Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 713903N **Date: 03-01-2014**

Subject Name: Optimum Utilization of Heat and Power

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the basic concepts of Combined Heat and Power in detail.	**07**
	(b)	Classify the prime movers. Explain any one of them in brief.	**07**
Q.2	**(a)**	Explain the concept of heat pump and heat engine with block diagram. Compare heat engines and heat pumps with example of each.	**07**
	(b)	Explain the heat exchange network synthesis and it's optimization for minimum utility targets.	**07**
		OR	
	(b)	Explain the maximum energy recovery and minimum number of heat exchangers in brief.	**07**
Q.3	**(a)**	Discuss the Optimum design of multistage refrigeration system.	**07**
	(b)	Explain the heat pumping in distillation.	**07**
		OR	
Q.3	**(a)**	Describe heat integration of compression refrigeration.	**07**
	(b)	Explain the heat Integration of evaporators.	**07**
Q.4	**(a)**	Explain the energy losses and waste heat recovery in recuperative heat exchanger.	**07**
	(b)	Discuss major aspects in considerations for deign of Insulation to reduce energy losses.	**07**
		OR	
Q.4	**(a)**	Explain the energy losses through heat pipes and waste heat recovery in it.	**07**
	(b)	Write a detailed note on pinch technology.	**07**
Q.5	**(a)**	List and explain the advantages of cogeneration technology.	**07**
	(b)	Explain the need for optimizing steam systems?	**07**
		OR	
Q.5	**(a)**	Discuss the techno economics of cogeneration and its application.	**07**
	(b)	Explain topping, bottoming and combined cycle in detail.	**07**

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