

22231

23242

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. Attempt any FIVE of the following :

$2 \times 5 = 10$

- (a) Define Scale up.
- (b) Give the relation between chemical kinetics and thermodynamics.
- (c) Enlist different types of Accidents.
- (d) Give the use of emergency Exit route and Assembly point.
- (e) Define weight percent to express composition.
- (f) Write down the formula to calculate Normality of the solution.
- (g) Define electrical conductivity and give its unit.



2. Attempt any THREE of the following : 4 × 3 = 12

- (a) Differentiate chemical industries on the basis of application.
- (b) Explain the impact of major accidents in chemical industry.
- (c) Write down the formula of mole % and volume %.
- (d) Give the effect of temperature and solvent on solubility of a solute.

3. Attempt any THREE of the following : 4 × 3 = 12

- (a) Describe Dalton's law and Amagat's law with formula.
- (b) 4 grams of NaOH (molecular weight 40) are dissolved in water to obtain 100 ml solution. Find the normality and molarity of the solution.
- (c) Describe Refractive Index and its dependency on composition.
- (d) Describe importance of "Distillation" in chemical industry.

4. Attempt any THREE of the following : 4 × 3 = 12

- (a) Explain the relationship between chemistry and chemical engineering.
- (b) Explain the importance of safety in chemical industry.
- (c) Explain different causes of accidents in industry.
- (d) An aqueous solution of NaCl is prepared by dissolving 25 kg of NaCl in 100 kg of water. Find the weight % and mole % composition of solution.
- (e) Enlist different "unit process". Explain any one in details.

**5. Attempt any TWO of the following :****6 × 2 = 12**

- (a) Explain principle, construction and working of conductivity meter.
- (b) Explain the following unit process with example :
  - (i) Sulphonation
  - (ii) Hydrogenation
  - (iii) Dehydration
- (c) Explain unit operation “Electrodialysis” with diagram.

**6. Attempt any TWO of the following :****6 × 2 = 12**

- (a) Explain principle, construction and working of pH meter with glass electrode.
  - (b) Classify unit operations and unit processes (min. 5 points).
  - (c) Give the application of :
    - (i) Distillation
    - (ii) Leaching
    - (iii) Drying unit operations
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