22231

24225

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.

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

Marks

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

(a) Draw the labelled sketch of batch reactor.

(b) What is the relationship between chemistry and chemical engineering ?

(c) Why scale up study is necessary ?

(d) Draw the symbol representing hazard due to flammable and toxic material.

(e) Define wet bulb temperature. State the condition at which dry bulb temperature will be equal to wet bulb temperature.

(f) Write the working principle of Abbe's refractometer.

(g) Write the relation between strength and normality.

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

(a) State the importance of kinetics and thermodynamic study.

(b) With suitable example, write the classification of chemical industry based on application.

(c) Explain the concept and need of emergency exit route and assembly point.

(d) Write the first aid to be used in following cases :

(i) Eye injury (Chemical)

(ii) Burn

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

(a) Estimate the quantity of H_2SO_4 required to prepare 0.25 N, 5 L Solution.

(b) LPG contains 64% Butane (C_4H_{10}) and 34% Propane (C_2H_6) on mole% basis. Calculate composition in wt%.

(c) Explain the method to measure specific gravity of any material using specific gravity bottle.

(d) Write the statement and mathematical expression of Dalton's law and Amagat's law.

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

(a) State the working principle and applications of distillation and leaching.

(b) Define Electrical conductivity. State its unit. State relationship between electrical conductivity and conductance.

(c) What is meaning of term saturation solubility ? On what factors solubility of solute depends ?

(d) Draw the sketch of Abbe's refractometer and label the parts.

(e) Explain the major causes of industrial accidents with examples.

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

(a) Explain oxidation and pyrolysis with example and chemical reaction.

(b) Explain following unit operations on purpose, principle and applications :

(i) Size reduction

(ii) Filtration

(iii) Evaporation

(c) Draw sketch of pH electrode. State the industrial application of pH measurement.

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

(a) With neat sketch, explain electro dialysis process.

(b) Draw the symbol as per IS3232 :

(i) Ball mill

(ii) Evaporator

(iii) Absorption Column

(iv) Jaw crusher

(v) Crystallizer

(vi) Plate and frame filter

(c) Suggest the name of Unit Operations/Unit process to be used for the following application :

(i) Solid-Solid separation

(ii) Removing suspended impurities from water

(iii) Extraction of Oil from Oil seeds.

(iv) Producing Vanaspati Ghee from Oil.

(v) Manufacturing of Cement

(vi) Production of nitrated compound (TNT)