

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

1. (a) Attempt any Two of the following : 8
- (i) Give 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) Explain importance of ASTM in quality testing of material.
 - (iv) Elaborate the terms LR, GR and AR with respect to the quality of laboratory material.
- (b) Discuss the requirements to be fulfilled for applying for patent. 4
- OR**
- (b) Write a note on storage and handling of concentrated acids in industry. 4
- 2 (a) Attempt any Two of the following : 8
- (i) How is pure water for electronic and pharma applications prepared by membrane processes?
 - (ii) Describe the technique of ultrafiltration giving suitable example. How is it different from microfiltration?
 - (iii) Discuss the principle and applications of reverse osmosis
 - (iv) Explain the desalination process of salty water using electrodialysis with special reference on the membranes used.
- (b) Explain the instrumentation of Flow injection analysis. 4
- OR**
- (b) Describe the application of multilayer film for the determination of glucose in blood. Explain the role of different membranes and the mode of detection of reaction products. 4
3. Attempt any Two of the following : 8
- (i) What are the advantages of using microwave technique for chemical reactions?
 - (ii) Explain atom economic and non economic process. How does the atom economic process assist in reduction of toxicity?

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- (iii) What properties should the solvent possess for its use as a green solvent?
- (iv) Give brief account of photochemical reaction with principle and applications.

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

OR

(b) Calculate the % atom economy of the acid hydrolysis reaction of methyl acetate. **4**

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

- (i) What is zone electrophoresis? Discuss factors which affect the migration rate of molecules in it.
- (ii) Describe the principle and instrumentation used in capillary electrophoresis.
- (iii) What are nano materials? How are they classified?
- (iv) Explain isoelectric focusing with its applications.

(b) Discuss the principle, instrumentation and applications of SDS page. **4**

OR

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

5. Attempt any **Four** of the following : **12**

- (i) What is transportation symbol ? Give three examples.
- (ii) Explain the advantages patenting.
- (iii) How does automation enhance the acceptability of the results?
- (iv) Discuss the use of reverse osmosis for purification of brackish water.
- (v) What is zero waste concept with reference to green chemistry?
- (vi) Explain the use of ionic liquid as solvent and catalyst.
- (vii) Give the applications of miscellar electrokinetic capillary chromatography.
- (viii) Write a note on "the optical and electrical properties of nano materials".

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