

Total No. of Questions : 12]

T.E. Electrical Sem. V
May - June - 2012

SEAT No. :

P1085

[Total No. of Pages : 3

[4163] - 257

T.E. (Electrical)

ENERGY AUDIT & MANAGEMENT

(2008 Pattern) (Sem. - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:-

- 1) Answer three questions from section I and three questions from Section II.
- 2) Answers to the two sections should be written in separate answer books.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 5) Assume suitable data, if necessary.

SECTION - I

- Q1) a) Explain short term and long term policies for energy sector. [10]
b) Explain salient features of Energy Conservation Act 2001. [8]

OR

- Q2) a) Explain in detail various energy sources. [10]
b) What is Energy Conservation Building Code? List salient features of ECBC. [8]

- Q3) a) Discuss in detail the objectives of Demand Side Management. [8]
b) Discuss ways to implement the DSM in commercial sector. [8]

OR

- Q4) a) Explain in detail various barriers in implementing Demand Side Management. [8]
b) What are the duties of Energy Manager? [8]

P.T.O.

- Q5) a) Explain the procedure of detailed energy audit. [8]
 b) What is a Sankey diagram? Draw a typical Sankey diagram of a Process industry. [8]

OR

- Q6) a) List various instruments and state their use in carrying out energy audit. [8]
 b) In a steel industry the monthly production related (variable) energy consumption was 1.85 times the production and non production related (fixed) energy consumption was 16000 kWh per month upto Jan 2011. In the month of Feb 2011 a series of energy conservation measures were implemented Use CUSUM technique to develop a table and calculate energy savings for the subsequent 6 months period from the date given below. [8]

Month	Production (Kg)	Actual Energy Consumption (kWh)
Jan 2011	63500	114200
Feb 2011	70500	135000
Mar 2011	74000	157000
Apr 2011	58000	119100
May 2011	62000	122700
Jun 2011	72000	141400

SECTION - II

- Q7) a) With suitable example explain role of electricity tariff in energy management. [8]
 b) By using net present value analysis workout economic feasibility of following projects, by taking discounting factor of 8%. [10]

	Project 1	Project 2
Capital cost	Rs. 30000	Rs. 30000
Year	Savings in Rs	Savings in Rs
1	6000	6600
2	6000	6600
3	6000	6300
4	6000	6300
5	6000	5700
6	6000	5400
7	6000	5100

OR

- Q8) a) A factory has an incandescent lighting load of comprising 100 numbers of 60W and 140 numbers of 100W. Calculate the payback of replacement of lamps with $1 \times 40\text{W}$ fluorescent lamp. Lighting requirement is for 4000Hrs/year and the cost of electricity is Rs. 4/kWh and the cost of replacement is Rs. 135 per unit. Take ballast consumption as 15W each.

Given data

100W incandescent lamp - 2200 lumen

60 W incandescent lamp - 1320 lumen

40W fluorescent lamp - 2400 lumen

[9]

- b) i) Explain time value of money. [9]
ii) Availability based tariff.
iii) Costing factors in tariff determination.

- Q9) a) Estimate the reduction in power consumption of condensate transfer pump by reducing speed of the pump by 20% from its rated speed. The operating characteristics of the pump at rated speed are $38\text{m}^3/\text{hr}$ discharge at a head of 65m and power drawn from the supply is 12.5 kW. [8]

- b) What is cogeneration? Explain topping and bottoming cycle cogeneration systems with appropriate examples. [8]

OR

- Q10)a) Enlist energy conservation measures in air conditioning system. [8]

- b) Write notes on: [8]

i) Energy efficient motors.

ii) Energy conservation in industrial grade fans and blowers.

- Q11)a) Discuss various alternatives for reduction of commercial losses in Indian power distribution network. [8]

- b) The energy audit studies are carried out in a sugar industry. What can be the proposed recommendations for energy conservation in boiler and steam system? [8]

OR

- Q12)a) It is decided to carry out energy audit of a large scale shopping mall having sizable central air conditioner load. Briefly explain methodology for air conditioning plant energy audit. [8]

- b) Explain energy audit case study of a steel Industry. [8]