

Duration: 2<sup>1/2</sup> Hour

Max Marks: 60

**N.B: 1. All questions carry equal marks.****2. Figures to the right indicate full marks.****3. Use of non-programmable calculator is allowed.**

- Q.1 A. Attempt any TWO of the following: 08**
- What are membrane processes? Explain the operating principle and applications of “microfiltration”.
  - Explain the process of solvent extraction.
  - Describe dialysis and electro-dialysis.
  - Write a note on ultrafiltration.
- B. Attempt any ONE of the following: 04**
- Explain the use of solvent extraction in sample preparation and pre-treatment steps.
  - With the help of a neat, labelled diagram, explain how reverse osmosis is used to purify brackish water?
- Q.2 A. Attempt any TWO of the following: 08**
- With the help of labelled diagram, explain construction and working of a Soxhlet Extractor.
  - Define herb and explain types of Herbal drugs.
  - Enlist and explain any two methods of extraction of herbs.
  - What are the various guidelines of WHO on good manufacturing practices of herbal medicines?
- B. Attempt any ONE of the following: 04**
- Explain various factors to be considered while selecting solvents in the extraction of herbs.
  - Explain briefly drying and processing of herbal raw material.
- Q.3 A. Attempt any TWO of the following: 08**
- Enlist the twelve principles of green chemistry.
  - Calculate the percentage atom economy of acid hydrolysis of methyl acetate (C=12, H=1, O=16)
- $$\text{CH}_3\text{COOCH}_3 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{CH}_3\text{OH}$$
- Discuss the advantages of supercritical fluid over organic solvents.
  - Give brief account of photochemical reaction.

**B. Attempt any ONE of the following:** **04**

- i. With appropriate examples of reaction, explain the terms atom economy.
- ii. What is zero waste concept with reference to green chemistry?

**Q.4 A. Attempt any TWO of the following:** **08**

- i. Explain the zone electrophoresis.
- ii. Discuss the principle and applications of SDS-PAGE.
- iii. Write a short note on isoelectric focusing.

iv. What are nano materials? How are they classified?

**B Attempt any ONE of the following:** **04**

- i. Write a short note on continuous electrophoresis.
- ii. List the applications of nano materials.

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

- a. Enlist applications of dialysis and electro dialysis.
- b. Write the criteria used for solvent selection in solvent extraction Process.
- c. Explain selection and authentication of herbal materials.
- d. Define Phytotherapy and name the biological contaminants in herbal materials.
- e. How does the atom economy help to reduce the toxicity of the reaction?
- f. Write the principle and application of electro chemical synthesis.
- g. How is particle size of nano material is determined?
- h. Discuss the high voltage electrophoresis in brief.

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