Total No. of Questions : 12]

SEAT No. :

P861

[Total No. of Pages : 3

[4458] - 434

B.E. (Mechanical) (Semester - I)

ENERGY AUDIT AND MANAGEMENT

(2008 Course) (Elective - I (a))

Time :3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***Solve questions 1 or 2, 3 or 4, 5 or 6 from Section-I and 7 or 8, 9 or 10, 11 or 12 from Section-II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables and time value of money factor table is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Write definition, objectives and principles of energy management. **[8]**

b) Describe the energy conservation opportunities in DG sets. **[8]**

OR

Q2) a) Describe sector wise energy consumption pattern of India. Also draw pie chart for it. **[8]**

b) How energy efficiency affects the environment? Explain energy security. **[8]**

Q3) a) Explain any four energy audit instruments with applications. **[8]**

b) Write the ten steps to be carried out in Detailed Energy Audit for ice factory? **[8]**

OR

Q4) a) Explain analysis and recommendation phase of energy audit with example. **[8]**

b) Explain ten step audit methodology for Dairy plant. **[8]**

P.T.O.

Q5) a) Describe the factors influencing costing and typical cost of Steam, Compressed air, Natural gas, Electricity. **[10]**

b) Calculate NPV of a project whose capital cost is 30,000.00 and gives annual savings of 6000.00 each year for a period of 10 years. The annual discount rate is 8%. **[8]**

OR

Q6) a) Explain various types of cash flows with cash flow diagram for an investment. **[10]**

b) What is sensitivity and risk analysis? Explain factors affecting sensitivity and risk analysis. **[8]**

SECTION - II

Q7) a) What are advantages and disadvantages of direct method of efficiency calculation for Boiler? Explain indirect method of efficiency calculation. **[10]**

b) Calculate the pump efficiency from the data given : pump flow is 0.40 m^3, power absorbed : 325 kW, suction head + 1m, Delivery Head 55m, motor efficiency 88%, Type of drive : direct coupled, Density of water 996kg/m^3. **[8]**

OR

Q8) a) How furnace efficiency is calculated? Explain different heat losses in fuel fired furnaces. **[10]**

b) Explain energy saving opportunities in pumping system. **[8]**

Q9) a) The lighting connected load for the small industry consisting of 150 Fluorescent tubes of 55W each with magnetic ballast. In first option, the magnetic ballast of Fluorescent tubes is replaced by electronic ballast and power consumption of same fluorescent tubes reduces to 40W. Calculate the Simple payback period of above replacement if cost of electronic ballast is Rs 105. In second option, fluorescent tubes are replaced by energy efficient fluorescent tubes of 20W and cost of Rs. 400 each. Calculate simple payback period. Which energy saving option is better and Why? Consider usage of 16 hours per day and an electrical tariff of Rs. 4 per KWh. **[8]**

b) Explain energy efficient motors. How motor selection is done? **[8]**

OR

Q10) a) Explain the terms: **[8]**

i) Copper losses.

ii) Luminous efficiency.

iii) Ballast.

iv) Power factor.

b) Explain the different maximum demand (MD) control methods. **[8]**

Q11) a) What are the different waste heat sources? Explain in brief. **[8]**

b) Explain the topping cycle and the bottoming cycle of cogeneration with two examples. **[8]**

OR

Q12) Write notes on : **[16]**

a) Heat wheel.

b) Heat pipe.

c) CDM projects.

d) Carbon credit.

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