

[illegible]

- Explain the mechanism of heat transfer in fluids.
- Write the Fourier's equation of conduction in spherical coordinates.
- What do you mean by critical thickness of insulation?
- What do you mean by thermal stresses?
- What is NTU?
- Why counter flow heat exchanger is more effective than parallel flow?
- What do you mean Gray bodies, how they are different from black bodies?
- What is characteristic length?
- Which dimensionless number is more significant in turbulent flow?
- What is Kirchhoff's law?

SECTION-B

2. What is thermal diffusivity? Discuss its significance.
3. Show that the temperature distribution in a plane wall without heat generation is linear.
4. A black body emits the radiation at 2000K calculate its monochromatic emissive power at 1 μm wavelength, wavelength at which emission is maximum and maximum emissive power.
5. Derive the relationship for the heat transfer from the fin insulated at tip.
6. What are Newtonian and non-Newtonian fluids? Give examples.

SECTION-C

7. The variation in the thermal conductivity of a material is given by $K=K_0 (1 + \alpha T + \beta T^2)$, find the expression for the steady state heat transfer in wall of thickness L maintained at surface temperatures T_1 and T_2 ($T_1 > T_2$).
8. Water is evaporated continuously at 100°C in an evaporator by cooling 500 kg of air per hour from 260°C to 150°C. Calculate the heat transfer surface area and steam evaporation per hour if liquid enters at 100°C. Take $U_0 = 46 \text{ W/m}^2\text{K}$, $C_p = 1.005 \text{ KJ/Kg.K}$ and $h_{fg} = 2257 \text{ KJ/Kg(at } 100^\circ\text{C)}$.
9. Discuss the various parameters that affect the engine heat transfer.

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.