

22231

11819

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.
 - (8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. **Attempt any FIVE of the following:** **10**
- a) How chemical industry classified based on application.
 - b) Enlist the different types of Accidents.
 - c) Draw the symbols of Hazards (flammable and toxic materials).
 - d) Define unsafe act.
 - e) Define Molarity of solution and how it is calculated?
 - f) Define pH solution. Write the scale for it.
 - g) Enlist different unit operation (Any four).
 - h) Define Evaporation and Leaching.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Define the term chemical Kinetics. Explain importance of Kinetics of chemical engineering.
 - b) Draw the personnel protective equipment (any two).
 - c) Draw the symbol of unit operation –
 - (i) Size Reduction
 - (ii) Ball Mill
 - d) Write working principal of conductivity motor.
- 3. Attempt any THREE of the following:** **12**
- a) Describe Dalton's law and Amagat's law with example.
 - b) Air contain 21% O₂ and 79% N₂ by volume. Calculate the composition in terms percentage by weight.
 - c) Describe application of pH measurement in industry. How pH affect the electrical conductivity.
 - d) Define unit operation and give its classification.
- 4. Attempt any THREE of the following:** **12**
- a) Explain the laws of Thermodynamics.
 - b) Describe the major causes of accident in chemical industries.
 - c) The combustion of 2.68 kg of a sample of coal yield 3.48 m³ of carbon dioxide gas measured at NTP condition. Find the carbon content of the sample.
 - d) Differentiate between filtration and sedimentation.
 - e) Define solubility and give the effect of temperature on a solubility of solute.

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

- a) Explain the measurement of Refractive index and its dependence on composition and temperature.
- b) Explain following unit process with example.
 - (i) Reduction
 - (ii) Calcination
 - (iii) Nitration
- c) Explain the concept of dry bulb, wet bulb temperature. How they are measured?

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

- a) Explain the working of Abbe's Refractometer.
 - b) Explain the principle of the following –
 - (i) Distillation
 - (ii) Drying
 - (iii) Crystallization
 - c) Draw a neat sketch of electrodialysis.
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