solute
(c) i	(iii) $\frac{\triangle T_f}{m}$
(d) K_f	(iv) Ratio of observed molar mass to actual molar mass

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

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

7. Carbon tetrachloride has a dipole moment: **[1]**

    a) $\mu = 0$ b) $\mu = 1$

    c) $\mu = 2$ d) $\mu = 4$

8. Among the following, which bivalent ion of the first transition series shows a maximum magnetic moment? **[1]**

    a) Co^{2+} b) Ni^{2+}

    c) Mn^{2+} d) Fe^{2+}

9. The slope of the line in the plot of concentration [A] Vs. time (s) indicate **[1]**

    a) +k   b) -k

    c) $\frac{+k}{2.303}$ d) $\frac{-k}{2.303}$

10. How to do the following conversion: **[1]**

RCOOCl + ? $\rightarrow$ RCHO

    a) Using H_2-Pd,$BaSO_4$ b) Using DIBAL-H

    c) Using H_2 - Pd   d) Using $NaBH_4$

11. Give IUPAC name of the compound given below. **[1]**

$$CH_3 - \underset{\underset{Cl}{|}}{C}H - CH_2 - CH_2 - \underset{\underset{OH}{|}}{C}H - CH_3$$

    a) 2 – Chloro – 5 – hydroxyhexane   b) 5 – Chlorohexan – 2 – ol

    c) 2 – Hydroxy – 5 – chlorohexane   d) 2 – Chlorohexan – 5 – ol

12. The correct increasing order of basic strength for the following compounds is _____. **[1]**

I. NH_2 (benzene ring)

II. NH_2 (benzene ring with NO_2)

III. NH_2 (benzene ring with CH_3)

a) III < I < II

b) III < II < I

c) II < III < I

d) II < I < III

13. **Assertion (A):** Cellulose is not digested by human beings.   **[1]**

   Reason (R): Cellulose is a polymer of β-D-glucose.

   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 (A):** Benzaldehyde is less reactive than ethanal towards nucleophilic addition reactions.   **[1]**

   Reason (R): Ethanal is more sterically hindered.

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

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

   c) Assertion (A) is correct, but Reason (R) is wrong statement.

   d) Assertion (A) is wrong, but Reason (R) is correct statement.

15. **Assertion (A):** Hydrolysis of (–)-2-bromooctane proceeds with inversion of configuration.   **[1]**

   Reason (R): This reaction proceeds through the formation of a carbocation to give (+)-octan-2-ol as a product. In S_N2 reaction of optically active halides are accompanied by inversion of configuration.

   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 oxygen of OH group in alcohols is attached to sp^3 hybridised carbon.   **[1]**

   Reason (R): The bond angle in alcohols $C - \widehat{O} - H$ is $109^o28'$.

   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. Using the valence bond approach, deduce the shape and magnetic behaviour of $[Cr(NH_3)_6]^{3+}$ion. [Atomic number of Cr = 24] **[2]**

18. Why is Cr^{2+} reducing and Mn^{3+} oxidising when both have d^4 configuration? **[2]**

19. **Answer the following:** **[2]**

    (a) For a chemical reaction, what is the effect of catalyst on the rate of the reaction. **[1]**

    (b) Why is the probability of reaction with molecularity higher than three very rare? **[1]**

20. Why do gases always tend to be less soluble in liquids as the temperature is raised? **[2]**

    OR

    Calculate the freezing point of a solution containing 0.520 g glucose ($C_6H_{12}O_6$) dissolved in 80.20 g of water. (For water K_f = 1.86 K kg mol^{-1})

21. Draw the structures of the following compounds. **[2]**

    i. 4-Chloropentan-2-one

    ii. 3-Bromo-4-phenylpentanoic acid

Section C

22. Calculate the potential of hydrogen electrode in contact with a solution whose PH is 10. **[3]**

23. The rate constant for a first order reaction is $60 s^{-1}$. How much time will it take to reduce the concentration of the reactant to $\frac{1}{10} th$ its initial value? **[3]**

24. Give equations of the following reactions: **[3]**

    i. Oxidation of propan-1-ol with alkaline $KMnO_4$ solution.

    ii. Bromine in CS_2 with phenol.

    iii. Dilute HNO_3 with phenol.

    iv. Treating phenol with chloroform in presence of aqueous NaOH.

    OR

    Write the structures of the major products expected from the following reactions:

    a. Mononitration of 3-methylphenoI

    b. Dinitration of 3-methylphenol

    c. Mononitration of phenyl methanoate

25. An aromatic compound A (Molecular formula C_8H_8O) gives positive 2, 4-DNP test. It gives a yellow precipitate of compound B on treatment with iodine and sodium hydroxide solution. Compound A does not give Tollen's or Fehling's test. On drastic oxidation with potassium permanganate it forms a carboxylic acid C (Molecular formula $C_7H_6O_2$), which is also formed along with the yellow compound in the above reaction. Identify A, B and C and write all the reactions involved. **[3]**

26. When a steady current of 2A was passed through two electrolytic cells A and B containing electrolytes $ZnSO_4$ and $CuSO_4$ connected in series, 2g of Cu were deposited at the cathode of cell B. How long did the current flow? What mass of Zn was deposited at cathode of cell A? **[3]**

    [Atomic mass: Cu = 63.5 g mol^{-1}, Zn = 65 g mol^{-1}; 1F = 96500 C mol^{-1}]

27. In each of the following pairs of compounds, identify the compound which will undergo S_N1 reaction faster. **[3]**

i. and

ii. and
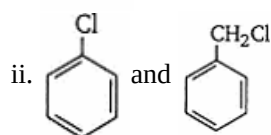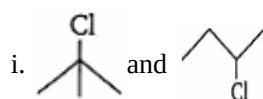
28. Determine the value of equilibrium constant (K_c) and ΔG^θ for the following reaction. **[3]**

$$Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$$
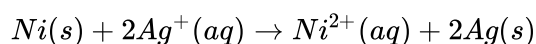
$$E^\theta = 1.05\,V\,(1\,F = 96500\,C\,mol^{-1})$$

Section D

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

Transition metal oxides are generally formed by the reaction of metals with oxygen at high temperatures. The highest oxidation number in the oxides coincides with the group number. In vanadium, there is a gradual change from the basic V_2O_3 to less basic V_2O_4 and to amphoteric V_2O_5. V_2O_4 dissolves in acids to give VO^{2+} salts.

Potassium dichromate is a very important chemical used in the leather industry and as an oxidant for the preparation of many azo compounds. Dichromates are generally prepared from chromate. Sodium dichromate is more soluble than potassium dichromate. The latter is, therefore, prepared by treating the solution of sodium dichromate with potassium chloride. Sodium and potassium dichromates are strong oxidising agents; sodium salt has a greater solubility in water and is extensively used as an oxidising agent in organic chemistry. Potassium dichromate is used as a primary standard in volumetric analysis.

i. Which of the 3d series of the transition metals exhibits the largest number of oxidation and why? (1)

ii. A transition metal exhibits highest oxidation state ih oxides and fluorides. Give reason. (1)

iii. How would you account for the increasing oxidising power in the series: (2)

$$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-?$$
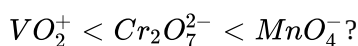
OR

MnO is basic whereas Mn_2O_7 is acidic in nature. Give reason. (2)

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

Many chemical and biological processes depend on osmosis, the selective passage of solvent molecules through the porous membrane from a dilute solution to a more concentrated one. The osmotic pressure π depends on molar concentration of the solution (π = CRT). If two solutions are of equal solute concentration and, hence, have the same osmotic pressure, they are said to be isotonic. If two solutions are of unequal osmotic pressures, the more concentrated solution is said to be hypertonic and the more diluted solution is described as hypotonic. Osmosis is the major mechanism, for transporting water upward in the plants. Transpiration is the leaves supports the transport mechanism of water. The osmotic pressure of seawater is about 30 atm; this is the pressure that must be applied to the seawater (separated from pure water using a semi-permeable membrane) to get drinking water.

i. What will happen if a plant cell kept in a hypertonic solution? (1)

ii. Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cells in a solution containing in 1.2% sodium chloride solution? (1)

iii. What happens when the external pressure applied becomes more than the osmotic pressure of solution? (2)

OR

Which mechanisms helps in the transportation of water in a plant? (2)

Section E

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

    (a) What are Purines and Pyrimidines? Name the purines and Pyrimidines present in DNA and RNA nucleic Acids. **[1]**

    (b) Write the full forms of DNA and RNA. **[1]**

    (c) Name the vitamin whose deficiency causes convulsions. **[1]**

    (d) Which vitamin B group can be stored in our body? **[1]**

    (e) i. What is the difference between a nucleoside and nucleotide? **[1]**

    ii. Write one difference between α-helix and β-pleated sheet structures of protein.

    (f) What are nucleic acids? Why two strands in DNA are not identical but are complementary? **[1]**

    (g) Some enzymes are named after the reaction, where they are used. What name is given to the class of enzymes which catalyse the oxidation of one substrate with simultaneous reduction of another substrate? **[1]**

32. Write the IUPAC names of the following coordination compounds: **[5]**

    i. $[Co(NH_3)6]Cl_3$

    ii. $[Co(NH_3)_5Cl]Cl_2$

    iii. $K_3[Fe(CN)_6]$

    iv. $K_3[Fe(C_2O_4)_3]$

    v. $K_2[PdCl_4]$

    vi. $[Pt(NH_3)_2Cl(NH_2CH_3)]Cl$

    OR

    Using IUPAC norms write the formulas for the following:

    a. Tetrahydroxozincate(II)

    b. Potassium tetrachloridopalladate(II)

    c. Diamminedichloridoplatinum(II)

    d. Potassium tetracyanonickelate(II)

    e. Pentaamminenitrito-O-cobalt(III)

    f. Hexaamminecobalt(III) sulphate

    g. Potassium tri(oxalato)chromate(III)

    h. Hexaammineplatinum(IV)

    i. Tetrabromidocuprate(II)

    j. Pentaamminenitrito-N-cobalt(III)

33. i. Write the structures of main products when benzene diazonium chloride reacts with the following reagents: **[5]**

    a. H_3PO_2 + Hp

    b. CuCN/KCN

    c. H_2O

    ii. Arrange the following in the increasing order of their basic character in an aqueous solution: $C_2H_5NH_2$, $(C_2H5)_2NH, (C_2H_5)_3N$. Give justification.

    OR

    Write major product(s) in the following reactions:

i. $C_6H_5\text{-}NO_2 \xrightarrow{Sn/HCl} ?$

ii.

$$\underset{\text{(benzenediazonium chloride)}}{\begin{array}{c} N_2^+\ Cl^- \\ \text{benzene ring} \end{array}} \xrightarrow{Cu_2Cl_2/HCl} ?$$

iii. $CH_3CONH_2 \xrightarrow{Br_2/KOH} ?$
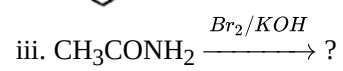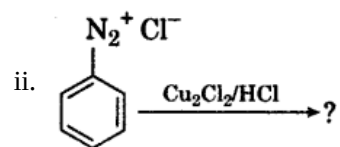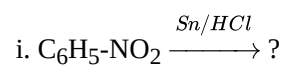
Solution

Section A

1.

    (b) (C) > (B) > (A)

    Explanation: Haloalkanes are prepared from alcohol and halogen acids where the hydroxyl group of the alcohol is replaced by the halogen. Options (A) (B) and (C) are primary, secondary, tertiary alcohols respectively. Tertiary alcohols are more reactive than secondary and primary alcohol, the secondary halide is more reactive than primary halide and they form haloalkanes from haloacids at room temperature without catalysts. The order of reactivity of alcohols is 3°>2°>1°.

2.

    (c) information regarding the unique sequence of bases on DNA for a person

    Explanation: A sequence of bases on DNA is unique for a person and information regarding this is called DNA fingerprinting. It is same for every cell and cannot be altered by any known treatment.

3.   **(a)** methoxyethane

    Explanation: Ether reacts with HI to form alcohol and alkyl iodide. Alcohol on oxidation will give the iodoform test.

4.

    (d) Glutaric acid

    Explanation:

    - Pentanedioic acid is known as glutaric acid.
    - $(COOH)_2$ is known as oxalic acid.
    - Butanedioic acid is known as succinic acid.
    - Hexanedioic acid is known as adipic acid.
    - Heptanedioic acid is known as pimelic acid.

5.

    (c) 16 min

    Explanation: 75% completion means 2 half lifes so 50% completion means only one half life.

    $k = \frac{2.303}{t} \log \frac{a}{a-x}$

    $k = \frac{2.303}{32} \log \left(\frac{100}{100-75} \right) \dots (1)$

    $k = \frac{2.303}{t} \log \left(\frac{100}{100-50} \right) \dots (2)$

    from (1) and (2), we get

    t = 16 mins

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

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

7.   **(a)** μ = 0

    Explanation: CCl_4 is a symmetrical molecule. Hence, the dipole moment is zero.

8.

    (c) Mn^{2+}

    Explanation: Mn^{2+} has d^5 configuration so a maximum number of unpaired electrons and hence maximum magnetic moment. This magnetic moment can be calculated by using the spin only formula: $\mu_{so} = \angle n(n+2)$, where n= number of unpaired electrons.

9.

    (b) -k

    Explanation: Slop of the line indicates = -k while the intercept represents $[R]_0$.

10. **(a)** Using H_2-Pd,$BaSO_4$

Explanation: Catalytic hydrogenation of acid chloride using H_2-Pd, $BaSO_4$ converts acid chloride selectively to aldehydes (**$BaSO_4$** reduces the activity of palladium). This is known as Rosenmund Reduction.

11.

(b) 5 – Chlorohexan – 2 – ol

Explanation: $\overset{6}{C}H_3 - \overset{5}{C}H - \overset{4}{C}H_2 - \overset{3}{C}H_2 - \overset{2}{C}H - \overset{1}{C}H_2$

with CL on C5 and OH on C2
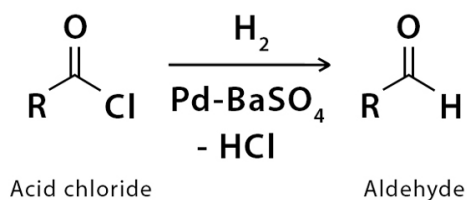
5−chlorohexan−2−ol
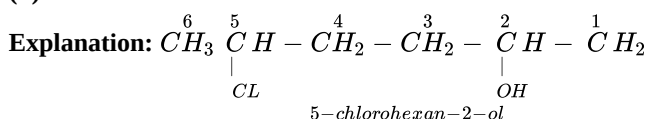
-OH is given preference over -Cl so numbering is done so that –OH gets the lowest number.

12.

(d) II < I < III

Explanation:
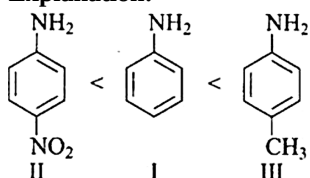
Electron withdrawing group decreases the basic strength of aniline while electron releasing groups increases the basic strength of aniline.

13.

(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.

14.

(c) Assertion (A) is correct, but Reason (R) is wrong statement.

Explanation: Assertion (A) is correct, but Reason (R) is wrong statement.

15.

(c) A is true but R is false.

Explanation: Hydrolysis of alkyl halides with inversion of configuration is an example of S_N2 mechanism. This mechanism is a one-step process and does not involve the formation of a carbocation.

16.

(c) A is true but R is false.

Explanation:

The bond angle $C - \overset{\frown}{O} - H$ in alcohols is slightly less than the tetrahedral angle $109^o28'$. It is due to the repulsion between the unshared electron pairs of oxygen.

Section B

17. Cr has electronic configuration $[Ar]4s^13d^5$

Cr^{3+} has electronic configuration $[Ar]4s^03d^5$
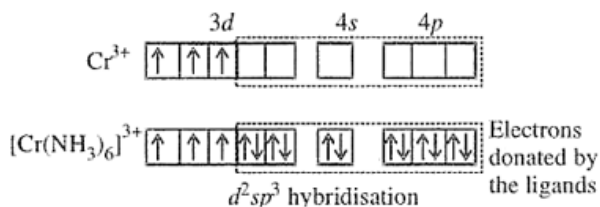
$d^5 sp^3$, hybridisation gives octahedral shape. The complex is paramagnetic due to the presence of unpaired electrons.

18. Chromium Cr^{2+} is reducing as its configuration changes from d^4 to d^3, the latter having a half-filled t_{2g} level. On the other hand, the change from (Manganese) Mn^{3+} to Mn^{2+} results in the half-filled (d^5) configuration which has extra stability.

19. Answer the following:
    (i) Catalyst increases the rate of reaction by providing alternative path with lower energy of activation.
    (ii) As the number increases the chance of simultaneous collision decrease that means the probability of more than three molecules colliding simultaneously is very small. Therefore, the possibility of molecularity being three is very low.

20. Mostly dissolution of gases in liquid is an exothermic process. It is because the fact that this process involves decrease of entropy. Thus, increase of temperature tends to push the equilibrium in backward direction as a result solubility of the gas decreases.
    (Gas + Solvent $\rightleftharpoons$ Solution + Heat)

<div align="center">OR</div>

M_B = Molecular mass of glucose, $C_6H_{12}O_6$

$= (6 \times 12) + (12 \times 1) + 6 \times 16) = 180\, g\, mol^{-1}$

w_B = mas of glucose = 0.520g

W_A = mass of water = 80.20g

K_f = 1.86KKg/mol

$\Delta T_f = \frac{K_f \times w_B \times 1000}{M_B \times w_A} = \frac{1.86 \times 0.520 \times 1000}{180 \times 80.20}$

= 0.0669

21. i.

4-Chloropentan-2-one

ii.

3-Bromo-4-phenylpentanoic acid
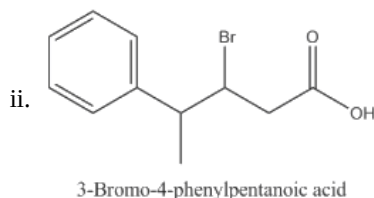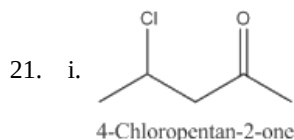
<div align="center">**Section C**</div>

22. For hydrogen electrode:

$H^+ + e^- \rightarrow \frac{1}{2}H_2$
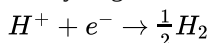
Applying Nernst equation:

$E = E^0 - \frac{0.0591}{n}\log \frac{1}{[H^+]}$

$= 0 - \frac{0.0591}{1}\log \frac{1}{10^{-10}}$ [pH = 10 means $[H^+]$

$= 10^{-10}M$

$= -0.0591 \times 10 = -0.591V$

23. Given, $k = 60 s^{-1}, [R]_o = 100M$ and $[R] = 100M \times \frac{1}{10} = 10M$

$t = \frac{2.303}{k}\log \frac{[R]_0}{[R]} = \frac{2.303}{k}\log \left[\frac{100}{10}\right]$
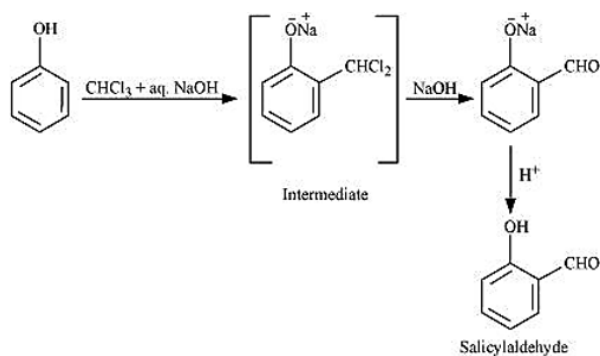
$t = \frac{2.303}{60}\log 10 = 0.0384\, s$

24. i. $CH_3CH_2CH_2OH \xrightarrow{alkKmnO_4} CH_3CH_2COOH$
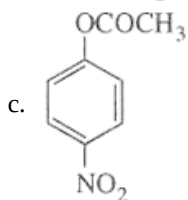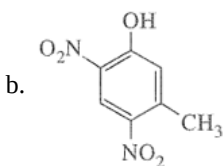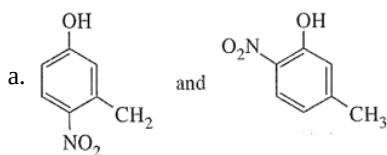   Propan-1-ol   Propanoic acid
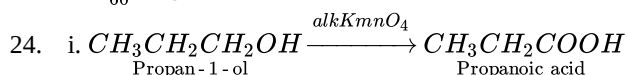
ii.
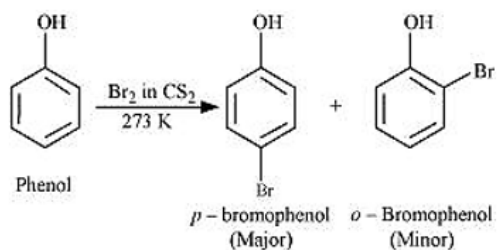
iii.
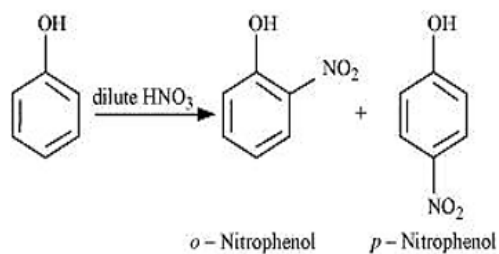
iv.

OR

The combined influence of -OH and -CH₃ groups determine the position of the incoming group. Keeping in view that both -OH and -CH₃ are o- and p-directing groups, the following products are obtained:

a.

and

b.

c.

25. The molecular formula of the compound is C_8H_8O. As A does not give Tollens or Fehling's test. It must be a ketone. It gives a positive test with 2, 4-DNP, and iodoform test. It means it is methyl ketone. B is iodoform and C is benzoic acid.
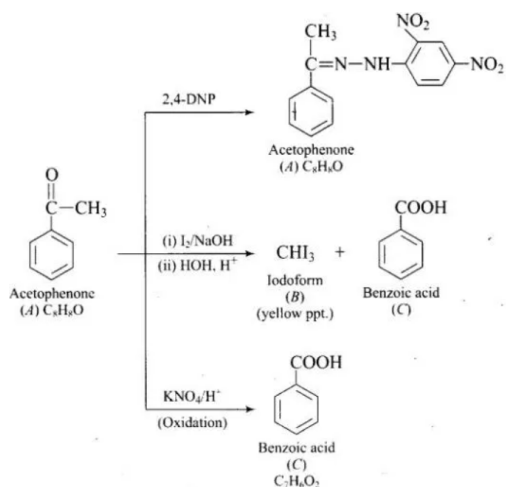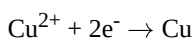
26. Steady current = 2A

copper deposited at cathode of cell B = 2g

Cell B contains $CuSO_4$ and reaction may be represented as,

$$CuSO_4 \rightarrow Cu^{2+} + SO_4^{2-}$$

The reaction happens at cathode as,

$Cu^{2+} + 2e^- \rightarrow Cu$

So, 1 mol Cu deposited by 2F charge

63.5 g Cu $\rightarrow$ 2 × 96500

2g Cu $\rightarrow$ x
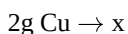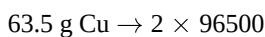
x = $\frac{2 \times 2 \times 96500}{63.5}$ = 6078.74 C

we know formula

Q = It

6078.74 = 2 × t

t = $\frac{6078.74}{2}$ = 3039.37 Sec

From faraday's second law of electrolysis,

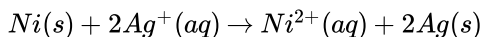$\frac{wt \text{ of } Cu}{wt \text{ of } Zn} = \frac{Eqwt Cu}{Eq \cdot wt Zn}$

$\frac{2}{x} = \frac{63.5/2}{65/2}$

x = $\frac{2}{0.9769}$ = 2.047 g

weight of Zn deposited = 2.047 g

27. i. Since 3° carbocations are more stable than 2° carbon cations therefore will react faster.

 ii. Benzyl chloride readily forms benzyl cation which is stabilized by resonance. Thus, benzyl chloride undergoes S_N1 reaction faster than chlorobenzene.

28. We have,

$$Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$$

For the reaction n = 2, E_{cell}^{θ} = 1.05 V

$\Delta G^{\theta} = -nFE^{\theta}$

$\Delta G^{\theta} = -2 \times 96500\,C \times 1.05\,V$

$\Delta G^{\theta} = -202.65\,kJ\,mol^{-1}$

For Equilibrium constant, we have,

$\Delta G^{\theta} = -2.303\,RT \log K_c$

$\log K_c = -\frac{\Delta G^{\Theta}}{2.303 RT}$

$= -\frac{202650}{2.303 \times 8.314 \times 298}$

$K_c = \text{Antilog}(35.5161)$

$K_c = 3.284 \times 10^{35}$

Section D

29. i. Manganese (Z = 25) shows maximum number of O.S. This is because its outer EC is $3d^5 4s^2$. As 3d and 4s are close in energy, it has maximum number of e-1 s to loose or share. Hence, it shows O.S. from +2 to +7 which is the maximum number.

ii. A transition metal exhibits higher oxidation states in oxides and fluorides because oxygen and fluorine are highly electronegative elements, small in size and strongest oxidising agents.

iii. This is due to the increasing stability of the lower species to which they are reduced.

OR

When a metal is in a high oxidation state, its oxide is acidic and when a metal is in a low oxidation state its oxide is basic.

30. i. A plant cell gets shrink when it is kept in a hypertonic solution.

ii. 1.2% sodium chloride solution is hypertonic with respect to 0.9% sodium chloride solution or blood cells. When blood cells are placed in this solution, water flows out of the cells and they shrink due to loss of water by osmosis.

iii. When the external pressure applied becomes more than the osmotic pressure of the solution, then the solvent molecules from the solution pass through the semipermeable membrane to the solvent side. This process is called reverse osmosis.

OR

In an upward direction, osmosis helps in the transportation of water in a plant.

Section E

31. Attempt any five of the following:

(i) **Pyrimidines:** These are three bases derived from pyrimidines. These are cytosine (C), thymine (T) and uracil (U).In DNA, T is present but in RNA, U is present.

Purines: There are two bases derived from purine. These are adenine (A) and guanine (G).

In DNA, Purines present are Adenine (A) and Guanine (G) and Pyrimidines present are Cytosine (C) and Thymine (T) while in RNA, Purines are the same while Pyrimidines present in RNA includes Cytosine (C) and Uracil (U).

(ii) DNA $\longrightarrow$ Deoxyribonucleic acid

RNA $\longrightarrow$ Ribonucleic acid

(iii) B_6 / Pyridoxine

(iv) Vitamin B^{12} can be stored in our body.

(v) i. **Nucleoside:** It is formed when pentose sugar combines with nitrogen base.

Nucleotide: When nucleoside bonds with phosphate group.

ii. α-helix has intramolecular hydrogen bonding while β-pleated has intermolecular hydrogen bonding / α-helix results due to regular coiling of polypeptide chains while in α-pleated all polypeptide chains are stretched and arranged side by side.

(vi) Nucleic acids are polymers of Nucleotides.

Because the H-bonds are formed between specific pairs of bases/pairing between A & T and between C & G.

(vii) Enzyme oxidoreductase, the ending of name of an enzyme is -ase.

32. i. Hexaamminecobalt(III) chloride

ii. Pentaamminechloridocobalt(III) chloride

iii. Potassium hexacyanoferrate(III)

iv. Potassium trioxalatoferrate(III)

v. Potassium tetrachloridopalladate(II)

vi. Diamminechlorido(methylamine)platinum(II) chloride

OR

a. The IUPAC name of Tetrahydroxozincate(II) is $\left[Zn(OH)_4\right]^{2-}$

b. The IUPAC name of Potassium tetrachloridopalladate(II) is $K_2\left[PdCl_4\right]$

c. The IUPAC name of Diamminedichloridoplatinum(II) is $\left[Pt(NH_3)_2Cl_2\right]$

d. The IUPAC name of Potassium tetracyanonickelate(II) is $K_2\left[Ni(CN)_4\right]$

e. The IUPAC name of Pentaamminenitrito-O-cobalt(III) is $\left[Co\left(ONO\right)\left(NH_3\right)_5\right]^{2+}$
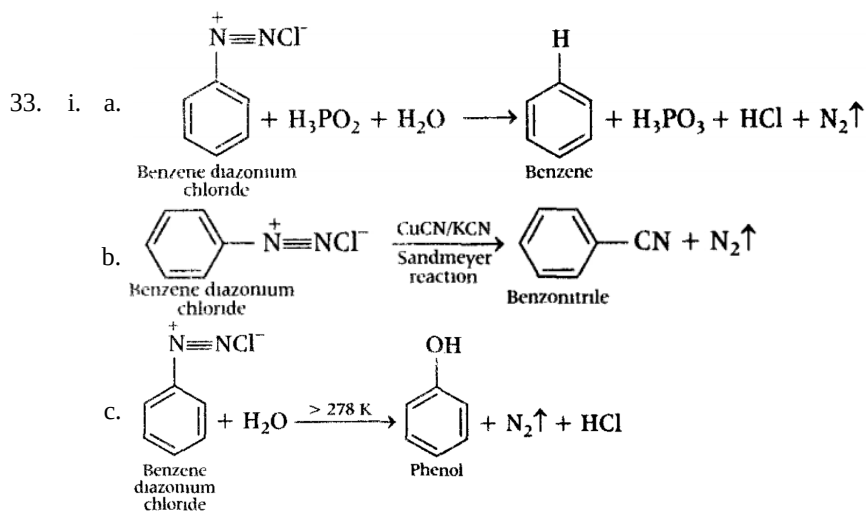
f. The IUPAC name of Hexaamminecobalt(III) sulphate is $\left[Co(NH_3)_6\right](SO_4)_3$

g. The IUPAC name of Potassium tri(oxalato)chromate(III) is $K_3\left[Cr(C_2O_4)_3\right]$

h. The IUPAC name of Hexaammineplatinum(IV) is $\left[Pt(NH_3)_6\right]^{4+}$

i. The IUPAC name of Tetrabromidocuprate(II) is $\left[Cu(Br)_4\right]^{2-}$

j. The IUPAC name of Pentaamminenitrito-N-cobalt(III) is $\left[Co\left(NO_2\right)\left(NH_3\right)_5\right]^{2+}$

33. i. a.

Benzene diazonium chloride + H_3PO_2 + H_2O $\longrightarrow$ Benzene + H_3PO_3 + HCl + $N_2\uparrow$

b.

Benzene diazonium chloride $\xrightarrow[\text{reaction}]{\text{CuCN/KCN}\atop\text{Sandmeyer}}$ Benzonitrile $-CN$ + $N_2\uparrow$

c.

Benzene diazonium chloride + H_2O $\xrightarrow{> 278\ K}$ Phenol $+ N_2\uparrow$ + HCl

ii. The relative basic strength of $C_2H_5NH_2$, $(C_2H5)_2NH$ and $(C_2H_5)_3N$ depends upon the stabilisation of their corresponding conjugate acids (formed as a result of accepting a proton from water by a number of factors such a; B-bonding, steric hindrance of the alkyl groups and +I-effect of the alkyl groups. All these factors are favourable for 2° amines, therefore, $((C_2H5)_2NH$ is a stronger base than $C_2H_5NH_2$ and $((C_2H_5)_3N$. Since. C_2H_5 group is large, it exerts some steric hindrance to H-bond.

Therefore, stabilisation of the conjugate acid derived from $(C_2H_5)_3N$ is due to mainly by +I-effect which is greater than the stabilisation of the conjugate acid derived from $C_2H_5NH_2$ by H-bonding.

 is more stable than
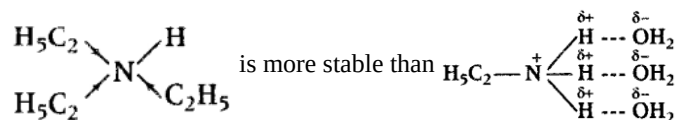
Thus, $(C_2H_5)_3N$ is more basic than $C_2H_5NH_2$. Hence, the overall basic strength of the three amines increases in the order: $C_2H_5NH_2 < (C_2H_5)_3N < (C_2H5)_2NH$.

OR

i. $C_6H_5\text{-}NO_2 \xrightarrow{Sn/HCl} C_6H_5.NH_2$ (Aniline)

ii.

$\xrightarrow{Cu_2Cl_2/HCl}$ Chlorobenzene $+ N_2\uparrow$

iii. $CH_3CONH_2 \xrightarrow[Hofmann\ bromamide\ degradation]{Br_2/KOH} CH_3NH_2 + K_2CO_3 + 2KBr + 2H_2O$