Class XII Session 2026-27
Subject - Chemistry
Sample Question Paper - 6

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 reagents are required for one step conversion of chlorobenzene to toluene? **[1]**

   a) $CH_3Cl/$ Anhydrous $AlCl_3$ b) $NaNO_2 + HCl$

   c) CH_3Cl/Fe, Dark d) CH_3Cl, Na, Dry ether

2. Which of the following is an example of a pentose sugar? **[1]**

   a) Glucose b) Fructose

   c) Arabinose d) Galactose

3. Williamson's synthesis is used for the preparation of **[1]**

   a) ethers b) alkyl halides

   c) aldehydes d) alcohols

4. Compound 'A' undergoes the formation of cyanohydrins which on hydrolysis gives lactic acid ($CH_3CHOHCOOH$). Therefore, compound 'A' is: **[1]**

   a) Formaldehyde b) Acetaldehyde

   c) Benzaldehyde d) Acetone

5. The following data is obtained during the first order thermal decomposition of $2\ A(\ g) \rightarrow B\ (g) + C(s)$ at constant volume and temperature **[1]**

Time	Total pressure in pascals
1. At the end of 10 minutes	300

2. After completion	200

The rate constant in min^{-1} is

a) 0.0693 b) 6.93

c) 69.3 d) 0.00693

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

Column I	Column II
(a) K_b	(i) Elevation in boiling point
(b) K_f	(ii) Van't Hoff factor
(c) i	(iii) Cryoscopic constant
(d) $\triangle T_b$	(iv) Ebullioscopic constant

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

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

7. Chloroform is stored in closed dark coloured bottles completely filled because it: **[1]**

a) gets slowly oxidized by air in the presence of light and form a poisonous gas.

b) forms an extremely poisonous gas in the presence of light.

c) gets slowly oxidized by air in the presence of light.

d) can change its colour in the presence of light and get spoilt by the action of light.

8. Electronic configuration of a transition element X in +3 oxidation state is $[Ar]3d^5$. What is its atomic number? **[1]**

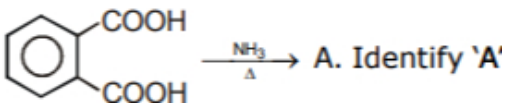
a) 26 b) 27

c) 25 d) 24

9. Name the order of reaction which proceeds with a uniform rate throughout. **[1]**

a) Zero order b) Third order

c) First order d) Second order

10.  **[1]**

a) Acetaldehyde b) Benzamide

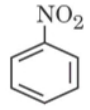
c) Phthalimide d) Benzene

11. Phenol is less acidic than: **[1]**

a) o-methylphenol b) o-nitrophenol

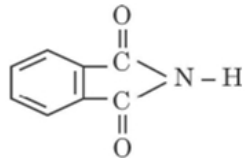
c) o-methoxyphenol d) ethanol

12. Hoffmann Bromamide Degradation reaction is given by: **[1]**

a) 

b) $CH_3 - CH_2 - \overset{\overset{O}{\|}}{C} - NH_2$

c) CH_3 - C $\equiv$ N

d) 

13. **Assertion (A):** Glucose is a reducing sugar. **[1]**
Reason (R): Despite having an aldehydic group, glucose does not give 2,4-DNP test.

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):** Pure HCN reacts with aldehydes and ketones. **[1]**
Reason (R): Addition of HCN to carbonyl compounds gives cyanohydrins.

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.

15. **Assertion (A):** The presence of a nitro group at ortho or para position increases the reactivity of haloarenes towards nucleophilic substitution. **[1]**
Reason (R): Nitro group, being an electron-withdrawing group decreases the electron density over the benzene ring.

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):** Dehydration of glycerol with $KHSO_4$ gives acrolein. **[1]**
Reason (R): Acrolein is an α, β-unsaturated aldehyde.

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. When 19.5 g of F - CH_2 – COOH (Molar mass = 78 g mol^{-1}), is dissolved in 500 g of water, the depression in freezing point is observed to be 1°C. **[2]**
Calculate the degree of dissociation of F - CH_2 - COOH.

[Given: K_f for water = 1.86 K kg mol^{-1}]

OR

State Raoult's law for a solution containing volatile components. Why is the vapour

pressure of an aqueous solution of glucose lower than that of water?

18. $PtCl_4 \cdot 2KCl$ doesn't give precipitate of AgCl with $AgNO_3$ solution. Write the structural formula and IUPAC name of the complex. **[2]**

19. Give reasons for the following: **[2]**

i. Transition metals form alloys.

ii. Mn_2O_3 is basic whereas Mn_2O_7 is acidic.

iii. Eu^{2+} is a strong reducing agent.

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

i. Consider the equation $2NO\,(g) + 2H_2\,(g) \rightarrow N_2\,(g) + 2H_2O\,(g)$. The rate law for this equation is first order with respect to H_2 and second order with respect to NO. write the rate law for this reaction. **[1]**

ii. Define rate constant. **[1]**

21. Predict the reagent for carrying out the following transformations: (Any **two**) **[2]**

i. Benzoyl chloride to Benzaldehyde

ii. Ethanal to 3-hydroxy butanal

iii. Ethanoic acid to 2-chloroethanoic acid

Section C

22. Write the Nernst equation and calculate emf of the following cell at 298 K: **[3]**

Cr | Cr^{3+} (0·1 M) || Fe^{2+} (0·01 M) | Fe

Given : $E^{\ominus}_{Cr^{3+}/Cr}$ = -0·75 V

$E^{\ominus}_{Fe^{2+}/Fe}$ = -0·45 V

(log 10 = 1)

23. The following results have been obtained during the kinetic studies of the reaction: **[3]**

$2\ A + B \rightarrow C + D$

Experiment	$[A]/molL^{-1}$	$[B]/molL^{-1}$	**Initial rate of formation of** $D\left(\ mol\ L^{-1}\ \min^{-1}\right)$
1	$0 \cdot 1$	$0 \cdot 1$	6.0×10^{-3}
2	$0 \cdot 3$	0.2	7.2×10^{-3}
3	$0 \cdot 3$	0.4	2.88×10^{-1}
4	0.4	$0 \cdot 1$	2.40×10^{-2}

What is the rate law? What is the order of reaction with respect to each reactant and the overall order of reaction?

24. a. Can sodium ethoxide and t-butyl chloride be used for the preparation of t-butyl ethyl ether? Give suitable explanation. Justify your answer by suggesting the appropriate starting material required for preparation of t-butyl ethyl ether. **[3]**

b. Give the IUPAC name of above mentioned ether.

25. Give plausible explanation for each of the following: **[3]**

a. Sodium hydrogen sulphite is used for separation and purification of aldehydes.

b. 2, 2, 6-trimethylcyclohexanone does not form cyanohydrin.

c. Only one $-NH_2$ group of semicarbazide is involved in the formation of semicarbazone.

26. The conductivity of 2.5×10^{-4} M methanoic acid is 5.25×10^{-5} S cm^{-1} and its $\wedge_m^0$ has a value 400 S cm^2 mol^{-1}. Calculate its molar conductivity and degree of dissociation. **[3]**

27. Complete the following reactions by writing the structural formulae of 'A' and 'B': **[3]**

i. $CH_3CH = CH_2 \xrightarrow{HBr}$ 'A' $\xrightarrow{\text{aq. } KOH}$ 'B'

ii. $CH_3CH_2\underset{\underset{Cl}{|}}{CH}CH_3 \xrightarrow[\Delta]{\text{alc. KOH}}$ 'A' $\xrightarrow{HBr}$ 'B'

iii. $'A' \xrightarrow{Mg} CH_3CH_2MgCl \xrightarrow[H^+]{H_2O} \underset{\text{(Main product)}}{'B'}$

28. Calculate $\Delta_r G^\circ$ and $\log K_C$ of the reaction: **[3]**

$Fe^{2+}(aq) + Ag^+(aq) \longrightarrow Fe^{3+}(aq) + Ag(s)$

Given $E^\circ_{Ag^+/Ag} = 0.80\ V, E^\circ_{Fe^{3+}/Fe^{2+}} = 0.77\ V$

$\left[R = 8.314\ J\ K^{-1}\ mol^{-1},\ F = 96500 C mol^{-1}\right]$

Section D

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

The involvement of (n - 1)d electrons in the behaviour of transition elements impart certain distinct characteristics to these elements. Thus, in addition to variable oxidation states, they exhibit paramagnetic behaviour, catalytic properties and tendency for the formation of coloured ions. The transition metals react with a number of non-metals like oxygen, nitrogen and halogens. $KMnO_4$ and $K_2Cr_2O_7$ are common examples.

The two series of inner transition elements, lanthanoids and actinoids, constitute the f-block of the periodic table. In the lanthanoids, there is regular decrease in atomic size with increase in atomic number due to the imperfect shielding effect of 4f-orbital electrons which causes contraction.

Answer the following questions:

a. Why do transition metals and their compounds act as good catalysts? **(1)**

b. What is the cause of contraction in the atomic size of lanthanoids? **(1)**

c. Define lanthanoid contraction. How does it affect the atomic radii of the third transition series and the second transition series? **(2)**

OR

c. In aqueous media, which is a stronger reducing agent - Cr^{2+} or Fe^{2+} and why? **(2)**

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

A raw mango placed in concentrated salt solution loses water via osmosis and shrivel into pickle. Wilted flowers revive when placed in fresh water. A carrot that has

become limp because of water loss into the atmosphere can be placed into the water making it firm once again. Water will move into its cells through osmosis. When placed in water containing less than 0.9% (mass/volume) salt, blood cells swell due to flow of water in them by osmosis.

i. People taking a lot of salt or salty food suffer from puffiness or edema. What is the reason behind this?

ii. The preservation of meat by salting and of fruits by adding sugar protects against bacterial action. How?

iii. Why the direction of osmosis gets reversed if a pressure larger than the osmotic pressure is applied to the solution side? Write its one application.

OR

What care is generally taken during intravenous injections and why?

Section E

31. **Attempt either A or B** **[5]**

i. **Answer the following questions:** **[1]**

i. Differentiate between

a. Nucleotide and Nucleoside

b. Amylose and Amylopectin

ii. The two strands in DNA are not identical but are complementary. Explain.

iii. Name the bases present in RNA. Which one of these is not present in DNA?

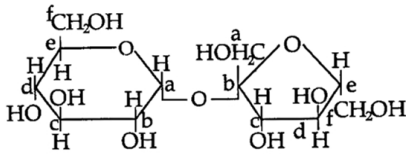
iv. Which polymer is stored in the liver of animals?

v. Differentiate between peptide linkage and glycosidic linkage. Give two points.

ii. **Answer the following questions:** **[1]**

i. i. What is an anomer?

ii. Structure of a disaccharide formed by glucose and fructose is given below. Identify anomeric carbon atoms in monosaccharide units.



ii. Which vitamin B group can be stored in our body?

iii. α-Helix is a secondary structure of proteins formed by twisting of the polypeptide chain into right-handed screw like structures. Which type of interactions is responsible for making the α-helix structure stable?

iv. Write function of carbohydrates in plants.

v. Give an example of fibrous protein.

32. **Attempt either A or B** **[5]**

i. **Answer the following questions:** **[1]**

i. What is the IUPAC name of $[Co(NH_3)_5ONO]^{2+}$?

ii. Out of $[CoF_6]^{3-}$ and $[Co(C_2O_4)_3]^{3-}$, which one complex is

i. diamagnetic

ii. more stable

iii. outer orbital complex and

iv. low spin complex?

(Atomic no. of Co = 27)

iii. What type of isomerism is shown by complex $[Co(NH_3)_5Cl]SO_4$?

iv. How is the crystal field splitting energy for octahedral complex (Δ_0) related to that of tetrahedral complex (Δ_t)?

v. Write the IUPAC name of the complex:

$[Co(H_2O)(CN)(en)_2]^{2+}$

ii. **Answer the following questions:** **[1]**

i. Name a complex used in the treatment of cancer.

ii. What is the solution in which photographic film is washed? What reaction takes place?

iii. Write the IUPAC name and hybridisation of the following complexes:

i. $[Co(NH_3)_6]^{3+}$

ii. $[NiCl_4]^{2-}$

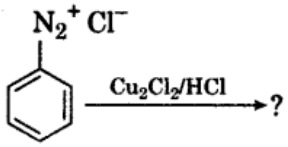
(Given : Atomic number : Ni = 28, Co = 27)

iv. Write the IUPAC name of $[Cu(NH_3)_4]SO_4$.

v. What is the coordination number of central metal ion in $[Fe(C_2O_4)_3]^{3-}$?

33. Write major product(s) in the following reactions: **[5]**

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

ii. 

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

OR

Give the reasons for the following:

i. Aniline does not undergo Friedel-Crafts reaction.

ii. $(CH_3)_2NH$ is more basic than $(CH_3)_3.N$ in an aqueous solution.

iii. Primary amines have a higher boiling point than tertiary amines.

Solution

Section A

1.

(d) CH_3Cl, Na, Dry ether

Explanation:

CH_3Cl, Na, Dry ether

2.

(c) Arabinose

Explanation:

The solution is correct because Arabinose is a five-carbon sugar, which classifies it as a pentose. In contrast, Fructose, Glucose, and Galactose are all six-carbon sugars, making them hexoses. Therefore, Arabinose is the only option that fits the definition of a pentose sugar.

3. **(a)** ethers

Explanation:

The Williamson ether synthesis is an organic reaction, forming an ether from an organohalide and deprotonated alcohol (alkoxide). This reaction was developed by Alexander Williamson in 1850. Typically it involves the reaction of an alkoxide ion with a primary alkyl halide via an S_N2 reaction.



4.

(b) Acetaldehyde

Explanation:

Cyanohydrin formed from aldehydes or ketones followed by complete hydrolysis that is used to produce alpha hydroxycarboxylic acids and on complete hydrolysis, CN converts to COOH. The complete reaction as follows:

$CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$

$CH_3CH(OH)CN + H_3O^+ \rightarrow CH_3CH(OH)COOH$

5. **(a)** 0.0693

Explanation:

The solution is correct because it uses the relationship between the change in pressure and the rate constant for a first-order reaction. Initially, the reaction starts with 2 moles of A, which decomposes to produce 1 mole of B and a solid C. The total pressure at the end of 10 minutes is 300 pascals, indicating that some A has decomposed. After completion, the total pressure is 200 pascals, which corresponds to the pressure contributed by B. The change in

pressure from the initial state to completion allows us to determine the extent of the reaction. The pressure change can be related to the concentration of A that has reacted, which is then used to calculate the rate constant using the first-order rate equation. By applying the first-order kinetics formula and the given pressures, the calculated rate constant comes out to be $0.0693\ min^{-1}$.

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

7. **(a)** gets slowly oxidized by air in the presence of light and form a poisonous gas.
Explanation:
In the presence of light chloroform slowly oxidizes in air to form phosgene (carbonyl chloride $COCl_2$), which is a poisonous gas. It is therefore stored in closed dark coloured bottles completely filled so that air is kept out.
$2CHCl_3 + O_2 \rightarrow 2COCl_2 + 2HCl$

8. **(a)** 26
Explanation:
$[Ar]3d^5$: As X^{3+} is formed by the loss of 3 electrons, the configuration of element X is $[Ar]3d^64s^2$
$\therefore$ Atomic number = 26

9. **(a)** Zero order
Explanation:
Zero order reaction proceeds with a uniform rate throughout.
rate $=k[A]^0=k=$ constant.
The rate of the reaction is independent of the reactant concentration.

10. **(c)** Phthalimide
Explanation:
The structure shown in the image corresponds to phthalimide, which is characterized by its specific arrangement of a benzene ring fused to a five-membered imide group. The presence of the two carbonyl groups adjacent to the nitrogen atom, along with the benzene ring, confirms that it is phthalimide. The other options do not match this structure due to differences in functional groups and overall molecular arrangement.

11. **(b)** o-nitrophenol
Explanation:
o-nitrophenol
Phenol is less acidic than o - nitrophenol as electron withdrawing ($-NO_2$) group increases the acidity of phenols while electron donating groups ($-CH_3$,$-OCH_3$) decrease the acidity of phenols.

12. **(b)** $CH_3 - CH_2 - \overset{O}{\overset{\|}{C}} - NH_2$
Explanation:

$$CH_3 - CH_2 - \overset{O}{\overset{||}{C}} - NH_2$$

13. **(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.

14. **(d)** A is false but R is true.
Explanation:
HCN is a weak acid and have low degree of dissociation but in presence of a base (even H_2O), the dissociation increases appreciably to provide appreciable CN^- to attack C=O bond.

15. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation:
Nitro Group present on ortho and para position of haloarenes act as an electron-withdrawing group and thus there is the deficiency of electrons makes it more reactive towards nucleophilic substitution reaction.

16. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation:
Removal of two molecules of water gives a product which tautomerises to yield acrolein -an α, β-unsaturated aldehyde.

Section B

17. $\Delta T_f = iK_f m$
$= iK_f \frac{W_B}{M_B} \times \frac{1000}{W_A}$
$1 = i \times 1.86 \times \frac{19.5}{78} \times \frac{1000}{500}$
i = 1.075
$\alpha = \frac{i-1}{n-1}$
$= \frac{1-075-1}{2-1}$
Degree of dissociation= 0.075

OR

- The partial vapour pressure of each component of the solution is directly proportional to its mole fraction present in solution.
- Because glucose decreases the surface area and hence decreases the escaping tendency of water

18. Structural formula: $K_2\left[PtCl_6\right]$
IUPAC Name: Potassium hexachloridoplatinate(IV)

19. i. Due to comparable radii.
ii. In Mn_2O_3, Mn is in +3 (lower) oxidation state while in Mn_2O_7, Mn is in higher oxidation state (+7).
iii. Because its stable oxidation state is +3.

20. Answer the following:
(a) The rate law is R = k $[NO]^2$ $[H_2]$
(b) Rate constant is rate of the reaction when the concentration of reactions is unity.

21. i. Rosenmund Reduction in presence of Lindlar's Catalyst (H_2/Pd-$BaSO_4$).
ii. Aldol Condensation in presence of dil. NaOH.

iii. Hell-Volhard Zelinsky Reaction in presence of Cl_2/Red Phosphorous.

Section C

22. $E_{cell} = E^0_{\text{cell}} - \frac{0.059}{6}\log\frac{\left[Cr^{3+}\right]^2}{\left[Fe^{2+}\right]^3}$

$E^0_{\text{cell}} = -0.45 - (-0.75)$

= 0.30 V

$E_{\text{cell}} = 0.3 - \frac{0.059}{6}\log\frac{(0-1)^2}{(0.01)^3}$

$= 0 \cdot 3 - .00985\log\frac{\left(10^{-1}\right)^2}{\left(10^{-2}\right)^3}$

= 0.3 - .00985 × 4 log10

= 0.3 - 0.0394

= 0.2606 V

23. Let rate $= k[A]^x[B]^y$

$\frac{\text{Rate 1}}{\text{Rate 4}} = \frac{1}{4} = \left(\frac{1}{4}\right)^x$

$x = 1$ or first order with respect to A

24. a. No

Sodium ethoxide is a strong nucleophile as well as a strong base so elimination reaction of t-butyl chloride predominates over substitution.

Chloroethane and Sod.tert-butoxide/C_2H_5Cl and $(CH_3)_3CONa$

b. 2-Ethoxy-2-methylpropane

25. a. Because aldehydes form water soluble hydrogensulphite addition compounds which can be converted back to the aldehydes on treating it with dilute mineral acid or alkali.

b. Due to steric hindrance created by three methyl groups/Due to steric hindrance.

c. The other $-NH_2$ group is in resonance with the carbonyl group.

26. $\Lambda_m = \frac{1000\times \text{K}}{\text{M}}$ S cm^2 mol^{-1}

$\Lambda_m = \frac{1000\times 5.25\times 10^{-5}}{2.5\times 10^{-4}}$ - S cm^2 mol^{-1}

= 210 S cm^{2}mol^{-1}

$\wedge^0_m \text{HCOOH} = \lambda^\circ\text{HCOO}^- + \lambda^\circ\text{H}^+$

= (50.5 + 349.5) S cm^{2}mol^{-1}

= 400 S cm^{2}mol^{-1}

$\alpha = \frac{\Lambda_m}{\Lambda^\circ_m}$

$\alpha = \frac{210}{400}$

= 0.525

27. i. $A = CH_3CH_2CH_2Br$

$B = CH_3CH_2CH_2OH$

ii. $A = CH_3CH = CHCH_3$

$B = CH_3CH_2CH(Br)CH_3$

iii. $A = CH_3CH_2Cl$

$B = CH_3CH_3$

28. $E^\circ_{\text{Cell}} = E^\circ{}_{\text{cathode}} - E^\circ{}_{\text{anode}}$

$= E^\circ{}_{Ag^+/Ag^-} - E^\circ_{Fe^{3+}/Fe^{2+}}$

$= 0.80 - 0.77$

$= 0.03\ V$

$\Delta G^0 = -nF\ E^\circ_{\text{Cell}}$

$= -1 \times 96500 \times 0.03$

$= -2895\ J/mol$

$= -2.895 KJ/mol$

$\Delta G^0 = -2.303 RT \log Kc$

$\log Kc = -\Delta G^0 / 2.303 RT$

$= 2895/2.303 \times 8.314 \times 298$

$\log Kc = 2895/5700$

$= 0.508$

Section D

29. a. Due to their ability to show multiple oxidation states and to form complexes / provide large surface area.
    b. Due topoor shielding effect of 4f orbital.
    c. The overall decrease in atomic and ionic radii from La to Lu is known as lanthanoid contraction. Atomic radii of second and third transition series are very similar.

OR

    c. Cr^{2+} is stronger reducing agent than Fe^{2+}

    Reason: $d^4 \rightarrow d^3$ occurs in case of Cr^{2+} to Cr^{3+}

    But $d^6 \rightarrow d^5$ occurs in case of Fe^{2+} to Fe^{3+}

    In a medium (like water) d^3 is more stable as compared to d^5

30. i. People experience water retention in tissue cells and intercellular spaces due to osmosis.
    ii. Through the process of osmosis, a bacterium on salted meat or candid fruit loses water, shrivels and dies.
    iii. The pure solvent flows out of the solution through the semi permeable membrane due to reverse osmosis. It is used in desalination of sea water.

    OR

    During intravenous injection, the concentration of the solution should be same as that of blood so that they are isotonic. Because if the solution concentration is hypertonic than blood cell will shrink and if it is hypotonic than blood cell will swells/burst.

Section E

31. Attempt either A or B

    (a) Answer the following questions:

    i. a. Nitrogeneous base linked with pentose sugar called as nucleoside while Nucleoside linked with phosphate group is called as nucleotide.
    b. Amylose is water soluble while amylopectin is water insoluble.

    ii. In the helical structure of DNA, the two strands are held together by hydrogen bonds between specific pairs of bases. Cytosine forms hydrogen bond with guanine, while adenine forms hydrogen bond with thymine. As a result, the two strands are complementary to each other.

    iii. Uracil, cytosine, guanine and adenine are present in RNA. Among these, uracil is not present in DNA.

    iv. Glycogen is stored in liver of animals. In the liver, glycogen can make up 5-6% of the organ's fresh weight, and the liver of an adult, weighing 1.5 kg, can store roughly 100-120 grams of glycogen.

    v.

Peptide linkage	**Glycosidic linkage**
Peptide linkage is formed between two amino acids.	Glycosidic linkage is formed between two monosachharides.

Hydrolysis of peptide linkage forms two amino acids.	Hydrolysis of glycosidic linkage forms two monosaccharides.
it links carbon and nitrogen atoms.	It links two carbon atoms through an oxygen atom.
It is found in polypeptides.	It is found in polysaccharides.
It can be represented as -CONH-.	It can be given as -C-O-C-.

(b) Answer the following questions:

i. i. The isomers which differ only in the configuration of the hydroxyl group at C-1 are called anomers and are referred to as α- and β-forms.

ii. 'a' carbon of glucose and 'b' carbon of fructose are the anomeric carbon atoms in the monosaccharide units.

ii. Vitamin B^{12} can be stored in our body.

iii. In α-helix structure of the protein, a polypeptide chain is stabilized by the formation of intramolecular H-bonding by twisting into right-handed screw with -NH- group of amino acids in one turn with the >C = O groups of amino acids belonging to adjacent turn.

iv. They store energy in the form of starch in plants.

v. Keratin and Myosin

32. Attempt either A or B

(a) Answer the following questions:

i. Pentamminenitrito –O-cobalt (III) ion

ii. i. Diamagnetic complex - $[Co(C_2O_4)_3]^{3-}$

ii. More Stable Complex - $[Co(C_2O_4)_3]^{3-}$

iii. Outer orbital complex - $[CoF_6]^{3-}$

iv. Low spin complex - $[Co(C_2O_4)_3]^{3-}$

iii. Ionization isomerism

iv. $\Delta_t = \left(\frac{4}{9}\right)\Delta_o$

v. Aquacyanidobis(ethane-1,2-diamine)cobalt(III) ion

(b) Answer the following questions:

i. cis platin $[Pt(NH_3)_2Cl_2]$

ii. $AgBr + 2Na_2S_2O_3 \rightarrow Na_3[Ag(S_2O_3)_2] + NaBr$

iii. i. Hexaamminecobalt(III)

d^2sp^3

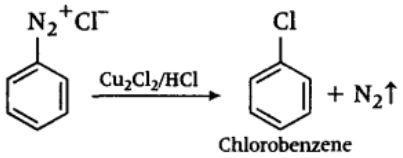
ii. Tetrachloridonickelate (II)

sp^3

iv. Tetraamine copper II sulphate

v. Six

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

ii. 

iii. $CH_3CONH_2 \xrightarrow{Br_2/KOH} CH_3NH_2 + K_2CO_3 + 2KBr + 2H_2O$

Hofmann bromamide degradation

OR

i. Aniline is a Lewis base and forms a salt with Lewis acid.
Aniline being a Lewis base reacts with Lewis acid ($AlCl_3$)to form a salt.

$$C_6H_5NH_2 + AlCl_3 \longrightarrow C_6H_5\overset{+}{N}H_2AlCl_3^-$$

As a result, N acquires a positive charge so, it acts as a strong deactivating group for electrophilic substitution reaction. Thus, aniline does not undergo Friedel-Crafts reaction.

ii. In aqueous solution, basic nature depends on + I-effect, H-bonding, and steric-effect.
The combined effect shows that $(CH_3)_2$·NH is more basic than $(CH_3)_3$·N as H-bonding is more in case of $(CH_3)_2$·NH than in $(CH_3)_3N$, which predominates over the stability due to +I- effect of three -CH_3 groups.

iii. Large pK_b value means a weak base

In aniline, the lone pair of electrons on N-atom is delocalized over the benzene ring. As a result, electron density on the nitrogen decreases and electrons are not available for donation. In contrast, in CH_3-NH_2, +I effect of -CH_3 group increases the electron density on the N-atom. Therefore, aniline is a weaker base than methylamine and hence, its pKb value is higher than that of methylamine.