

PG (CBCS)
M.SC. Semester- IV Examination, 2026
CHEMISTRY
PAPER: CEM 404
(CHEMISTRY IN TECHNOLOGY)

Full Marks: 40

Time: 2 Hours

The figures in the right-hand margin indicate full marks.
 Candidates are required to give their answers in their own words as far as practicable.

GROUP-A**1. Answer any FOUR of the following questions:****2×4=8**

- a) How does cyanide affect haemoglobin?
- b) Define clinical and forensic toxicology.
- c) What electron microscopy used for in biophysical studies?
- d) What is dynamic light scattering (DLS) used to measure?
- e) Define a toxic chemical in the environmental context.
- f) What is meant by a carcinogen?

**GROUP-B****2. Answer any FOUR of the following questions:****4×4=16**

- a) How drug–DNA complex is formed? Mention its significance in chemotherapy.
- b) Give a detailed account of the fundamentals of nanoscience and nanotechnology, including size regime, surface effects and quantum effects.
- c) Discuss the biochemical effects of arsenic and cadmium, and comment on their impact on enzymes.
- d) Briefly describe the principle of circular dichroism and its use in studying biomolecular structure.
- e) Explain the environmental significance of sulphur dioxide and ozone as toxic chemicals.
- f) Briefly describe the important applications of nanomaterials in medicine.

GROUP-C**3. Answer any TWO of the following questions:****2×8=16**

- a) Describe biomolecular complexes: protein–ligand and enzyme–substrate. Give suitable examples and discuss their functional significance.
- b) Describe the principles and practices of electron microscopy and atomic force microscopy in the analysis of materials and biomolecules.

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- c) Discuss synthesis, characterization and properties of gold nanomaterials, citing one method of synthesis and two characterization techniques.
- d) Discuss the toxicity of cyanide and pesticides, and explain how carcinogens exert their biochemical effects.

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