Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER IV (NEW) EXAMINATION – SUMMER - 2017

Subject Code: 2742102 **Date:03/05/2017**

Subject Name: Energy Conservation & Management

Time:02:30 pm to 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 energy security. Enlist different strategies to achieve it and discuss role of energy conservation to achieve energy security. **07**

(b) Explain advantages and disadvantages of various cogeneration systems. **07**

Q.2 **(a)** Give two examples of waste heat recovery. What are the direct and indirect benefits of waste heat recovery? **07**

(b) Explain Electricity act - 2003 and its features. **07**

OR

(b) Define energy conservation. Mention its importance and explain energy conservation act 2001. **07**

Q.3 **(a)** Explain method for estimation of annual heating and cooling loads for evaluation of thermal performance of a building. **07**

(b) Explain various methods to find the furnace efficiency. **07**

OR

Q.3 **(a)** What are the disadvantages of direct method of boiler efficiency evaluation over indirect method? Explain procedure to calculate boiler efficiency using indirect method. **07**

(b) Define energy security. Enlist different strategies to achieve it and discuss role of energy conservation to achieve energy security. **07**

Q.4 **(a)** Define the terms: SPP, ROI, NPV, IRR, Cash flow, Risk analysis & Time value of money. **07**

(b) Using the net present value analysis technique, evaluate the financial merits of the proposed projects shown in the Table below. Assume an annual discount rate of 8% for each project. **07**

	Project – 1	Project – 2
Capital cost (Rs.)	30000.00	30000.00
Year	Net annual saving (Rs.)	Net annual saving (Rs.)
1	+6000.00	+6 600.00
2	+6000.00	+6 600.00
3	+6000.00	+6300.00
4	+6000.00	+6300.00
5	+6000.00	+6000.00
6	+6000.00	+6000.00
7	+6000.00	+5700.00
8	+6000.00	+5700.00
9	+6000.00	+5400.00
10	+6000.00	+5400.00
Total net saving at end of year 10	+60000.00	+60000.00

OR

Q.4 **(a)** A proposed project requires an initial capital investment of Rs. 20000. The cash flows generated by the project are shown in the table below: **07**

Year	Cash flow (Rs)
0	-20000.00
1	+6000.00
2	+5500.00
3	+5000.00
4	+4500.00
5	+4000.00
6	+4000.00

Given the above cash flow data, find out IRR (internal rate of return) for the project at discount rate of 8%, 12% & 16%.

(b) What are the types of commonly used lamps? Explain briefly. **07**

Q.5 **(a)** Briefly discuss about carbon market. **07**

(b) Briefly discuss about role of Energy Service Companies (ESCOs) **07**

OR

Q.5 **(a)** Write short note on clean development mechanism (CDM). **07**

(b) Briefly discuss about KYOTO protocol. **07**

****