

UIT-RGPV (Autonomous) Bhopal
Department of Petrochemical Engineering

Subject In-charge: Prof. Mehtab Singh Chouhan

Semester: VII

Subject code – PC 702

Subject: Transport Phenomena

Assignment no 3 (date:17.11.2021)

Submission date (22.11.2021)

1. Define the effectiveness of a fin. Give comparison of forced and free convection in nonisothermal systems.
2. Derive the equations of maximum temperature rise, average temperature rise and heat flow at the surface for heat conduction with an electrical heat source. Derive temperature profiles for heat conduction with a nuclear heat source.
3. Derive governing for natural convection heat transfer. Write down unsteady state macroscopic mechanical energy balance.
4. Write short note on heat conduction with chemical heat source. Write down on kinetic energy calculations for constant area and variable area.
5. What mean by thermal conductivity ? Compare the Fourier's law of heat conduction with Newton's law of viscosity.
6. A 10 cm long copper fin of diameter 6 mm is attached to a vertical wall at 500 K and projected in the room where air is at 300 K. the heat transfer coefficient at the fin surface is 30 W/m ² K and conductivity of fin material is 390 W/mk. Calculate:. (a) Heat loss from the fin (b) Fin efficiency (c) Fin effectiveness