Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

ME-605 (GS)

B.E. VI Semester

Examination, May 2018

Grading System (GS)

Heat and Mass Transfer

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume missing data suitably, if any.
iv) Draw neat and clean sketches/diagrams/figures wherever required.

1. What do you mean by critical thickness of insulation? Derive the formula to find it for cylinder.

2. Beginning with a general conduction equation make suitable assumptions to show that temperature distribution through a plane wall is linear.

3. What is meant by lumped capacity? What are the physical dimensions necessary for a lumped unsteady state analysis to apply?

4. Derive relation for heat dissipation from an infinitely long fin. Also write design considerations for fins.

5. Define the following numbers with significance:
   a) Reynold's number
   b) Prandtl number
   c) Nusselt number

6. Air flow through a long rectangular (40×60 cm) air conditioning duct maintains the outer duct surface temperature at 15°C. If the duct is uninsulated and exposed to the air at 27°C. Calculate the heat gained by the duct per meter length, assuming it to be horizontal.

7. Derive an expression for LMTD of a counter flow heat exchanger.

8. Answer any four of the following:
   a) Compare conduction, convection and radiation modes of heat transfer with examples.
   b) What is time constant for thermocouples? Write the expression for the same.
   c) What is overall heat transfer coefficient? Write the expression for the same.
   d) What is meant by Fouling? Define Fouling factor.
   e) What is Shape factor? State its applicability
   f) Discuss types of condensation.

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