QP Code : BV-14930

[Total Marks : 60

(2 ½ Hours)

N.B.: (1) All questions are compulsory.
(2) Use of log table or nonprogrammable calculator is permitted.

Q.1 (a) Attempt any Two of the following : 8

(i) Enlist the first aid methods used in case of accidents in chemical plants.

(ii) What care is to be taken while transporting the highly flammable materials ?

(iii) Discuss the fundamental requirements for patenting.

(iv) Give the importance of a reference or standard material in chemical analysis.

(b) Explain the term patent. What is the significance of patented work ? How is it beneficial ? 4

OR

(b) What are safety precautions to be taken during storage of highly corrosive material in the chemical industry ? 4

Q.2 (a) Attempt any Two of the following : 8

(i) Explain with example, how the automation in instrumental analysis has overcome the limitations of conventional techniques.

(ii) Describe the technique of ultrafiltration giving suitable example. How is it different from microfiltration?

(iii) Give the principle and applications of reverse osmosis.

(iv) Explain the basic operating principle of electro dialysis. How is it used for the preparation of salt free water ?

(b) Give an account of different membranes used in membrane separation processes. 4

OR

(b) Describe the instrumentation involved in the Flow Injection analysis with a suitable example. 4

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Q.3 (a) Attempt any Two of the following 8

(i) What are the advantages of microwave technique in chemical synthesis ?

(ii) Explain the atom economic and uneconomic reactions with suitable examples.

(iii) Discuss the advantages of supercritical fluids over other organic solvents.

(iv) Give a brief account of photochemical reactions with respect to their principle and applications.

(b) Calculate the percentage atom economy for the reaction involving acid hydrolysis of methyl acetate. 4

OR

(b) Elaborate on designing of green processes with reference to Inherent Safer Design (ISD) and Process Intensification (PI). 4

Q.4 (a) Attempt any Two of the following: 8

(i) What is zone electrophoresis? What are the different factors which affect the migration rate of molecules in zone electrophoresis ?

(ii) Describe capillary electrophoresis giving the emphasis on the method of detection.

(iii) Explain the principle, instrumentation and applications of SDS PAGE technique.

(iv) What is Micellar electrokinetic capillary chromatography ? What are its applications ?

(b) How are nano materials classified ? Explain the dimensionality of carbon nano tubes. 4

OR

(b) Explain the principle and applications of gel electrophoresis. 4

Q.5 Attempt any Four of the following : 12

(i) What care is required to be taken in storage of hygroscopic materials ?

(ii) What is ASTM ? How is it useful in chemical laboratory ?

(iii) Compare and contrast discrete analysers and continuous flow analysers.

(iv) Discuss the application of multi layer film technique in the determination of potassium ions in serum sample.

(v) Give the principle and applications of electrochemical synthesis.

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

(vii) Discuss the applications of capillary isoelectric focusing method.

(viii) Explain the ...