

8. Explain briefly the following :

15

No. of Printed Pages : 04

Roll No. ....

- (a) Gray body
- (b) Radiation shape factor
- (c) Plank's law.

**E-45**

**B.Tech. EXAMINATION, Dec. 2017**

(Fifth Semester)

(B. Scheme) (Main & Re-appear)

(CHE)

CHE-309-B

HEAT TRANSFER

*Time : 3 Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

M-E-45

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120

(3-13/9) M-E-45

P.T.O.

## Unit I

1. What is Fourier law of heat conduction ? Carry out a three dimensional energy balance over a elemental control volume and derive energy equation in Cartesian coordinates. Also write expression for energy equation in cylindrical coordinates. **15**
2. Carry out an energy balance for one dimensional conduction and convection through a rectangular fin, derive general solution and find solution for the following boundary conditions : **15**
  - (a) The fin is very long and the temperature at the end of the fin is essentially that of the surrounding fluid.
  - (b) The fin is of finite length and loses heat by convection from its end.
  - (c) The end of the fin is insulated.

M-E-45

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## Unit II

3. Apply momentum balance on a control volume for flow over a flat plate and derive expression between hydrodynamic boundary layer thickness and Reynolds number. **15**
4. Derive Reynolds Colburn analogy for flow over a flat plate, in which case it is applicable to flow in a tube. **15**

## Unit III

5. Analyse heat transfer in film condensation on a vertical flat plate and derive expression for Nusselt number. **15**
6. What is log mean temperature difference in heat exchangers ? Derive expression for it. **15**

## Unit IV

7. Write short notes on the following : **15**
  - (a) Boiling point elevation
  - (b) Falling film and rising film evaporator
  - (c) Single and multiple effect evaporator.

(3-13/10)M-E-45

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P.T.O.