Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 171907 **Date: 31-05-2014**

Subject Name: Energy Conservation and Management

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.**

Q.1 **(a)** Define the following terms relating to energy: Reserve to Production Ratio, Final Energy Consumption, Energy intensity, Energy pricing, Energy Security. **07**

(b) Consider a boiler plant consisting of an economizer, a boiler and a super heater **07**

Mass of water evaporated per hour=5940Kg/hr
Mass of coal burnt per hour=675 Kg/hr
L.C.V of coal=31600 k J/Kg
Pressure of steam at boiler stop valve=14 bar
Temperature of feed water entering and leaving economizer=32°C and 115°C resply
Dryness fraction of steam leaving boiler and entering super heater=0.98
Temperature of steam leaving super heater=260°C
Specific heat of superheated steam=2.3 K J/Kg, determine

1. Percentage of heat in coal utilized in economizer.
2. Percentage of heat in boiler.
3. Percentage of heat in coal utilized in super heater.
4. Overall efficiency of boiler plant.

Q.2 **(a)** Write short note on Energy Conservation Act 2001. **07**

(b) Explain need for energy audit and information to be collected during the detailed energy audit. **07**

OR

(b) Explain detailed energy audit report format for a typical process industry. **07**

Q.3 **(a)** Mention long-term energy strategies available for the better energy secured nation? **07**

(b) Explain method for estimation of annual heating and cooling loads for evaluation of thermal performance of a building. **07**

OR

Q.3 **(a)** Explain the term Bench marking and method of matching energy use for a requirement for obtaining maximum efficiency in a system. **07**

(b) Define following terms: CUSUM, EMIS, Energy monitoring. **07**

Q.4 **(a)** Differentiate between: **07**

1. Simple payback period and Return on investment
2. Present value and net present value
3. Return on investment and simple payback period.

(b) Define following terms: star and delta connection, power factor, reactive power, electric tariff, direct current. **07**

OR

Q.4 **(a)** Explain risk and sensitivity analysis of a newer energy conservation technology adopted for a system. **07**

(b) Explain energy need of growing economy for a developing country and explain sectoral energy consumption. **07**

Q.5	**(a)**	List energy saving techniques of a power transmission system.	**07**
	(b)	Write short note on cogeneration plant. State features of cogeneration plant of a sugar manufacturing industry.	**07**

OR

Q.5	**(a)**	Explain energy conservation method for a pump/pumping system.	**07**
	(b)	Classify heat recovery systems and explain any one in detail.	**07**

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