Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (2012 Onwards) (Sem.–6)

HEAT TRANSFER

Subject Code : BTME-602

M.Code : 71186

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. Define heat transfer coefficient.

b. Write the relation of overall heat transfer co-efficient (U_0) of hollow cylinder when heat travels from outside to inside.

c. Write the boundary conditions of an infinitely long fin.

d. Define critical thickness of insulation.

e. Define radiosity. Write relation between radiosity and irradiation.

f. What are the drawbacks of Rayleigh's method?

g. What is reciprocity theorem?

h. What are the drawbacks of LMTD method?

i. Define emissive power.

j. What are empirical correlations?

SECTION-B

2. Derive three dimensional heat conduction equations in cylindrical coordinates considering internal heat generation.

3. Derive relation for heat exchange between two infinitely long nonblack planes.

4. Find functional relationship for pressure drop of fluid passing through a tube of diameter D with velocity V. The density and dynamic viscosity of fluid are ✕and ⌣respectively.

5. What are the different regimes of boiling?

6. Derive the relation for average value of temperature difference between the fluids of a heat exchanger.

SECTION-C

7. Derive the relation of temperature distribution and heat transfer for rectangular fin of infinite length.

8. The temperatures on the inner and outer sides of a furnace wall are 650°C and 250° C respectively. It is exposed to ambient air at 50°C. To reduce the heat loss from the furnace, its wall thickness is increased to double. Determine the %age decrease in heat loss due to change in wall thickness assuming no change in surface and ambient temperatures.

9. Calculate radiation heat transfer in :

   a. Two discs of diameter 50cm placed parallel to each other concentrically at a distance of lm. The disc temperatures are 720°C and 220°C respectively, when no other surface present except the discs.

   b. A 5cm sphere at 600°C placed near an infinite wall at 100°C.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.