(2½ Hours) **(Total 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.

1. A. Attempt **ANY TWO** of the following:- **(08)**

i) What is reverse osmosis? With the help of a neat labelled diagram, explain how it is used to purify brackish water.

ii) What are the membrane processes? Write the principle and applications of ultra-filtration.

iii) Elaborate- "Solvent Extraction as a means of analytical determination".

iv) Explain the terms in solvent extraction (a) Distribution ratio (b) Percentage extraction (c) Separation factor.

B. Attempt **ANY ONE** of the following:- **(04)**

i) Explain the desalination process of salty water using electro-dialysis.

ii) Explain the use of solvent extraction in sample preparation and pre-treatment steps.

2. A. Attempt **ANY TWO** of the following: **(08)**

i) Explain construction and working of Soxhlet Extractor.

ii) Define herb and explain preparation of herbal drugs.

iii) Discuss various guidelines of WHO on good manufacturing practices of herbal medicines.

iv) What is standardisation of herbal extract? Explain toxicological standardisation of herbal extract.

B Attempt **ANY ONE** of the following: **(08)**

i) Explain various factors to be considered while selecting solvents in the extraction of herbal materials.

ii) Discuss in brief percolation method used for extraction of herbal drugs.

3. A. Attempt **ANY TWO** of the following: **(08)**

i) 'Atom economy helps in reducing the toxicity of reactions'. Justify.

ii) Explain the electrochemical synthesis with suitable examples.

iii) What are the advantages of super-critical fluids over organic solvents?

iv) Discuss the applications of photo-chemical reactions.

B. Attempt **ANY ONE** of the following:- **(04)**

i) What properties should a solvent possess for its use as a green solvent?

ii) What are the advantages of using microwave technique for chemical reactions?

4. A. Attempt **ANY TWO** of the following: **(08)**

i) What are nano-materials? How are they classified?

ii) Explain the method of Isotaechophoresis.

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. Attempt **ANY ONE** of the following:- **(04)**

i) Explain the principle and application of gel electrophoresis

ii) Discuss the principle and instrumentation of SDS page.

5. Attempt **ANY FOUR** of the following: **(12)**

i) Discuss the 'Types of Membranes' used in membrane separation processes.

ii) Write the applications of microfiltration.

iii) Explain selection and authentication of herbal materials

iv) Write a note on drying and processing of herbal raw material.

v) Describe the zero-waste concept of green chemistry.

vi) "Ionic liquids are preferred to routine organic solvents" Explain the statement.

vii) Enlist the applications of Nano materials.

viii) Explain in brief the detectors used in electrophoresis.