TED (10)–5083

(REVISION—2010)

Reg. No. ....

Signature ....

FIFTH SEMESTER DIPLOMA EXAMINATION IN POLYMER
TECHNOLOGY—OCTOBER, 2012

CHEMICAL ENGINEERING

[*Time* : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. State the difference between fundamental and derived units.

2. Define molality and normality.

3. Define thermal conductivity.

4. Write the advantages of mixer settlers.

5. Define relative volatility.   (5×2=10)

PART—B

(Maximum marks : 30)

II Answer *any five* of the following.

1. (a) Define density and specific gravity.   2

   (b) Calculate the normality of sodium carbonate and hydrochloric acid using the following data :
       (i) 2.1 gm of sodium carbonate is dissolved in 250 ml. water.
       (ii) 18 ml of sodium carbonate solution is neutralised by 20 ml of hydrochloric acid solution.   4

2. (a) Explain Fourier's law of thermal conduction.   3

   (b) Estimate the heat loss per m^2 of the surface through a brick wall 0.5 m thick, when the inner surface is at 400 K and the outside surface is at 310 K. (The thermal conductivity of the brick may be taken as 0.7 w/(m.k).   3

3. (a) What is natural convection ? Give two examples.   3

   (b) Write the classification of individual heat transfer co-efficient.   3

4. Differentiate between gas absorption and distillation.   6

5. Explain the working of valve plates for distillation column.   6

6. Explain minimum reflux ratio for distillation.   6

7. Explain simple distillation.   6

[497]   [P.T.O.

Marks

PART—C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each question carries 15 marks.)

UNIT—I

III (a) Give the concept of dimensional analysis and explain one of its application. 8

(b) Explain the uses of flow diagrams and prepare one flow diagram for any chemical process. 7

OR

IV (a) Explain :

(i) Various systems of units (ii) Advantages of S.I system 6

(b) Calculate the volume corresponds to one gram of Nitrogen at 3 atm pressure and temperature at 600 K. 6

(c) Calculate the amount of NaOH required to prepare 500 ml of 2N solution. 3

UNIT—II

V (a) Derive an equation of heat flow through thick walled cylinder. 8

(b) Derive the quantity of heat flow rate through a plane wall under conduction. 7

OR

VI (a) Derive an equation of heat transfer through spherical wall. 8

(b) Derive the conduction equation through compound resistances in series for composite wall. 7

UNIT—III

VII (a) Explain the working of long tube vertical evaporator and draw the diagram. 8

(b) Draw the diagram of horizontal Ballman extractor and explain the working to extract cotton seed oil. 7

OR

VIII (a) Explain the working of perforated plate tower for continuous counter current extraction. 8

(b) Explain the characteristics and types of tower packings in absorption. 7

UNIT—IV

IX (a) Explain the working of Bubble cap plate and sieve plate for distillation column. 8

(b) Explain batch distillation, draw the distillation unit. 7

OR

X (a) Explain steam distillation. 8

(b) Explain :

(i) Liquid flow patterns over tray.

(ii) Entrainment. 7