



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 154603

Roll No.

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B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15
HEAT & MASS TRANSFER

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions. Assume suitable data, if required.
All question carry equal marks.

1. Attempt any four parts of the following : $5 \times 4 = 20$
 - (a) Discuss the term 'Critical thickness of insulation' with suitable example.
 - (b) Describe Henry's Law with suitable example.
 - (c) Classify different types of condensers with suitable examples.
 - (d) Discuss the emissivity of a black body.
 - (e) Write a short note on 'Principles of Convection'.
 - (f) Explain 'Molecular diffusion' and 'Turbulent diffusion'.

- 2 Attempt any two parts of the following : 10×2
- (a) Discuss the different modes of drying operation. With the help of neat sketch, explain the construction and operation of a rotary dryer.
 - (b) Derive the expression for heat-transfer rate for steady state conduction through a spherical wall.
 - (c) Define the term NTU. Also enumerate the steps of designing of a packed column.
3. Attempt any two parts of the following : 10×2
- (a) Write a short note on 'Mass transfer in fluidized bed'. Also discuss the equilibrium solubility of gases in liquids.
 - (b) Justify the statement that temperature affects diffusion coefficients. Also discuss Fick's law of diffusion with suitable example.
 - (c) Write short note on 'Selection of solvents'. Also give the complete procedure for the determination of mass transfer coefficients with suitable example.
4. Attempt any two parts of the following : 10×2
- (a) Give the classification of the different types of crystallizers. Also discuss the controlling factors for nucleation and crystal growth.

- (b) Define critical moisture content. A wet solid is to be dried from 50% to 25% moisture under constant drying conditions in 7 hrs. If the equilibrium moisture content is 6% and critical moisture content is 14%, how long it will take to dry solids to 11% moisture under the same conditions.
- (c) Discuss the construction and working of heat exchangers with neat sketch. Also describe the need of LMTD in heat transfer process.
5. Write short notes on any four of the following : 5×4
- (a) Absorption in tray column
 - (b) View factor
 - (c) Forced convection
 - (d) HTU and HETP
 - (e) Surface diffusion
 - (f) Absorption equilibrium.
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