B. E. 6th Semester (Mech. Engg.)
Examination, May–2013
HEAT TRANSFER
Paper– ME-306-E

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt any **five** questions.*

1. Derive an expression for heat conduction through hollow sphere. 20

2. The temperature for the two sides of a 25 mm. Thick steel plate with constant thermal conductivity having uniform heat generation are 180°C and 120°C. Develop a mathematical formulation of a 1-D steady state heat conduction in the plate. 20

3. Derive an expression for 3-D heat conduction in spherical co-ordinates. 20

4. (a) What is heat generation ? What do you mean by heat generation ? Give some examples. 10

   (b) Define fin effectiveness with expression. 10

5. Derive an expression for transient heat conduction in plane walls with convective boundary conditions. 20

6. (a) Discuss the forced convection with thermal and hydro-dynamic boundary layers. 10

   (b) Discuss momentum and energy equations with example. 10

7. (a) State Stephen-Boltzmann law. 10

   (b) Define shape factors and their relationships. 10

8. Write short notes on following : 20

   (a) Heat exchanger effectiveness

   (b) Film boiling

   (c) Reversible and Irreversible process.