22232

3 Hours / 70 Marks

Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Figures to the right indicate full marks.

(3) Assume suitable data, if necessary.

(4) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following : **10**

(a) Describe the importance of chemical kinetics in chemical reaction engineering.

(b) Give the classification of different chemical reactors.

(c) Enlist the different personal protective equipments. (any four)

(d) Draw hazards symbols for bio and toxic materials.

(e) Define molarity of the solution.

(f) Define the wet bulb and dry bulb temperature.

(g) Define electrical conductivity. State its unit.

2. Attempt any THREE of the following : **12**

(a) Describe the importance of scale up in process industry.

(b) Differentiate between batch reactor and continuous reactor. (any four point)

(c) State Daltons and Amagats law.

(d) Describe the construction and working of Abbe's refractometer.

3. Attempt any THREE of the following : **12**

(a) Describe the different methods of expression for the given concentration and composition of solution.

(b) An aqueous solution of NaCl is prepared by dissolving 20 kg of NaCl in 40 kg of water. Find (a) Weight %, (b) Mole % compositon of solution.

[At. wt. of Na = 23, Cl = 35.5]

(c) Describe application of pH measurement in industry. How pH affect the electrical conductivity ?

(d) Describe the importance of filteration in chemical industry.

4. Attempt any THREE of the following : **12**

(a) Explain the first and second laws of thermodynamics.

(b) Explain the importance of emergency exit route and assembly point.

(c) Explain the different first aid measures in chemical industry.

(d) Find the molarity and normality of 1 lit solution in which 165 gms of H_2SO_4 is dissolved (Density of solution = 1.10 g/mL)

[Atomic weight of H = 1, S = 32, O = 16]

(e) What are the purposes of doing size reduction in chemical industry ?

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

(a) Explain the principle, construction and working of pH meter with glass electrode.

(b) Explain the principle of the following :

(i) Sedimentation

(ii) Leaching

(iii) Crystallization

(iv) Adsorption

(c) Explain the following unit processes with suitable example :

(i) Reduction

(ii) Dehydrogenation

(iii) Pyrolysis

6. Attempt any TWO of the following : **12**

(a) Explain the construction and working of conductivity meter.

(b) Differentiate between drying and evaporation (5 points).

(c) Draw a neat sketch of electrostatic separator.
