

Please check whether you have got the right question paper.

N.B:

1. All questions are compulsory.
2. Figures to the right indicate full marks.

- Q.1 a.** Attempt ANY TWO of the following: 8
- i) What are the safety precautions to be taken during storage of highly corrosive material in the chemical industry?
 - ii) Describe the different grades of chemicals used in laboratory.
 - iii) How is safety ensured while transporting highly inflammable materials?
 - iv) Write a note on ASTM data with reference to quality testing material.
- b.** What are the important instructions displayed near a chemical reactor to avoid accidents in the chemical plant? 4
- OR**
- b.** Discuss the fundamental requirements for patenting. 4
- Q.2 a.** Attempt ANY TWO of the following: 8
- i) How is pure water for electronic and pharma applications prepared by the membrane process?
 - ii) Describe the flow injection analysis. How is sample transported and detected in this technique?
 - iii) With suitable examples, explain ultra-filtration technique.
 - iv) Differentiate between dialysis and electro-dialysis with respect to separation mechanism and applications.
- b.** Write a note on 'microfiltration'. 4
- OR**
- b.** Discuss the applications of multilayer film for the determination of glucose in blood. Explain the role of different membranes and the mode of detection of reaction products. 4
- Q.3 a.** Attempt ANY TWO of the following: 8
- i) Elaborate on designing of green processes with reference to Inherent Safer Design (ISD) and Process Intensification (PI).
 - ii) Why CO₂ is the most preferred super-critical fluid?
 - iii) Atom economy helps to reduce the toxicity of the reaction. Justify with suitable examples.
 - iv) What are photochemical reactions? Explain their advantages.
- b.** Explain the electrochemical synthesis with suitable examples. 4
- OR**
- b.** Discuss the advantages of supercritical fluids over other organic solvents. 4
- Q.4 a.** Attempt ANY TWO of the following: 8
- i) What is zone electrophoresis? Discuss the factors which affect the migration rate of molecules in it.
 - ii) List the detectors used in capillary electrophoresis. Explain anyone in detail.

- iii) Explain the classification of nano materials. Elaborate carbon nanotubes with special reference to dimensions.
- iv) Give a detailed account of instrumentation used in gel electrophoresis.

b. Explain isoelectric focusing with its applications. 4

OR

b. What is Micellar electrokinetic capillary chromatography? Discuss its applications. 4

Q.5 Attempt ANY FOUR of the following: 12

- i) What is the sequence of documentation for patenting?
- ii) Explain the first aid treatment given to a victim of acid burn in laboratory.
- iii) What are the gas monitoring equipments?
- iv) Discuss the use of reverse osmosis for purification of brackish water.
- v) What are ionic liquids? List their applications as a solvent.
- vi) Explain the terms: a) Sustainable development b) Atom economy.
- vii) Give the applications of nanomaterials.
- viii) Describe the principle and applications of SDS-PAGE.
