PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Winter 2017 - 18 Examination

Semester: 2   Date: 12/01/2018
Subject Code: 03210182   Time: 02:00PM to 04:30PM
Subject Name: Design of Heat Exchangers   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Explain Recuperator type and Regenerator type heat exchanger in details.   **(05)**

B) Derive LMTD for counter flow heat exchanger with neat figure   **(05)**

C) Explain the physical significance of Nusselt Number and Stanton Number   **(05)**

Q.2 **Answer the following questions. (Attempt any three) (Each five mark)**   **(15)**

A) Explain function of condenser and describe evaporative condenser in details.

B) Discuss basic criteria for selection of heat exchangers

C) Explain different types of fouling in heat exchanger in details

D) Explain allocation of streams in shell and tube heat exchanger

Q.3 A) Explain construction of compact type Plate fin heat exchangers.   **(07)**

B) Explain baffles function and its significance with neat sketch   **(08)**

OR

B) Explain double pipe heat exchanger and derive the expression for hydraulic diameter and   **(08)**
equivalent diameter for hairpin heat exchanger.

Q.4 A) In a certain heat exchanger hot water flows at a rate of 5000kg/hr. and gets cooled from 95 ^{0}C to   **(07)**
65^{0}C . At the same time 50000kg/hr of cooling water at 30^{0}C enters the heat exchanger. The flow
conditions are such that overall heat transfer co-efficient remain constant at 2270 W/m^2 k.
Determine the heat transfer area required and effectiveness ,assuming the flow is parallel, consider
Cp=4.5 Kj/kg K

OR

A) In a parallel flow double pipe heat exchanger water flows through the inner pipe and its heated   **(07)**
from 20^{0}C to 70^{0}C.oil flowing through the annulus is cooled from 200 ^{0}C to 100^{0}C. is desired to
cool the oil to a lower exit temperature by increasing the length of the heat exchanger.
Determine the minimum temperature to the oil may be cooled.

B) Explain condenser design and its types with neat sketch.   **(08)**