Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –II Examination Dec. - 2011

Subject code: 1721107 **Date: 19/12/2011**

Subject Name: Energy conservation & 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.**
4. **Use of nonprogrammable calculator and steam table is permitted.**

1 a) Discuss opportunities of waste heat recovery in case of large capacity steam generator. [07]

b) Following particulars refer to a steam power plant consisting of a boiler, super heater and an economiser. [07]

Steam Pressure = 20 bar , Mass of steam generated = 10000 kg/hr
Mass of coal used = 1300 kg/hr , C.V. of coal = 29000 kJ/kg
Temp of feed water entering & leaving the economiser are 35° C & 105° C respectively
Temperature of steam leaving the super heater = 350 ° C.
Dryness fraction of steam leaving the boiler = 0.98.
Determine : i) Overall efficiency of the plant ii) Equivalent evaporation from and at 100 ° C
iii) % of heat utilised in boiler, super heater & economiser.
Make use of following steam table:

Abs. Pr. (bar)	Sat. Temp. (° C)	Sp. Vol. (m^3/ kg)		Sp. Enthalpy (kJ/kg)	
		v_f	v_g	h_f	h_{fg}
20	212.37	0.001177	0.09954	909	1890.5

2

a) State importance of energy conservation in industry and discuss principles of energy conservation. [07]

b) What are the different heat loads? Discuss the factors that influence thermal performance of any building. [07]

OR

b) Discuss the use of insulating materials for hot as well as cold insulation. [07]

3

a) State different methods to store the energy and explain any two. [07]

b) Classify the energy audit methodology and explain in detail about energy audit. [07]

OR

3

a) Give technical tips to conserve energy in case of i) Chillers ii) Pumps [07]

b) Classify co-generation cycles and explain bottoming cycle with neat sketch . [07]

4

a) How losses occurring in electric power supply system can be reduced? [07]

b) Give technical tips to conserve energy in case of i) electric motors ii) electric drives [07]

4 OR

a) Define (1) power factor (2) slip (%) (3) Payback period and discuss the use of automatic power factor controllers. [07]

b) Discuss the need for electrical load management. Explain step by step approach for maximum demand control. [07]

5

a) Explain energy conservation techniques which can be used for D.G. sets used in industry. [07]

b) Discuss energy conservation opportunities in case of air compressors used in industry. [07]

OR

5

a) Discuss energy conservation opportunities in case of HVAC systems. [07]

b) Discuss energy conservation opportunities in case of furnaces. [07]