TY-mech

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination – Sept./Oct. 2019

Course: TY Mech- I and II **Sem: Vth**

Subject: Heat Transfer **Subject Code: BTMEC501**

Max Marks: 20 **Date:- 23/09/19** **Duration:- 1 Hr.**

Instructions to the Students:

1. Draw figures wherever possible.
2. Assume suitable data if required.

		Level	Marks
Q.1	Answer the following questions		6
	1. State different modes of heat transfer.	L-1	
	2. Write equation of 'Newton's law of heating/cooling'.	L-1	
	3. Write an application of 'Extended Surfaces or Fins'.	L-2	
	4. Write equation/formula of Reynolds Number and Prandle Number.	L-1	
	5. Define 'Critical Radius of Insulation'	L-1	
	6. State any two factors which affects thermal conductivity of material	L-2	
Q.2	Solve Any Two of the following.		3 X 2
(A)	Write short note on 'Hydrodynamic Boundary Layer'.	L-2	
(B)	A hollow cylinder of 50mm inner dia and 80mm outer diameter is 5m long. The thermal conductivity of cylinder material is 110 W/m-^{0}C. If the inner and outer surfaces of cylinder are at 210^{0}C and 30^{0}C, determine the rate of heat loss from the cylinder.	L-3	
(C)	A wall of furnace is made up of inside layer of silica brick 120 mm thick covered with a layer of magnesite brick 240 mm thick. The temperatures at the inside surface of silica brick wall and outside surface of magnesite brick wall are 730^{0}C and 105^{0}C resp. The contact thermal resistance between two wall at the interface is 0.0035 ^{0}C/W per unit area. If thermal conductivities of Silica and magnesite brick are 1.7 W/m-^{0}C and 5.8 W/m-^{0}C, calculate a) The rate of heat loss per unit wall area. b) Temperature drop at interface.	L-3	
Q.3	Solve Any One of the following.		8
(A)	Derive generalized three dimensional conduction equation in Cartesian co-ordinates and reduce it to various forms.	L-3	
(B)	Twelve thin brass fins (K= 65 W/m-^{0}C) of 0.8 mm thick are placed axially on a 5 cm dia cylinder which stands vertically and is surrounded by air at 40^{0}C. The fins extend 3.5 cm from the cylinder surface. What is the rate of heat transfer to air per meter length of cylinder when its surface is at 150^{0}C? Take h = 20 W/m^2 C.	L-3	
	*** End ***		