CBSE EXAMINATION PAPER-2025

CHEMISTRY

(Solved)

Time allowed : 3 hours | Maximum Marks : 38

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **24 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 12** are multiple choice questions Each question carries **1 marks.**

iv. **Section B** – questions number **13 to 16** are very short answer Each question carries **2 marks.**

v. **Section C** – questions number **17 to 22** are short answer Each question carries **3 marks.**

vi. **Section D** – questions number **23 to 24** are case based questions

vii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

viii. Use of calculator is NOT allowed.

Section A

Question 1.

According to Werner's theory of coordination compounds:

[1 Marks]

(A) Primary valences are ionisable.

(B) Both primary and secondary valences are non-ionisable.

(C) Secondary valences are ionisable.

(D) Both primary and secondary valences are ionisable.

Question 2.

Which of the following complex ion is not optically active?

[1 Marks]

(A) cis-$[Co(en)_2Cl_2]^+$

(B) $[Co(ox)_3]^{3-}$

(C) trans-$[Co(en)_2Cl_2]^+$

(D) $[Co(en)_3]^{3+}$

Question 3.

Which of the following is the softest metal?

[1 Marks]

(A) Fe

(B) Zn

(C) Cu

(D) Sc

Question 4.

The freezing point of one molal KCl solution, assuming KCl to be completely dissociated in water, is: (Kf for water = 1·86 K kg mol^{-1})

[1 Marks]

(A) −1·86°C

(B) +2·72°C

(C) +3·72°C

(D) −3·72°C

Question 5.

A solution of acetone in ethanol:

[1 Marks]

(A) obeys Raoult's law.

(B) shows a negative deviation from Raoult's law.

(C) shows a positive deviation from Raoult's law.

(D) forms an ideal solution.

Question 6.

Which of the following cell converts the energy of combustion of fuel into electrical energy?

[1 Marks]

(A) Mercury cell

(B) Lead storage cell

(C) Dry cell

(D) Fuel cell

Question 7.

The unit of rate and rate constant are same for a:

[1 Marks]

(A) Second order reaction

(B) Zero order reaction

(C) First order reaction

(D) Third order reaction

Question 8.

Pyranose ring of glucose is formed due to the reaction between:

[1 Marks]

(A) C_1 and C_5

(B) C_1 and C_3

(C) C_1 and C_2

(D) C_1 and C_4

Question 9.

Assertion (A) : Actinoids show wide range of oxidation states.

Reason (R) : Actinoids are radioactive in nature .

[1 Marks]

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

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

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

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

Question 10.

Assertion (A) : Hydrolysis of an ester follows first order kinetics.

Reason (R) : The concentration of water does not get altered much during the reaction.

[1 Marks]

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

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

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

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

Question 11.

Assertion(A): Boiling point of (CH3)3N is higher than that of $CH_3CH_2CH_2NH_2$.

Reason (R) : Hydrogen bonding is more extensive in $CH_3CH_2CH_2NH_2$.

[1 Marks]

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

(B) Assertion (A) is false, but Reason (R) is true

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

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

Question 12.

Assertion (A) : Phenol is strongly acidic as compared to ethanol.

Reason (R) : Phenoxide ion is more stable than ethoxide ion.

[1 Marks]

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

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

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

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

Section B

Question 13.

State Henry's law. Why are aquatic species more comfortable in cold water as compared to warm water ?

[2 Marks]

Question 14.

Write IUPAC names of the following coordination compounds :

(i) $[CoCl_2(en)_2]SO_4$

(ii) $K_3[Fe(C_2O_4)_3]$

[2 Marks]

Question 15.

Differentiate between :

(i) Double salt and Complex compound

(ii) Didentate ligand and Ambidentate ligand

[2 Marks]

Question 16.

How do you explain the following ?

(a) Presence of an aldehydic group in glucose.

(b) Presence of five – OH groups in glucose.

[2 Marks]

Section C

Question 17.

Give reasons for the following :

(a) The pH of aqueous NaCl increases when it is electrolysed.

(b) Unlike dry cell, mercury cell has a constant cell potential through its lifetime.

(c) Conductivity of solution decreases with dilution.

[3 Marks]

Question 18.

Answer the following about the complexes $[FeF_6]^{3-}$ and $[Fe(CN)_6]^{4-}$:

(i) Write the hybridization involved in each case.

(ii) Which of them is the outer orbital complex and which one is the inner orbital complex ?

(iii) Compare their magnetic behaviour.

[Atomic number : Fe = 26]

[3 Marks]

Question 19.

(i) What happens to the colour of complex $[Ti(H_2O)_6]^{3+}$ when heated gradually ?

(ii) Write the electronic configuration for d^5 ion if $\Delta_o < P$.

(iii) Write the hybridization and magnetic behaviour of the complex $[Ni(CO)_4]$.

[Atomic number : Ni = 28]

[3 Marks]

Question 20.

A compound (A) with molecular formula C_4H_5N on reduction with DIBAL-H followed by hydrolysis, gives a compound (B). Compound (B) gives positive Tollens' test but does not give iodoform test. Compound (B) can also be obtained when ethanal is treated with dilute NaOH followed by heating. Identify (A) and (B). Write the reactions of (A) with DIBAL-H followed by hydrolysis.

[3 Marks]

Question 21.

How will you obtain the following from aniline ? Give chemical equations only.

(a) Sulphanilic acid

(b) Phenylisocyanide

(c) Acetanilide

[3 Marks]

Question 22.

Vapour pressure of pure water at 298 K is 24·8 mm Hg. Calculate the lowering in vapour pressure of an aqueous solution which freezes at– 0·3°C. (Kf of water = 1·86 K kg mol^{-1})

[3 Marks]

Section D

Question 23. Alcohols undergo a number of reactions involving the cleavage of C – OH bond. However, phenols do not undergo reactions involving the cleavage of C – OH bond. Alcohols are weaker acids than water. Alcohols react with halogen acids to form the corresponding haloalkanes. Phenols are stronger acids than alcohols. A characteristic

feature of phenols is that they undergo electrophilic substitution reactions such as halogenation, nitration, etc. Since – OH group is a strong activating group, phenol gives trisubstituted products during halogenation, nitration, etc.

Question 24.

The a-amino acids are the building blocks of proteins. All a-amino acids exist as zwitter ion due to which they show amphoteric behaviour. All amino acids are joined through peptide bond. Proteins are broadly classified as globular proteins and fibrous proteins. Globular proteins are water soluble, whereas fibrous proteins are not. The complete structure of protein is discussed at four different levels i.e. primary, secondary, tertiary and quaternary structures. Protein loses its biological activity in denatured form.

(1)

Define the following :

(i) Peptide linkage (ii) Denatured protein

[2 Marks]

(2)

Write the names of two different secondary structures of proteins.

[1 Marks]

(3)

Why do amino acids show amphoteric behaviour ?

[1 Marks]

(4)

How can you differentiate between Fibrous protein and Globular protein ?

[1 Marks]