Total No. of Questions :12]

SEAT No. :

P3672

[Total No. of Pages :4

[4959] - 1034

B.E. (Mechanical)

ENERGY AUDIT & MANAGEMENT

(Semester - I) (Elective - I) (2012 Pattern)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Solve 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. 11 or Q. 12.***
2) ***Draw Neat diagrams wherever necessary.***
3) ***Use of scientific calculator is allowed.***
4) ***Assume suitable data wherever necessary.***

SECTION - I

Q1) a) What are the various types of energies. Explain each type in brief. **[5]**

b) Write short notes on **[5]**

i) Energy policy

ii) Energy action planning

OR

Q2) a) Describe energy and environment. **[5]**

b) Explain need for renewable energy. **[5]**

Q3) a) Describe Energy Conservation Opportunities in Boiler system. **[5]**

b) Define energy Audit? Explain Walkthrough or Preliminary energy audit. **[5]**

OR

P.T.O.

Q4) a) Explain need of Energy Audit. **[5]**

b) List down opportunities for energy conservation in HVAC System. **[5]**

Q5) a) Calculate NPV of a project whose capital cost is 30,000 and gives annual saving of 6,000 each year for a period of 10 years. The annual discount rate is 8%. **[5]**

b) A sum of Rs. 60,000 is deposited in a bank at the beginning of a year. The bank pays 6% interest annually. How much money will be in bank account at the end of fifth year, if no money is withdrawn? **[5]**

OR

Q6) a) A Company invests Rs. 20 lacks and completes an energy efficiency project at the beginning of year 1. The film is investing its own money and expects an internal Rate of return, IRR, of at least 26% on constant positive annual net cash flow of Rs 3 lacks, over a period of 10yr, Starting with year 1.

i) Will the project meet the firm Expectations? **[5]**

b) Calculate the IRR of above Numerical. **[5]**

SECTION - II

Q7) a) Explain Typical Furnace Features with neat diagram. **[7]**

b) Calculate the Efficiency of Boiler by Direct Method.

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

v) Feed water temperature : 70°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. **[6]**

OR

Q8) a) Enlist and discuss the energy saving methods for pumping system. **[6]**

b) Calculate the efficiency of Boiler By direct Method. **[7]**

i) Type of boiler: Coal fired

ii) Quantity of steam (dry) generated : 10 TPH

iii) Steam pressure (gauge) / temp : 10 Kg/cm^2(G)/160°C

iv) Quantity of coal consumed : 2

v) Feed water temperature : 80°C

vi) GCV of coal: 12000 KJ/Kg

vii) Enthalpy of steam at 10 Kg/cm^2 pressure: 2500 KJ/Kg (Saturated)

viii) Enthalpy of feed water : 320 Kcal/Kg

Q9) a) The connected load for hostel is as below **[7]**

i) 190 Fluorescent tubes of 55 W each magnetic ballast.

ii) 20 Fluorescent tubes of 40W each electronic ballast.

iii) I old fan 100W each

It is decide to replace the all tubes of 20 W and old fan by new fan of 80W. Considering usage of 06 hrs per day and an electrical tarrif of Rs. 4 per k Wh. Calculate energy saving of tubes and fans replacement.

b) Explain types of lamps used in lighting system. **[6]**

OR

Q10) a) Explain why efficiency of Energy efficient motor is motor than conventional motor. **[7]**

b) The Connected loads for shop are as below **[6]**

i) 10 Bulbs of 60 W each

ii) 08 Fluorescent tubes of 50 W each

iii) An old Refrigerator of 300 W

It is decided to replace the bulbs and tubes with 12 Cfl of 16 W each and an old refrigerator by energy efficient refrigerator of 150 W. Considering usages of 8 hours per day and an electrical tariff of Rs. 5 Per KWh; Calculate an annual electrical energy saving in KWh and Cost.

Q11) a) Classify waste heat recovery with example. Write down benefits. **[7]**

b) Compare topping cycle and bottoming cycle of cogeneration with example. **[7]**

OR

Q12)a) Explain in brief **[7]**

i) CDM Project

ii) Carbon Credit Calculation

b) How does a plate heat exchanger work? Give typical example. **[7]**