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B. E. (Sixth Semester) Examination, April-May 2021

(New Scheme)

(Mech. & Automobile Engg. Branch)

HEAT & MASS TRANSFER

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Part (a) is compulsory in each unit. Attempt any* ***one*** *part from (b) & (c) of each unit.*

Unit-I

1. (a) Define Heat Transfers. 2

   (b) Explain Fourier's law of heat transfer. Also define unit conductance and thermal resistance. 14

(c) Derive an equation for steady-state, one-dimensional conduction through a composite wall. 14

Unit-II

2. (a) Define Transient State heat conduction. 2

(b) Explain the criteria used for lumped system analysis in unsteady state heat conduction. 14

(c) Derive an expression for heat transfer from a straigth fin of uniform cross-section. 14

Unit-III

3. (a) Define Natural Convection. 2

(b) Explain the physical significance of Renold's, Prandtl and Stanton Number. 14

(c) Write short notes on thermal and velocity boundary layer. 14

Unit-IV

4. (a) Define Film Condensation. 2

(b) Explain the boiling phenomena and boiling curve. 14

(c) Write short notes on diffusion and mass transfer coefficient. 14

Unit-V

5. (a) What is thermal radiation? 2

(b) State and prove Kirchhoff's law of radiations. 14

(c) Derive an expression of LMTD for counter-flow heat exchanger. 14