23124

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

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.

Marks

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

- (a) Give classification of chemical industry based on application.
- (b) Draw hazard symbols for toxic and corrosive chemicals.
- (c) List out types of accidents.
- (d) Give classification of reactors based on shape.
- (e) Define normality of solution.
- (f) Define specific gravity and write down the formula.
- (g) Describe pH scale.

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

- (a) Differentiate batch reactor and continuous reactor.
- (b) Enlist personal protective equipments with their use.
- (c) Write formula for mole% and volume%.
- (d) Define solubility and explain effect of temperature on solubility.

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

   (a) Describe Dry bulb and Wet bulb temperature.

   (b) An aqueous solution of Sodium Chloride is prepared by dissolving 10 kg of Sodium Chloride in 50 kg of water. Find (a) Weight% (b) Mole% composition of solution.

   Mol. wt of $Na = 23$, $Cl = 35.5$, $H = 1$, $O = 16$.

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

   (d) Describe the importance of size reduction in the industry.

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

   (a) Give the relationship between chemical kinetics and thermodynamics.

   (b) Explain importance of safety in chemical industry.

   (c) Give any four standard safety instructions.

   (d) 50 gm NaOH is dissolved in water to prepare 1500 ml solution. Calculate (i) Normality and (ii) Molarity of the solution.

   (e) Enlist different unit operations. Explain any one in detail.

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

   (a) Explain Abbe's refractometer and state its industrial applications.

   (b) Explain the principle of following :

   (i) Filteration

   (ii) Screening

   (iii) Distillation

   (iv) Leaching

    (c)   Explain following unit processes with suitable example :

        (i)   Nitration

        (ii)   Esterification

        (iii) Hydrogenation

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

    (a)   Explain electrical conductivity meter with neat sketch.

    (b)   Differentiate unit operations and unit processes. Explain gas absorption in detail.

    (c)   Describe electro-dialysis.

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