

Total No. of Questions : 12]

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SEAT No. :

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B.E. (Mechanical Engineering)
ENERGY AUDIT & MANAGEMENT
(2012 Pattern) (Elective - I) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer any five questions from the following.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

Q1) a) Explain Indian energy scenario and draw Pie-chart. [5]

b) Describe relation between environment and energy. Also list down responsibilities of energy manager? [5]

OR

Q2) a) Explain energy Audit methodology for sugar factory. [5]

b) Explain the four principles of energy management. [5]

Q3) a) Explain energy conservation opportunities in cooling towers. [5]

b) Explain need of energy audit with detail report for HVAC system. [5]

OR

Q4) a) List the different instruments used for energy audit along with their applications. [5]

b) Why per-audit and post-audit is important during energy audit. [5]

P.T.O.

Q5) a) What is the NPV of a project (life 2 years) which requires an investment of Rs. 70000 and yield Rs. 20000 in the first year and Rs. 50000/- in the next year, if the interest rate is 10%. [5]

b) Explain the following financial analysis methods : [5]

- i) Net Present Value.
- ii) Return on Investment.
- iii) Internal rate of return.
- iv) Simple payback period.
- v) Time value for money.

OR

Q6) a) Explain various losses in industrial furnace system with a neat sketch. [5]

b) What is sensitivity and risk analysis? Explain factor affecting sensitivity and risk analysis? [5]

Q7) a) Calculate Thermal Efficiency of boiler and evaporation ratio by direct method with the help of following data : [7]

Type of boiler : Coal fired

Quantity of steam generated : 11 TPH

Quantity of Coal consumed : 1.8 TPH

Steam pressure and temperature : 10 kg/cm² (gauge) 190°C

Feed water temperature : 81°C

GCV of Coal : 12500 kJ/kg

Enthalpy of saturated steam at 10 kg/cm² pressure : 1685 kJ/kg.

Enthalpy of feed water : 310 kJ/kg.

b) What is power factor? What are the benefits of improving power factor? [6]

OR

Q8) a) What is maximum demand in electrical systems? Explain how maximum demand is calculated with the help of a load curve? [7]

b) List the energy saving opportunities in pumping system. [6]

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- Q9)** a) Explain the term copper losses and Luminous Efficiency. [7]
b) Write short note on the Electricity Act 2003. [6]

OR

- Q10)** a) Explain the selection and location of capacitors for improving power factor. [7]

- b) Explain the term Color Rendering Index (CRI) & Igniters. [6]

- Q11)** a) What is Cogeneration and what are its advantages? [7]

- b) Explain working of convective Recuperator with neat sketch. [7]

OR

- Q12)** a) What are heat wheels? Explain with neat sketch. [7]

- b) Write short note on : [7]

- i) CDM Project
- ii) Carbon credits