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Roll No.

MMTP - 202**M.E./M.Tech. II Semester**

Examination, December 2015

Design of Heat Exchangers*Time : Three Hours**Maximum Marks :70*

Note : i) Attempt any five questions.
 ii) All questions carry equal marks.

1. a) What are the direct contact type heat exchangers? Discuss in brief.
 b) What are the different flow arrangements in recuperative heat exchangers?
2. a) What do you mean by fouling factor? What are the causes of fouling?
 b) Discuss the importance of correction factor in heat exchanger design.
3. a) List the criteria to be used to select heat exchanger type that will suit your imposed requirement assuming your own requirement.
 b) In an open heart surgery under hypothermic conditions, the patient's blood is cooled before the surgery and rewarmed afterwards. It is proposed that a concentric tube counter flow heat exchanger of length 0.5m is to be used for this purpose, with a thin walled inner tube having a diameter of 55mm. If the water at 60°C and 0.1kg/s is used to heat blood entering the exchanger at 18°C and 0.05kg/s, what is the temperature of the blood leaving the exchanger and the heat flow rate. Take $U_0 = 500 \text{ W/m}^2\text{K}$, C_p of blood = 3.5 kJ/kgK and, C_p of water = 4.183 kJ/kgK

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4. a) What do you understand by the TEMA standards? Explain briefly.
 b) Explain the various corrosion locations in heat exchangers.
5. a) What are the advantages of heat pipe?
 b) How is heat pipe is rated? Why are fins used in a heat pipe?
6. a) Define effectiveness and NTU of a heat exchanger.
 b) What is the limitation of the LMTD method? How is ϵ -NTU method superior to correction factor-LMTD method?
7. a) Discuss in brief the heat exchanger material for non corrosive and corrosive service.
 b) Explain with suitable sketch the component of plate fin heat exchanger.
8. Write short note on (Any Three)
 - a) Heat exchanger testing and inspection
 - b) Software for heat exchanger design
 - c) Design of desert cooler
 - d) Split flow exchanger
