Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER 2012

Subject code: 1721107 Date: 03-01-2013

Subject Name: Energy Conservation and Management (Inter Disciplinary Elective II)

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)**	What is energy Audit? List types of it. Also Discuss the 10 step Audit methodology.	**07**
	(b)	Explain the losses responsible for low efficiency in Electrical motors.	**07**
Q.2	**(a)**	Discuss the energy scenario in India in coal, oil & natural gas sector. Also discuss the world's energy need as compared to India.	**07**
	(b)	Define: Pay back period, PEP, % slip of Electrical motor, Heat Rate, kVAR, % Blow down, Instantaneous cooling load.	**07**
		OR	
	(b)	Discuss energy conservation opportunities in Boilers.	**07**
Q.3		A wall made of 22.5 cm brick wall having 125 mm thick plaster on both sides is situated at Ahmedabad (23^oN latitude). Find out the Instantaneous heat gain and cooling load/m^2 of the wall area at 4 PM on June 21. The site survey gives the following additional data: NE wall. Assume wall construction is medium and time lag is 5 hrs.	**14**
		OR	
Q.3	**(a)**	Enlist the different loads on residential building and Explain how to calculate the cooling load for residential buildings	**07**
	(b)	Explain the factors considered for installation of steam traps.	**07**
Q.4	**(a)**	List out the energy efficient electrical devices and explain any one of them.	**07**
	(b)	Discuss performance parameters of I.C. Engines. Give tips on how to save fuel in automobile vehicle?	**07**
		OR	
Q.4	**(a)**	What is the need for maximum demand to be controlled? Explain maximum demand control techniques.	**07**
	(b)	Explain the factors considered for electrical billing.	**07**
Q.5	**(a)**	Classify the co-generation systems and explain bottoming cycle giving suitable example with neat sketch.	**07**
	(b)	What are the advantages of waste heat recovery? Write a short note on heat pipe with neat sketch. Also state application of it.	**07**
		OR	

Continue...

Q.5	**(a)**	The following data is available for a gas turbine based co-generation power plant: capacity of gas turbine generator : 4000kW Plant operating hours per annum : 8000 Plant load factor : 92% Heat rate given by the gas turbine supplier : 3050 kcal/kWh. Waste heat boiler parameters :	**07**

unfired steam output : 10 TPH
Steam temperature & pressure : 200^{o}C & 8.5 kg/m^{2}
steam enthalpy : 676.44 kcal/kg
fuel used : Natural gas
LCV of the fuel used : 10000 kcal/m^{3}
Price of gas : Rs.3000/m^{3}
Capital investment for total Co-generation plant : Rs. 275 Lakhs.
Estimate the cost of power generation.

(b) List the types of boiler water treatments. Discuss any two methods for boiler water treatment. **07**

****