Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-II Examination July 2010

Subject code: 721107

Subject Name: Energy Conservation and Management

Date:09 / 07 /2010 **Time: 11.00am – 1.30pm**

Instructions:

Total Marks: 60

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of student's own tables and chart is allowed.**

Q.1	**(a)**	Define energy management and state principles of energy management.	**06**
	(b)	Explain flywheel effect of building materials and explain the terms pull down load, ICL and IHG.	**06**
Q.2	**(a)**	Explain the term energy audit and detailed energy audit methodology.	**06**
	(b)	Explain: Bench marking, pay back period, PEP.	**06**
		OR	
	(b)	Explain energy management strategies for industry and explain any one.	**06**
Q.3		The following data is available for a room. Calculate the instantaneous cooling load through a roof at 4 PM. The following data be used : Outside design condition : 43^{o}C DBT, 27^{o}C WBT Inside design condition : 26^{o}C DBT, 50% RH U_{roof} = 2.7 W/m^2 K, Mass of the roof : 390.6 kg/m^2 Correction in TETD = 6.4^{o}C Time lag = 5 hrs. Roof area = 20m X 20m Roof position: Sunlit and shaded, for 40^{o}N latitude, July 21.	**12**
		OR	
Q.3	**(a)**	Enlist the different loads on residential building and Explain how to calculate the cooling load for residential buildings	**06**
	(b)	Give detail classification of energy and explain Indian energy scenario with respect to coal and oil supply.	**06**
Q.4	**(a)**	List out the energy efficient electrical devices and explain any one of them.	**06**
	(b)	Give tips on how to save fuel in automobile vehicle?	**06**
		OR	
Q.4	**(a)**	Explain electricity end uses in industry.	**06**
	(b)	Explain the factors considered for electrical billing.	**06**

Q.5 **(a)** The following data is available for a gasturbine based co-generation power plant: capacity of gas turbine generator : 4000kW **06**

Plant operating hours per annum : 8000

Plant load factor : 90%

Heat rate as per standard given by the gas turbine supplier : 3049.77 kcal/kWh.

Waste heat boiler parameters (unfired steam output) : 10 TPH

Steam temperature & pressure : 200^{o}C and 8.5 kg/m^{2}

steam enthalpy : 676.44 kcal/kg

fuel used : Natural gas

LCV : 950 kcal/m^{3}

Price of gas : Rs.3000/1000m^{3}

Capital investment for total Co-generation plant : Rs. 1300 Lakhs.

Estimate the cost of power and steam generation.

(b) What are the advantages of waste heat recovery? Write a short note on heat pipe with neat sketch. Also state application of it

Q.5 **(a)** Classify the co-generation systems and explain bottoming cycle **06**

(b) Write a short note on heat recovery and waste heat boilers **06**

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