

SAMPLE PAPER-03

CHEMISTRY (Theory)

Time allowed: 3 hours

(Questions)

Maximum Marks: 70

General Instructions:

Class – XII

- All the questions are compulsory.
 - There are **26** questions in total.
 - Questions **1** to **5** are very short answer type questions and carry **one** mark each.
 - Questions **6** to **10** carry **two** marks each.
 - Questions **11** to **22** carry **three** marks each.
 - Questions **23** is value based question carrying **four** marks.
 - Questions **24** to **26** carry **five** marks each.
 - There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions in five marks each. You have to attempt only one of the choices in such questions.
 - Use of calculators is **not** permitted. However, you may use log tables if necessary.
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- Give the IUPAC name of $(\text{CH}_3) - \text{CO} - \text{CO} - \text{CH}_3$.
- Give an example of a) Miscelles system and b) Macromolecular colloid.
- Give reasons: NO_2 is paramagnetic while N_2O_4 is diamagnetic.
- Why it is necessary to wash the precipitate with water before estimating it quantitatively?
- Explain why vitamin C cannot be stored in our body?
- Give reasons:
 - Phenol has higher boiling point than toluene.
 - Unlike phenols, alcohols are easily protonated.
- Write a note on:
 - Hoffmann bromamide reaction
 - Hunsdiecker reaction
- Define co-ordination number.
 - Give the co-ordination number of atoms in ccp and bcc structures.

Or

If three elements A, B and C crystallize in a cubic solid with A atoms at the corners, B atoms at the cube centres and C atoms at the faces of the cube, then give the formula of the compound.

- An organic compound having molecular formula C_8H_{18} on monochlorination gives a single monochloride. Write the structure of the hydrocarbon.

10. Comment: Raoult's law as a special case of Henry's Law.
11. Give the mechanism of preparation of ethyl alcohol from ethene by acid catalysed hydration.
12. Although p-hydroxy benzoic acid is less acidic than benzoic acid, o-hydroxy benzoic acid is 15 times more acidic than benzoic acid. Why?
- 13.
- Define thermoplastics and thermosetting polymers with two examples each.
 - How polymers are classified?
14. Complete the following reactions:
- $\text{XeF}_4 + \text{SbF}_6 \rightarrow$
 - $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow$
 - $\text{XeF}_4 + \text{H}_2\text{O} \rightarrow$
15. Differentiate natural and vulcanized rubber.
16. If N_2 gas is bubbled through water at 293 K, then how many millimoles of N_2 gas would dissolve in 1 litre of water? Assume that N_2 exerts a partial pressure of 0.987 bar. Given that Henry's law constant for N_2 at 293 K is 76.48 kbar.
17. Differentiate different allotropes of sulphur (six points).
- 18.
- Define coordination isomerism.
 - What is meant by linkage isomerism?
 - What is ionisation isomerism?

Or

Give the biological importance of the existing coordination complexes.

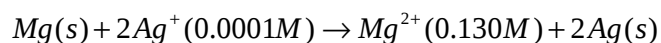
- 19.
- Why H_2S is less acidic than H_2Te ?
 - Ozone is used for purifying air in crowded places such as cinema halls, tunnels, etc.
20. Calculate the rate constant for the following data obtained during the first order thermal decomposition of N_2O_5 (g) at constant volume: $2 \text{N}_2\text{O}_5(\text{g}) \rightarrow 2 \text{N}_2\text{O}_4(\text{g}) + \text{O}_2(\text{g})$.
- | S.No | Time/s | Total pressure/ atm |
|------|--------|---------------------|
| 1. | 0 | 0.5 |
| 2. | 100 | 0.512 |
21. Give the prosthetic groups of the following proteins: nucleo proteins, glyco proteins, lipo proteins, phospho proteins and chromo proteins.
22. Define the following term:
- Rate law.
 - Order of a reaction.
23. You work in large University physical plant department, which oversees the day-to-day operations of the buildings on campus. The university currently maintains 14 days-scale-air-conditioning units that still use CFC production. A member of the budget committee comes to you because she is concerned about the potential costs of replacing so many units. She asks you these questions
- Since a cooling unit is sealed. Why does the continued use of CFC pose any risk to the environment?

- b. Can't the university simply buy a different refrigerant to replace the CFS and use it in the existing units? What would be the concern associated with such refrigerant replacement?

24. Resistance of a conductivity cell filled with 0.1 mol L⁻¹KCl solution is 100 W. If the resistance of the same cell when filled with 0.02 mol L⁻¹KCl solution is 520 W, calculate the conductivity and molar conductivity of 0.02 mol L⁻¹KCl solution. The conductivity of 0.1 mol L⁻¹KCl solution is 1.29 S/m.

Or

Represent the cell in which the following reaction takes place



Calculate its $E_{(cell)}$ if $E_{(cell)}^\theta = 3.17V$

25.

- Why scandium (Z = 21) is a transition element but zinc (Z = 30) is not?
- Why do the transition elements exhibit higher enthalpies of atomisation?
- Differentiate electrochemical cell and electrolytic cell (three points).

Or

- Define corrosion.
- Suggest two materials other than hydrogen that can be used as fuels in fuel cells.
- What are the factors affecting corrosion?

26.

- How is the variability in oxidation states of transition metals different from that of the non-transition metals? Illustrate with examples.
- Why is the highest oxidation state of a metal exhibited in its oxide or fluoride only?

Or

Describe the preparation of potassium dichromate from iron chromite ore. Give the effect of increasing pH on a solution of potassium dichromate.