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MRW–002

MASTER OF SCIENCE (RENEWABLE ENERGY AND ENVIRONMENT) (MSCRWEE)

Term-End Examination

June, 2024

MRW–002 : HEAT TRANSFER

Time : 3 Hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Distinguish between the following : (any ***four***) : 4×3.5=14

   (a) Regenerator and Recuperator

   (b) Conduction and Convection

   (c) Straight tube and Bent tube boiler

   (d) Shape factor and view factor

   (e) Reynolds' number and Prandtl's number

2. (a) Derive an expression for critical thickness of insulation for a cylinder. 7

   (b) What are extended surfaces ? What is their significance in heat transfer ? 7

3. (a) Explain the concept of thermal boundary layer for a Laminar flow over a thin flat plate. 7

   (b) What is the significance of the continuity equation ? 7

4. (a) Explain the following terms : 7

   (i) Spectral intensity

   (ii) Radiosity

   (b) How the shape factor is determined by decomposing one or both the surfaces into subdivisions ? Explain in brief. 7

5. (a) How does a rotary heat exchanger work ? Explain with diagram. 7

   (b) Define effectiveness of a heat exchanger. What is rating and sizing problem for a heat exchanger ? 7

6. Discuss the conduction heat transfer process through a slab with convection at boundaries. Derive an expression for the same. 14

7. Write short notes on any ***two*** of the following : 2×7=14

   (a) Surface condenser

   (b) Semi-infinite solid

   (c) Hydrodynamic boundary layer

   (d) Gray surface