

ME-6003 (CBGS)**B.E. VI Semester**

Examination, November 2019

Choice Based Grading System (CBGS)**Heat and Mass Transfer***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Suitable missing miscellaneous data, if any.
- What is thermal resistance.
 - Express the thermal resistance for conductive for a hollow cylinder in terms of inner and outer radii.
 - A domestic oven has a composite wall formed by 0.5cm thick chrome-mickel ($k = 19 \text{ W/mk}$) sheet supported by 1cm thick asbestos ($k = 0.1105 \text{ W/mk}$) sheet. In steady state operation the hot gases inside the oven are at 350°C while atmospheric air in at 30°C . The convective heat transfer coefficient at inside and outside surface of the oven are $100 \text{ W/m}^2\text{k}$ and $15 \text{ W/m}^2\text{k}$ respectively. Determine the rate of heat losses per unit area through the oven wall.
 - What is an Extended surface? Name three applications of it.
 - Define Fin efficiency and fin effectiveness.
 - Distinguish between natural and forced convection.
 - What is Grashof number and Rayleigh number? Discuss their significance.

- A horizontal rod of 5cm diameter is maintained at a constant temperature of 70°C by submerging it in water of 20°C . Calculate the heat loss by free convection per unit length of rod.
- Define LMTD and derive it's expression for parallel flow heat exchanger.
- What is Thermal radiation? State the governing heat transfer law of radiation.
 - Explain the different regimes of boiling.
- Write short notes on any two
 - Critical thickness
 - Fick's law of mass transfer
 - Black and Gray surfaces
 - Filmwise condensation
