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

Total No. of Questions : 18

B.Tech. (AE) (2012 to 2017) (Sem.–5)

HEAT TRANSFER

Subject Code : BTAE-503

M.Code : 70486

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

Write briefly :

1. What are the modes of heat transfer in a boiler?
2. Write basic one-dimension equation for conduction heat transfer with internal heat generation.
3. What do you mean by critical thickness of insulation?
4. What is a fin effectiveness?
5. What is NTU?
6. Why counter flow heat exchanger is more effective than parallel flow?
7. What do you mean opaque bodies?
8. Explain Stefan Boltzmann's law?
9. Which dimensionless number is more significant in turbulent flow?
10. What are grey and black bodies?

SECTION-B

11. What is thermal diffusivity? Discuss its significance.

12. One face of a copper plate 3 cm thick is maintained at 400 °C, and the other face is maintained at 100°C. How much heat is transferred through the plate? Take thermal conductivity for copper is 370W/m°C at 250°C.

13. Two infinite black plates at 800°C and 300°C exchange heat by radiation. Calculate the heat transfer per unit area.

14. Drive the relationship for the heat transfer from the fin losing heat from tip.

15. What is thermal boundary layer?

SECTION-C

16. A certain material 2.5 cm thick, with a cross-sectional area of 0.1 m^2, has one side maintained at 35°C and the other at 95°C. The temperature at the centre plane of the material is 62°C, and the heat flow through the material is 1 kW. Obtain an expression for the thermal conductivity of the material as a function of temperature.

17. A glass plate 30 cm square is used to view radiation from a furnace. The transmissivity of the glass is 0.5 from 0.2 to 3.5 μm. The emissivity may be assumed to be 0.3 up to 3.5 μm and 0.9 above that. The transmissivity of the glass is zero, except in the range from 0.2 to 3.5 μm. assuming that the furnace is a blackbody at 2000 °C, calculate the energy absorbed in the glass and the energy transmitted.

18. Define Emissivity, Absorptivity, Reflectivity and Transmissivity and explain Wein's displacement law.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.