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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 171907 **Date: 29/11/2011**

Subject Name: Energy conservation and Management

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)** Discuss in brief Energy conservation Act 2001 and its features. **07**

(b) Define Energy management. State the basic principles and benefits of energy management. **07**

Q.2 **(a)** What do you mean by 'Energy audit'? Discuss types of energy audit briefly. **07**

(b) Write note on 'Indian Energy scenario.' **07**

OR

(b) A domestic food refrigerator maintains a temperature of -10^0C. The ambient temperature is 40^0C. If heat leaks into the freezer at a continuous rate of 2kJ/s, determine the least power necessary to pump this heat out continuously. **07**

Q.3 **(a)** State key elements of Energy monitoring and targeting system. Also discuss its benefits. **06**

(b) Explain in brief the following: **08**

(i) Renewable and nonrenewable energy.
(ii) Commercial and Noncommercial energy
(iii) Low grade and High grade energy
(iv) Energy security

OR

Q.3 **(a)** What do you mean by Pay back period? **05**

A co-generation plant installation is expected to reduce a company's annual energy bill by Rs.24 lakhs. If the capital cost of the new co-generation installation is Rs.90 lakhs and the annual maintenance and operating costs are Rs. 6 lakhs, What will be the expected pay back period for the project?

(b) The following sample data are produced during monitoring programme. **09**
Establish Energy-Production relationship for the given foundry case.
Also Plot the Energy-production graph for nine months.

Month	Production Ton./month	Energy Toe/month
1	320	300
2	520	400
3	240	280
4	620	424
5	600	420
6	380	340
7	440	340
8	460	380
9	520	380

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Q.4 **(a)** Using the net present value method, evaluate the financial merits of two proposed projects shown in table. The annual rate is 8 % for each project. **07**

	Project 1	Project 2
Capital cost	30000	30000
Year	Net annual saving (Rs.)	Net annual saving (Rs.)
1	+6600	+6000
2	+6600	+6000
3	+6300	+6000
4	+6300	+6000
5	+6000	+6000
6	+6000	+6000
7	+5700	+6000
8	+5700	+6000
9	+5400	+6000
10	+5400	+6000
Total net saving at end of tenth year	+60000	+60000

(b) Discuss the role of Energy service companies (ESCOs). **07**

OR

Q.4 **(a)** Discuss the sources of waste heat and its potential applications. **07**

(b) With a neat sketch explain Gas turbine co-generation plant **07**

Q.5 **(a)** What are co-generation plants? Explain the difference between bottoming and topping cycle co-generation plants. **04**

(b) A portable machine requires a force of 250 N to move it. How much work is done if the machine is moved 25 m and what average power is utilized if the movement takes 50s? **04**

(c) Explain in brief Energy efficiency versus Energy conservation. Write step wise procedure to calculate Boiler efficiency. **07**

OR

Q.5 **(a)** A three phase induction 75 kW motor operates at 55 kW. The measured voltage is 415 V, Current 80 A. Calculate the power factor of the motor. **04**

(b) Explain the following : **04**

(i) Reactive power and Active power

(ii) Explain the importance of TOD (time of the day) tariff

(c) Prepare a list of five measures for energy optimization in boilers and in lighting systems. **07**

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