GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1723002   **Date: 18-06-2014**

Subject Name: Advance Computer Aided Design

Time: 02:30 pm - 05:00 pm   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw neat diagrams or sketches wherever necessary.**

Q.1   Prepare transshipment model for the data given below: **14**

Stream	T^s (^{0}C)	T^t (^{0}C)	C (kW/^{0}C)
C1	60	180	3
C2	30	130	2.6
H1	180	40	2
H2	150	40	4

         Take $\Delta T_m = 10^0$C. Formulate LP transshipment problem and find out the amount of minimum utilities required by direct solution technique. Also find the pinch point.

Q.2 **(a)** Write steps for the pinch design method to invent a heat exchanger network.   **07**

       (b) Define threshold approach temperature? Explain the importance of minimum approach temperature and discuss optimum approach temperature with appropriate graph.   **07**

<p align="center">OR</p>

       (b) Describe in details sequential and simultaneous approaches of optimization and integration.   **07**

Q.3 **(a)** What is superstructure? Draw superstructure network for matches H1-C1 and H1-C2 and write constraint equations.   **07**

       (b) Explain the positioning of heat engine and heat pump.   **07**

<p align="center">OR</p>

Q.3 **(a)** Draw grand composite curve (GCC) for the data given below and find out the minimum utility requirements and pinch point. Take $\Delta T_m = 10$K.   **10**

Stream	T_{in} K	T_{out} K	FC_p, kW/K
H1	430	340	15
C1	310	395	7
C2	370	460	32

       (b) Write a short note on heuristics for designing separation processes.   **04**

Q.4 **(a)** Discuss the multi effect distillation approach for heat integrated distillation trains.   **07**

       (b) Discuss heat pumping, vapour recompression and reboiler flashing with respect to heat integrated distillation column.   **07**

<p align="center">OR</p>

Q.4 (a) Discover the best sequence among those possible for the following problem of **07** the mixture of five components A, B, C, D, and E.

Sr. No.	Components	Flow, mol/s	Relative Volatilities
1	A	1.4	4.3
2	B	0.5	3.8
3	C	1.2	3.2
4	D	6.8	1.8
5	E	10.2	1

(b) Write a short note on side strippers and side enrichers. **07**

Q.5 (a) The processing times for three products A, B, and C are given below. **07** Determine with a Gantt Chart the make span and cycle time for manufacturing two batches of A, 1 of B and 1 of C for the case of unlimited intermediate storage policy with sequence AABC and BAAC.

	Processing times (hr)		
	Stage 1	Stage 2	Stage 3
A	5	4	3
B	3	1	3
C	4	3	2
Zero cleanup times			

(b) Explain in details minimum mass separating agents. **07**

OR

Q.5 (a) Explain in details various transfer policies for batch process scheduling. **07**
(b) Explain in details parallel units and intermediate storage with example. **07**

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