8. Write short notes on the following :

(a) Combined Conduction, Convection Heat Transfer.

(b) Thermocouple and temperature measurements.

(c) Heat Pipe and its principle. **15**

BB-183

M. Tech. EXAMINATION, Dec. 2017

(Second Semester)

(B. Scheme) (Re-appear Only)

(CHE)

CHE-506-B

ADVANCED HEAT TRANSFER

Time : 3 *Hours*] [*Maximum Marks :* 75

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.

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

Unit I

1. For laminar flow over a flat plate, develop a relation between Hydrodynamic boundary layer and Reynold number. **15**

2. For laminar flow over a flat surface, develop a relation between ratio of Hydrodynamic to thermodynamic Boundary layer with respect to Prandtl number. How can this be reduced to Nusselt number for the flat plate case ? **15**

Unit II

3. Carry out a boundary layer analysis for free convection heat transfer on a vertical flat plate and hence develop expression for '*h*' in terms of Grashof number and Prandtl number. **15**

4. A horizontal pipe 0.3048 metre diameter, is maintained at a temperature of 250ºC in a room where the ambient Air is at 15ºC. Calculate the free convection heat loss per metre of length. use vertical flat plate natural convection relation for calculation of '*h*'. Data : **15**

$$R = 0.03406 \frac{W}{m.^{\circ}C}$$

$$\beta = \frac{1}{T_{film}}$$

$$v = 26.54 \times 10^{-6} \frac{m^2}{s}$$

$$P_r = 0.687$$

Unit III

5. Carry out analysis of laminar forced convection heat transfer in a Tube and hence develop corresponding expression for Nusselt number. Give justification of various steps. **15**

6. Discuss in detail the following : **15**

(a) Free convection in enclosed spaces.

(b) Combined free and forced convection.

Unit IV

7. Write short notes on the following : **15**

(a) Heat transfer in fixed Bed.

(b) Flat Plate solar collector.

(c) Heat Transfer in fluidized Bed.