Printed Pages: 4   ECH-606

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 154603	Roll No.

B.TECH.

Theory Examination (Semester-VI) 2015-16

HEAT AND MASS TRANSFER

Time : 3 Hours   *Max. Marks : 100*

Note: Attempt all 3 sections.

Section-A

1.   **Attempt all the parts. Write answer of each part in short.   (2×10=20)**

   (a)   What do you mean by critical thickness of insulation?

   (b)   What is thermal conductivity of a material?

   (c)   How the turbulent flow plays a role in heat transfer?

   (d)   Define and give the significance of Sherwood Number.

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(e) Define turbulent diffusion?

(f) Define convection.

(g) What do you understand by dirt factor?

(h) Define and give the significance of Peclet Number.

(i) What do you understand by view factor?

(j) Define mass transfer coefficient?

(k) What do you mean by LMTD .

Section-B
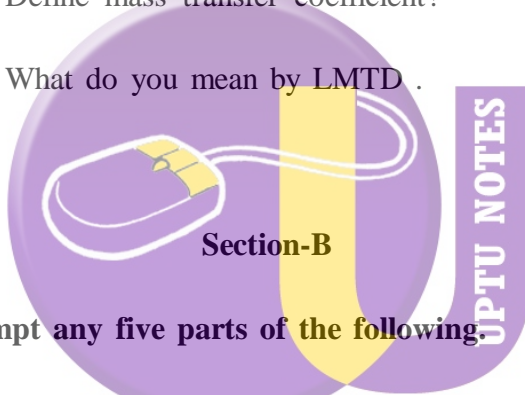
2. **Attempt any five parts of the following.** (**10×5=50**)

(a) Differentiate between a black body and a gray body. What is Kirchoff's law.

(b) Two parallel black plates 0.5m x 1 m are kept 2m apart and they face each other. One plate is held at 600K while the other plate is maintained at 400K.Calculate the radiant heat exchange between the plates.

(c) Explain versatility of shell and tube heat exchanger. Explain the principle and working of 2-4 shell and tube heat exchanger with neat labeled sketch.

(d) Discuss the process of adsorption in detail and its applications in chemical industries.

(e) Explain the construction and operation of packed bed absorption tower with the help of a neat sketch.

(f) A wet solid is to be dried from 35% to 10% moisture under constant drying conditions in five hours. If the equilibrium moisture content content is 4% and the critical moisture content is 14%, how long it will take to dry solids to 6% moisture under the same conditions?

(g) Define and explain the following:

(i) Crystallography

(ii) Super saturation

(iii) Equilibrium yield of crystallization

(iv) Factors governing nucleation

(h) Define Radiation, black body, grey body and Kirchoff's law .

Section-C

Attempt any two parts of the following. (15×2=30)

3. How the equilibrium relations are represented in the operation of Adsorption and also explain Adsorption hysteresis.

4. Classify the various types of dryers used in chemical process Industries. Also explain the construction and operation of a spray dryer with the help of neat sketch.

5. Classify different types of diffusion. Explain the dependency of diffusion coefficient on temperature.