312341

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 answer 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: **10**

a) Give the classification of chemical industries based on type of product.

b) List out various job roles available to chemical engineers in industry (Write any four job roles).

c) What is first-aid measure?

d) Define normality of solution.

e) Draw a neat sketch of fire triangle.

f) Define specific gravity.

g) Write the names of any four unit operations used in chemical industry.

P.T.O.

Marks

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

a) Describe the relation between chemistry and chemical engineering.

b) Draw a neat sketch of any four PPFs used in chemical laboratories.

c) Define pH solution. Draw a neat sketch of pH scale.

d) Describe the criteria for selecting material of construction in chemical process industry.

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

a) Describe the procedure to measure the density of any solution using specific gravity bottle.

b) 20 gms of caustic soda is dissolved in water to prepare 500 ml of solution. Find the normality and molarity of solution.

c) Describe the modes of heat transfer operation with suitable examples.

d) Describe the following unit processes with suitable example.

i) Oxidation

ii) Sulphanation.

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

a) Describe the commonly used physical properties of solutions.

b) Discuss the history and evolution of chemical engineering in India.

c) Discuss standard safety instruction to be followed while working in chemical laboratory.

d) Describe the following properties of materials –

i) Ductility

ii) Malleability

iii) Tensile strength

iv) Corrosion Resistance.

e) Describe the distillation and drying operation.

Marks

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

a) Draw the symbol of following equipment as per IS 3232.

i) Ball mill

ii) Jaw crusher

iii) Filtration

iv) Tray dryer

v) Stirrer

vi) Centrifugal pump.

b) An aqueous solution of caustic soda (NaOH) is prepared by dissolving 20 kg of caustic soda in 50 liter of water. Find weight %, mole % of composition of solution (Take purity of caustic soda is 100%). Density of water = 1 kg., 1 lit.

c) Describe the application of following MOC used in process industries –

i) Carbon steel

ii) Stainless steel

iii) Titanium.

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

a) Write four example of equipments each used for following operation in chemical industry –

i) Size Reduction

ii) Size Separation

iii) Transportation of fluid.

b) Describe the concept, applications and examples of instruments used for measurement.

c) Describe the concept and application of following material of construction. (Polymeric materials) used in process industries –

i) Polypropylene

ii) Teflon

iii) Low density polyethylene.