Total No. of Questions : 10]

SEAT No. :

P3884

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[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]**