Total No. of Questions : 12]

SEAT No. :

P1997

[Total No. of Pages : 3

[4859] - 1017

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

ENERGY AUDIT & MANAGEMENT

(2012 Pattern) (Elective - I)

Time :2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8,Q.9 or Q.10, Q.11or Q.12.*
2) *Figures to the right indicate full marks.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Assume suitable data if necessary.*

Q1) a) Write down the responsibilities of energy auditor. **[5]**

b) Discuss the environmental impact due to conventional energy use. **[5]**

OR

Q2) a) Explain current energy scenario in India. **[5]**

b) Write short note : **[5]**

I) Commercial energy and non commercial energy.

II) Renewable and non renewable energy.

Q3) a) Describe energy conservation opportunities in furnace system. **[5]**

b) Write down steps to carry out detailed energy audit. **[5]**

OR

Q4) a) Write down typical energy auditing format. **[5]**

b) Explain energy saving opportunities in steam system. **[5]**

P.T.O.

Q5) a) What is net present value of a project (life 2 years) which requires an investment of Rs.50, 000/- and yield Rs.30, 000/- in I year and Rs.40,000/- in the next year, if the interest rate is 10%. **[5]**

b) Explain financial analysis method for simple payback period. **[5]**

OR

Q6) a) A sum of Rs.40,000 is deposited in a bank at the beginning of a year. The bank pays 8 % interest annually. How much money will be in bank account at the end of fifth year, if no money is withdrawn? **[5]**

b) Annual saving after replacement of an boiler for I year is Rs. 5 Lacks, for II year is Rs.5,50,000 and for III year is 6,50,000 respectively. Total project cost is Rs. 13,50,000 considering cost of capital as 12%, what is the NPV of proposal. **[5]**

Q7) a) What is steam distribution system? Explain with neat sketch. **[7]**

b) Find out the efficiency of the boiler by direct method with the data given below : **[7]**

i) Type of boiler: coal fired

ii) Quantity of steam (Dry) generated: 8 TPH

iii) Steam pressure (Gauge) / Temp: 10 $Kg/Cm^2(G)$/ 180°C

iv) Quantity of coal consumed: 1.8 TPH

v) Feed water temperature: 85°C

vi) GCV of coal : 3200 Kcal/Kg

vii) Enthalpy of steam at 10 Kg/cm^2 pressure : 665 Kcal/Kg (Saturated)

viii) Enthalpy of feed water: 85 Kcal/Kg

OR

Q8) a) Write down opportunities to increase boiler efficiency with neat sketch.**[7]**

b) A Centrifugal pump is pumping 85 M^3 / Hr of water and pressure rise in pump is 6 Kg/Cm^2 (gauge). If power drawn by motor is 25 Kw. Find out the pump efficiency. Assume motor efficiency as 90% and water density as 998 Kg/M^3. **[7]**

Q9) a) Define power factor and explain how power factor improved with one example. **[6]**

b) The connected loads for Bungalow are as below

i) 05 bulbs of 60W each

ii) 06 fluorescent tubes of 40W each

iii) An old refrigerator of 200W

It is decided to replace the bulbs and tubes with 11Cfl of 15W each and an old refrigerator by energy efficient refrigerator of 175W. Considering usages of 6 hours per day and an electrical tarrif of Rs. 4 per Kwh; calculate an annual electrical energy saving in Kwh and money. **[7]**

OR

Q10)a) What are the types of lamps used in lighting system. Write down their future with typical applications. **[7]**

b) What are the types of electrical motors? Explain energy efficient motor. **[6]**

Q11)a) What is the cogeneration ? Write down principal of cogeneration and its advantages. **[7]**

b) Explain concept of waste heat recovery. Write down benefits of waste heat recovery. **[6]**

OR

Q12)a) Explain the topping cycle and the bottoming cycle with sketch. **[6]**

b) Describe heat wheel used for waste heat recovery with neat sketch. **[7]**