Question bank (G scheme)

Name of Subject: Heat Transfer Operation

Subject code: 17560

Semester: Fifth **Course: CH**

Unit test II

Chapter 3 - Radiation(08 marks)

3 marks question

1. Define i) black body ii) gray body iii) emissivity
2. Define i) absorptivity ii) reflectivity iii) transmissivity
3. Explain Kirchoff's law
4. Explain Stefan Boltzman law

8 marks question

1. Estimate the total heat loss by convection and radiation from an unlagged steam pipe 50 mm o.d at 415K to air at 290 K. e= 0.9 h= $1.18(\Delta T/D_0)^{0.25}$ W/m^2K

Chapter 4 Heat Transfer Equipment(16 marks)

3 marks question

1. Give advantages of plate type heat exchanger.
2. Through which side of shell and tube heat exchanger the following fluids are directed? Give reason

   i) High pressure liquid

   ii) Corrosive liquid

   iii) Viscous liquid
3. Which type heat exchanger is preferred for the following liquid and why?

   i) Viscous liquid

   ii) Corrosive liquid

4. Name three heat transfer equipments where latent heat is transferred

5. What are extended surface heat exchangers? Where is it used?

6. What are the uses of baffles in shell and tube heat exchangers?

7. What are multi pass heat exchangers? What are its advantages?

8 marks question

1. Draw a neat labeled diagram of 1-2 shell and tube exchanger

2. Explain the construction and working of double pipe heat exchanger

3. Explain the construction and working of reboiler/ kettle type heat exchanger

Chapter 5 - Evaporation(22 marks)

3 marks question

1. What are the properties of solution that affects evaporation?

2. Define capacity and economy of evaporator.

3. Which are the methods to improve economy of evaporator?

4. Give the advantages of forced circulation type evaporator?

8 marks question

1. Explain with a neat diagram the construction and working of forced circulation type evaporator.
2. What are multiple effect evaporator? Explain the type of feed arrangement preferred for viscous solution.
3. Compare forward and backward feed arrangement.
4. Explain with a neat diagram the construction and working of calendria type evaporator.
5. An evaporator is operating at atmospheric pressure. It is desired to concentrate the feed from 5% solute to 20% solute (by weight) at a rate of 5000kg/hr. Dry saturated steam at a pressure corresponding to saturation temperature of 399K is used. The feed is at 298K and boiling point elevation is 5K. Overall heat transfer coefficient is 2350 W/m^2K. Calculate economy and area of heat transfer.
   Latent heat of condensation of steam = 2185 KJ/kg
   Latent heat of vaporization of water = 2257 KJ/kg
   Specific heat of feed = 4.187 KJ/kg K