[5561]-540

B.E. (Mechanical)

ENERGY AUDIT AND MANAGEMENT

(2015 Pattern) (Semester-I) (Elective-II) (402045 C)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8 Q9 or Q10.

2) Draw a neat diagram wherever necessary.

3) Figures to the right indicate full marks.

4) Use of calculator, steam tables is allowed.

5) Assume suitable data if necessary.

Q1) a) Define with an example in each: **[4]**

   i)   Primary and secondary energy

   ii) Commercial and non-commercial energy.

b) What are Energy Efficiency, Energy Conservation and Energy Benchmarking?   **[6]**

OR

Q2) a) Explain any four strategies for better energy security of the nation?   **[4]**

b) How do an industry, nation and globe would benefit from energy efficiency programs?   **[6]**

Q3) a) What are the key features of Energy Audit Software?   **[4]**

b) Distinguish between 'preliminary energy audit' and 'detailed energy audit'. How does a preliminary energy audit help conduct detailed energy audit?   **[6]**

OR

Q4) a) What are the principles of energy management?   **[5]**

b) Briefly explain with examples on what is fuel and energy substitution? **[5]**

                                                                                    P.T.O.

Q5) a) What is the Net Present Value of an ENCON project with cash flows given in table below? The discount rate is 10%. Is the ENCON project attractive for implementation? **[8]**

Initial Investment	Rs. 10,00,000/-
Savings in Year	Cash Flow
1	Rs. 2,00,000/-
2	Rs. 2,00,000/-
3	Rs. 3,00,000/-
4	Rs. 3,00,000/-
5	Rs. 3,50,000/-

b) What are important guidelines to achieve energy efficiency in steam systems? **[8]**

OR

Q6) a) Use the Net Present value method to evaluate which of ENCON Project-I or Project-II is finalized to be implemented in an organization. Assume the annual discount rate as 8%. **[10]**

	Project-I	Project-II
Capital Investment	Rs. 80,000/-	Rs. 80,000/-
Year	Savings (Rs.)	Savings (Rs.)
1	12,000/-	13,200/-
2	12,000/-	13,200/-
3	12,000/-	12,600/-
4	12,000/-	12,600/-
5	12,000/-	12,000/-
6	12,000/-	12,000/-
7	12,000/-	11,400/-
8	12,000/-	11,400/-
9	12,000/-	10,800/-
10	12,000/-	10,800/-
11	12,000/-	10,000/-

b) Explain any six options for financing an energy saving financing program in any organization? **[6]**

Q7) a) What are the parameters to be monitored for evaluating 'direct efficiency' of boilers and what is the empirical relation used? **[8]**

b) Explain the factors that affect the performance evaluation of an Electric Heating Furnace? **[8]**

OR

Q8) a) Explain as to how do you assess the performance of centrifugal fan? **[8]**

b) Find the furnace efficiency to melt one ton of steel from an ambient temperature of 30 Deg C. Following is the test data obtained: **[8]**

Specific heat of steel = 0.682 kJ/kg/Deg C

Latent heat of melting of steel = 272 kJ/kg

Melting point of Steel = 1650 Deg C.

The melting furnace consumes 625 kWh to melt one ton of Steel.

Q9) a) What are the different effects of acid rain? **[6]**

b) Explain briefly Kyoto Treaty and its importance to the world. **[6]**

c) Why cogeneration systems play an important role in any industry? **[6]**

OR

Q10) a) Explain global warming and its implications. **[6]**

b) Explain three different types of instruments used during an energy audit. **[6]**

c) What is the different energy saving opportunities in any residential electrical lighting system? **[6]**

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