ST. JOSEPH PUBLIC SCHOOL

Kota Barrage Road, Kota-6 (Raj.)

C.B.S.E. New Delhi, **CHEMISTRY**	**GUESS PAPER**
Class: **XII**	**2025-26**
Time: **3 HRS**	MM: **70**

Note: This guess paper has been prepared with the aim of helping students score good marks; however, it does not guarantee that the Board examination will contain exactly the same questions.

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. Ethylidene chloride is a/an _____. **[1]**

   a) gem-dihalide
   b) vic-dihalide
   c) vinylic halide
   d) allylic halide

2. Which of the following bases is not present in DNA? **[1]**

   a) Adenine
   b) Cytosine
   c) Thymine
   d) Uracil

3. Many naturally occurring aldehydes and ketones are used in the blending of perfumes and flavouring agents. But the preferred ones are_____. **[1]**

   a) lower ketones
   b) higher aldehydes
   c) lower aldehydes
   d) higher ketones

4. The correct IUPAC name of $CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{OH}{|}}{C}} - CH_2CH_3$ is **[1]**

   a) 2,2-Dimethylpropanol
   b) 2-Methylbutan-2-ol
   c) tert-butyl alcohol
   d) 3-Methylbutan-3-ol

5. When a catalyst increases the rate of a chemical reaction, then the rate constant (k): **[1]**

   a) increases
   b) may increase or decrease depending on the order of the reaction

c) remains constant d) decreases

6. Match the items given in column I with that in column II: **[1]**

Column I	Column II
(a) Ω^{-1} cm^2mol^{-1}	(i) Mercury Cell
(b) $\alpha_{dissoiation}$ is low	(ii) λ_m
(c) Decreases with dilution	(iii) Weak Electrolyte
(d) Electrolyte is a paste of KOH/ZnO	(iv) Conductivity

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

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

7. Maximum number of molecules of CH_3I that can react with a molecule of CH_3NH_2 is: **[1]**

a) 4 b) 3

c) 1 d) 2

8. The action of nitrous acid on ethylamine gives mainly: **[1]**

a) ethyl nitrite b) ethane

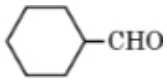
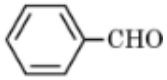
c) ethyl alcohol d) nitroethane

9. Rate of ionic reactions are generally **[1]**

a) Very slow b) Moderate

c) Slow d) Very fast

10. Which of the following does not give aldol condensation reaction? **[1]**

a)  b) 

c) CH_3COCH_3 d) CH_3 - CHO

11. Monochlorination of toluene in sunlight followed by hydrolysis by aq. NaOH yields **[1]**

a) m-cresol b) benzyl alcohol

c) o-cresol d) 2,4-dihydroxytoluene

12. Propanamide on reaction with bromine in aqueous NaOH gives: **[1]**

a) Ethanamine b) Propanenitrile

c) Propanamine d) N-Methyl ethanamine

13. **Assertion (A):** Except glycine, all naturally occurring α-amino acids are optically active. **[1]**

Reason (R): All α-amino acids occurring naturally except glycine has at least one asymmetric carbon.

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):** Benzoic acid does not give Friedel-Crafts reaction. **[1]**

Reason (R): The carboxyl group is deactivating and gets bonded to Lewis acid $AlCl_3$.

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):** Electron withdrawing groups in aryl halides decrease the reactivity towards nucleophilic substitution. **[1]**

Reason (R): 2,4 -Dinitrochlorobenzene is more reactive than chlorobenzene.

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 reaction of the alcohol with $SOCl_2$ is catalyzed by the presence of a tertiary amine (R_3N). **[1]**

Reason (R): Tertiary amine promotes the reaction by reacting with the by-product HCl.

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. Calculate the potential of the following cell Sn^{4+} (1.5 M) + Zn $\longrightarrow$ Sn^{2+} (0.5 M) + Zn^{2+} (2M). **[2]**

Given : $\mathbf{E}^0_{Sn^{4+}/Sa^{2+}} = 0.13V, E^0_{Zn^{2+}/Zn} = -0.76V$

Will the cell potential $\uparrow$ or $\downarrow$ if the concentration of Sn^{4+} is increased?

OR

Write the anode and cathode reactions occurring in a commonly used mercury cells. How is the overall reaction represented?

18. 10 ml of liquid A was mixed with 10 ml of liquid B. The volume of the resulting solution was found to be 19.9 ml what do you conclude? **[2]**

19. While filling up of electrons in the atomic orbitals, the 4s orbital is filled before the 3d orbital but the reverse happens during the ionization of the atom. Explain why? **[2]**

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

(a) Is rate of reaction always constant? **[1]**

(b) Express the rate of the following reaction in terms of disappearance of hydrogen in the reaction. **[1]**

$3H_2(g) + N_2(g) \rightarrow 2NH_3(g)$

21. How would you bring about the following conversions (any two): **[2]**

i. Propanal to butanone?

ii. Benzaldehyde to benzophenone?

iii. Benzyl chloride to benzonitrile?

Section C

22. How is 'ohm' expressed in terms of dimensions in SI unit? How do you arrive at this conversion? **[3]**

23. $[Cr(NH_3)_6]^{3+}$ is paramagnetic while $[Ni(CN)_4]^{2-}$ is diamagnetic. Explain why? **[3]**

Cr(24) = $[Ar]4s^1 3d^5$

Cr^{3+}(24) : $[Ar]4s^0\ 3d^3$

24. Name the reagents in the following reactions: **[3]**

i. Oxidation of a primary alcohol to a carboxylic acid

ii. Oxidation of a primary alcohol to an aldehyde

iii. Bromination of phenol to 2, 4, 6-tribromophenol

iv. Benzyl alcohol to benzoic acid

v. Dehydration of propan 2-ol-tio propene

vi. Butan -2-one to butan - 2- ol.

OR

Give two reactions that show the acidic nature of phenol. Compare acidity of phenol with that of ethanol.

25. Write the equations involved in the following reactions: **[3]**

i. Cannizzaro reaction

ii. Aldol condensation

iii. Hell-Volhard-Zelinsky reaction

26. Zinc rod is dipped in 0.1 M solution of $ZnSO_4$ **[3]**

The salt is 95% dissociated at is dilution at 298 K . Calculate the electrode potential. Given:

$E^0(Zn^{2+}/Zn) = -0.76$

27. How the following conversions can be carried out? **[3]**

i. 2-Methyl-1-propene to 2-chloro-2-methylpropane

ii. Ethyl chloride to propanoic acid

iii. But-1-ene to n-butyliodide

28. A first order decomposition reaction takes 40 minutes for 30% decomposition, calculate $t_{1/2}$ value for it. **[3]**

Section D

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

When a protein in its native form, is subjected to physical changes like change in temperature or chemical changes like change in pH, the hydrogen bonds are disturbed. Due to this, globules unfold and helix gets uncoiled and protein loses its biological activity. This is called the denaturation of protein.

The denaturation causes change in secondary and tertiary structures but primary structures remain intact. Examples of denaturation of protein are coagulation of egg white on boiling, curdling of milk, formation of cheese when an acid is added to milk.

i. Phospholipids form a thin layer on the surface of an aqueous medium. Give reason. (1)

ii. Which structure(s) of proteins remains(s) intact during the denaturation process? (1)

iii. What type of structure is α-helix and β-pleated structures of proteins? (2)

OR

Secondary structure of a protein refers to (2)

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

Isomers are two or more compounds that have the same chemical formula but a different arrangement of atoms. Due to the different arrangements of atoms, they differ in one or more physical or chemical properties. Two principal types of isomerism are known among coordination compounds. Stereoisomerism includes geometrical isomerism, optical isomerism while Structural isomerism consists of linkage isomerism, coordination isomerism, Ionisation isomerism and Solvate isomerism. Isomerism arises in heteroleptic complexes due to different possible geometric arrangements of the ligands. In a square planar complex of formula $[MX_2L_2]$ X and L are unidentate, the two ligands X may be arranged adjacent to each other in a cis isomer, or opposite to each other in

a trans isomer. Solvate form of isomerism is known as 'hydrate isomerism' in the case where water is involved as a solvent. This is similar to ionisation isomerism.

i. Optical isomers are called chiral. Explain (1)

ii. Draw one of the geometrical isomers of the complex $[Pt(en)_2Cl_2]^{2+}$ which is optically active. (1)

iii. Why thiocyanate is an ambidentate ligand? (2)

OR

Why molecular shape of $Ni(CO)_4$ is not the same as that of $[Ni(CN)_4]^{2-}$? (2)

Section E

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

(a) Give the structure of dichromate ion. **[1]**

(b) What are interstitial compounds. Give two examples **[1]**

(c) Reactivity of transition elements decreases almost regularly from Sc to Cu. Explain. **[1]**

(d) Why first ionisation enthalpy of Cr is lower than that of Zn? **[1]**

(e) The chemistry of the actinoids is more complex as compared to lanthanoids. Why? **[1]**

(f) State a consequence of lanthanide contraction shown by transition elements. **[1]**

(g) Give reasons for the following: **[1]**

i. Transition metals form alloys.

ii. Mn_2O_3 is basic whereas Mn_2O_7 is acidic.

32. Give plausible explanation for each of the following: **[5]**

i. Why are amines less acidic than alcohols of comparable molecular masses?

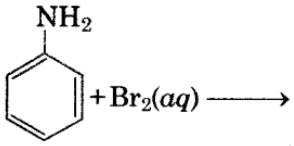
ii. Why do primary amines have higher boiling point than tertiary amines?

iii. Why are aliphatic amines stronger bases than aromatic amines?

OR

Write the main products of the following reactions:

i. $C_6H_5N_2^+Cl^- \xrightarrow{H_3PO_2 + H_2O}$

ii. 

iii. $CH_3 - \underset{\underset{O}{\|}}{C} - NH_2 \xrightarrow{Br_2 + NaOH}$

33. The vapour pressures of ethanol and methanol are 44.5 mm Hg and 88.7 mm Hg respectively. An ideal solution is formed at the same temperature by mixing 60 g of ethanol with 40 g of methanol. Calculate the total vapour pressure of the solution and the mole fraction of methanol in the vapour. **[5]**

OR

i. 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^oC. Calculate the degree of dissociation of $F - CH_2 - COOH$.

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

ii. Give reasons:

a. 0.1 M KCl has higher boiling point than 0.1 M Glucose.

b. Meat is preserved for a longer time by salting.