Q.P. Code : 39079

[Time: $2\frac{1}{2}$ Hours] **[Marks: 60]**

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)** Explain the first-aid methods used in-case of accidents in chemical plants.
- **ii)** Describe the different grades of chemicals used in laboratory.
- **iii)** Explain the significance of patented work, how is it beneficial?
- **iv)** What safety precautions are essential while handling highly corrosive material in the chemical industry?

b. What is ASTM? How is it useful in chemical laboratory? **4**

OR

b. Explain the term 'hazardous code" Give the symbols of any three hazardous codes. **4**

Q.2 a. Attempt **ANY TWO** of the following: **8**
- **i)** 'The automation in instrumental analysis has overcome the limitations of conventional techniques.' justify.
- **ii)** What are the membrane processes? List the applications of ultra-filtration.
- **iii)** Compare and contrast discrete analyzers and continuous flow analyzers.
- **iv)** Describe the operation of flow injection analysis system for the determination of chloride in water.

b. What are gas monitoring equipments? **4**

OR

b. Write a note on micro filtration. **4**

Q.3 a. Attempt **ANY TWO** of the following: **8**
- **i)** How does the atom economy help to reduce the toxicity of the reaction?
- **ii)** Explain the steps taken in designing green process.
- **iii)** What are the advantages of super-critical fluids over organic solvents?
- **iv)** Discuss the applications of photo-chemical reactions.

b. What properties should the solvent possess for its use as a green solvent? **4**

OR

b. What are the advantages of using microwave technique for chemical reaction? **4**

Q.4 a. Attempt **ANY TWO** of the following: **8**
- **i)** What are nano-materials? How are they classified?
- **ii)** Explain the working of flow injection analyzer in the determination of iron in water.
- **iii)** Explain iso-electric focusing with its application.
- **iv)** What is meant by electro-phoretic and electro-osmotic flow in zone electrophoresis? Describe the basic instrumentation in this technique.

b. Explain the principle and application of gel electrophoresis. **4**

OR

b. List the applications of micellar electrokinetic capillary chromatography. **4**

Q.5 Attempt **ANY FOUR** of the following: **12**

i) Discuss the requirements to be fulfilled for applying for patent.
ii) What care is required to be taken in storage of hygroscopic materials?
iii) Explain how electro-dialysis is used for the preparation of salt-free water?
iv) What is reverse osmosis? Explain how is it used to purify brackish water.
v) Describe the zero-waste concept of green chemistry.
vi) "Ionic liquids are preferred to routine organic solvents" Explain the statement.
vii) Write a note on the optical and electrical properties of nano materials.
viii) Discuss the instrumentation and application of SDS page.

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