

Total No. of Questions : 10]

SEAT No. :

**P3884**

**[5561]-540**

[Total No. of Pages : 3

**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]**

