Q.P. Code : 39079

[Time: 2½ 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?  
   OR

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

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?  
   OR

b. Write a note on micro filtration.  

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?  
   OR

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

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?

b. Explain the principle and application of gel electrophoresis.  
   OR

b. List the applications of micellar electrokinetic capillary chromatography.  

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Q.5 Attempt ANY FOUR of the following:

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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