



CHEMISTRY

Class 12 - Chemistry

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

The question paper is divided into **four sections**:

1. Section A

- Q. No. 1 contains **Ten multiple choice type** of questions carrying **One mark** each.
- Q. No. 2 contains **Eight very short answer type** of questions carrying **One mark** each.

2. Section B

- Q. No. 3 to Q. No. 14 contain **Twelve short answer type** of questions carrying **Two marks** each. (Attempt any Eight).

3. Section C

- Q. No. 15 to Q. No. 26 contain **Twelve short answer type** of questions carrying **Three marks** each. (Attempt any Eight).

4. Section D

- Q. No. 27 to Q. No. 31 contain **Five long answer type** of questions carrying **Four marks** each. (Attempt any Three).

5. Use of the log table is allowed. Use of calculator is not allowed.

6. Figures to the right indicate full marks.

7. For each MCQ, correct answer must be written along with its alphabet. e.g., (a).... / (b) / (c)..... / (d)..... Only first attempt will be considered for evaluation.

8. Physical constants:- i) ----- ii) ----- iii) -----

Section A

1. **Select and write the correct answer:** **[10]**

(a) The number of atoms per unit cell of body centred cube is: **[1]**

- | | |
|------|------|
| a) 1 | b) 6 |
| c) 2 | d) 4 |

(b) The dissociation constant of NH_4OH is 1.8×10^{-5} . The degree of dissociation in its 0.01 M solution is _____. **[1]**

- | | |
|------------|-------------|
| a) 4.242 | b) 0.4242 |
| c) 0.04242 | d) 0.004242 |

- (c) The rate of reaction for certain reaction is expressed as: [1]

$$\frac{1}{3} \frac{d[A]}{dt} = -\frac{1}{2} \frac{d[B]}{dt} = -\frac{d[C]}{dt}$$
 The reaction is _____.
- a) $2B \rightarrow 3A + C$ b) $3A \rightarrow 2B + C$
 c) $2B + C \rightarrow 3A$ d) $3A + 2B \rightarrow C$
- (d) Which of the following element does NOT belong to first transition series? [1]
 a) Ag b) V
 c) Cu d) Fe
- (e) Effective atomic number rule is used to find _____. [1]
 a) number of possible ligands around metal ion in complex b) geometry of complex
 c) number of isomers of complex d) stability of complex
- (f) The stability order for carbocation is _____. [1]
 a) $3^\circ > 2^\circ > 1^\circ$ b) $3^\circ > 1^\circ > 2^\circ$
 c) $2^\circ > 3^\circ > 1^\circ$ d) $1^\circ > 3^\circ > 2^\circ$
- (g) Anisole on heating with concentrated HI gives _____. [1]
 a) Iodobenzene b) Phenol + Methanol
 c) Iodobenzene + Methanol d) Phenol + Iodomethane
- (h) The secondary structure of protein is determined by _____. [1]
 a) hydrogen bond b) ionic bond
 c) co-ordinate bond d) covalent bond
- (i) The name of metal nanoparticle which acts as highly effective bacterial disinfectant in water purification process is _____. [1]
 a) carbon black b) copper
 c) silver d) gold
- (j) Identify the strongest acid amongst the following. [1]
 a) Dichloroacetic acid b) Chloroacetic acid
 c) Trichloroacetic acid d) Acetic acid

2. **Answer the following:** [8]
- (a) Define nanotechnology. [1]
 (b) Write the structure of phenylmethanamine. [1]
 (c) Give the structural formula and IUPAC name of isobutylbromide. [1]
 (d) What happens when ethene reacts with iodine monochloride? [1]
 (e) Define Ionization isomer. [1]
 (f) What is **boiling point**? [1]
 (g) Define the term **enthalpy**. [1]
 (h) Define resistivity [1]

Section B

Attempt any 8 questions

3. What is the action of acidified potassium dichromate on the following: [2]
i. KI
ii. H_2S
4. Derive an expression to calculate molar mass of non volatile solute by osmotic pressure measurement. [2]
5. Define nanochemistry. [2]
6. Write balanced chemical equations for the following: [2]
i. Action of sodium metal on ethanol
ii. Action of zinc dust on phenol
7. Complete and rewrite the balanced chemical equation for the following reaction: [2]
1-chloro-2,4-dinitrobenzene $\xrightarrow[368\text{ K, H}^+]{\text{aq. alkali}}$?
8. Derive the relationship between pH and pOH . [2]
9. Identify **A** and **B** and rewrite the reaction. [2]
 $C_2H_5-N^+(CH_3)_3I^- \xrightarrow[\Delta]{Ag_2O/H_2O} (A) \xrightarrow{\Delta} (B) + (CH_3)_3N + H_2O$
10. Three moles of an ideal gas are expanded isothermally from 15 dm^3 to 20 dm^3 at constant external pressure of 1.2 bar. Estimate the amount of work in Joules. [2]
11. What are reducing and non-reducing sugar? [2]
12. Define enthalpy of sublimation. How is it related to enthalpy of fusion and enthalpy of vaporization? [2]
13. How are polythene and neoprene prepared? [2]
14. Write two uses of neon. [2]

Section C

Attempt any 8 questions

15. Define the following terms: [3]
i. Isotonic solution
ii. Hypertonic solution
iii. Hypotonic solution
16. Explain impurity defect in stainless steel with diagram. [3]
17. How much quantity of electricity in coulomb is required to deposit $1.346 \times 10^{-3}\text{ kg}$ of Ag in 3.5 minutes from $AgNO_3$ solution? [3]
[Given: Molar mass of Ag is $108 \times 10^{-3}\text{ kg mol}^{-1}$]
18. What is the action of the following on ethyl bromide? [3]
19. One mole of an ideal gas is expanded isothermally and reversibly from 10 L to 15 L at 300 K. Calculate the work done in the process. [3]
20. Calculate spin only magnetic moment of divalent cation of transition metal with atomic number 25. [3]
Salts of Ti^{4+} are colourless. Give reason.
21. Solubility product of magnesium hydroxide is 1.4×10^{-11} . Calculate the solubility of magnesium hydroxide. [3]
22. Explain ionisation isomerism in coordination compounds with a suitable example. [3]
23. The reaction $A + B \rightarrow$ products is first order in each of the reactants. [3]
i. How does the rate of reaction change if the concentration of A is increased by factor 3?

- ii. What is the change in the rate of reaction if the concentration of A is halved and concentration of B is doubled?
24. Write the classification of aliphatic ketones with example. [3]
25. What happens when sulphur dioxide is oxidised in presence of V_2O_5 ? [3]
26. **Answer the following:** [3]
- (a) Write chemical reactions involved in Cannizzaro reaction of methanal. [2]
- (b) Write chemical reaction for carbylamine test. [1]

Section D

Attempt any 3 questions

27. **Answer the following:** [4]
- (a) Write Arrhenius equation. Derive an expression for temperature variations. [2]
- (b) Give electronic configuration of $Gd(Z = 64)$. [1]
- (c) Define green chemistry. [1]
28. **Answer the following:** [4]
- (a) Under what conditions work done by a gas is **zero**? [2]
- (b) Write the name of monomer used for preparation of Nylon 6. [1]
- (c) What is denaturation of protein? [1]
29. **Answer the following:** [4]
- (a) Face centred cubic crystal lattice of copper has density of 8.966 g cm^{-3} . Calculate the volume of the unit cell. [2]
- [Given: Molar mass of copper is 63.5 g mol^{-1} and Avogadro number N_A is $6.022 \times 10^{23} \text{ mol}^{-1}$]
- (b) Write aldol condensation reaction between ethanal and propanal. [2]
30. **Answer the following:** [4]
- (a) Mention the number of unpaired electrons and geometry of following complexes: [2]
- a. $[NiCl_4]^{2-}$
- b. $[Ni(CN)_4]^{2-}$
- (b) Write cell representation of standard hydrogen electrode. [1]
- (c) Arrange the following in the increasing order of the property mentioned: [1]
- $HOCl, HClO_2, HClO_3, HClO_4$ (acidic strength)
31. **Answer the following:** [4]
- (a) Convert the following: [2]
- i. Ethyl alcohol into ethyl acetate
- ii. Phenol into benzene
- (b) Write the molecular and structural formula of: [2]
- Thiosulphuric acid