

Total No. of Questions : 11]

SEAT No. :

P3979

[Total No. of Pages : 3

[5353]-570
T.E. (Electrical)
ENERGY AUDIT AND MANAGEMENT
(2015 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 4) *Assume suitable data, if necessary.*

Q1) Give highlights of Energy Conservation Building Codes (ECBC). **[6]**

OR

Q2) Discuss energy sector reforms for securing future energy demands. **[6]**

Q3) What are the principles of successful energy management? **[7]**

OR

Q4) What is force field analysis? How this is useful in energy management? Explain with example. **[7]**

Q5) Explain steps in implementation of demand side management. **[7]**

OR

Q6) What are the hurdles in implementation of DSM. **[7]**

Q7) a) What is the importance of energy audit? Explain steps involved in detailed energy audit. **[10]**

- b) In a canning plant the monthly production related energy consumption was 1.95 times the production and non-production related energy consumption was 17,500 kWh per month up to May 2017. In the month of June 2017 a series of energy conservation measures were implemented.

P.T.O.

Use CUMSUM technique to develop a table and calculate energy savings for the subsequent 6 months period from the data given below. Also plot CuSuM graph. [8]

Month	Production (kg)	Actual Energy Consumption (kWh)
Jul' 17	62000	113600
Aug' 17	71000	139000
Sep' 17	75000	158000
Oct' 17	90000	119300
Nov' 17	62000	123700
Dec' 17	73000	143600

OR

Q8) a) Are current tariff structures favouring energy management? Explain different tariff strategies which supports energy management and conversion. [9]

b) In data analysis following data points of specific energy consumption and production are obtained. By using least square method find liner straight line fit for following data points. (0, 3); (2, 1); (3, -1) and (5, -2) [9]

Q9) Attempt any two of the following [16]

a) What are commercially available air conditioning systems? Also discuss important points to considered in energy savings in air conditioning system.

b) Energy saving opportunities in furnace and rolling mill.

c) With neat diagram explain topping and bottoming cycle cogeneration systems.

Q10)a) The energy manager of company wants to replace 15HP induction motor with energy efficient motor for energy saving. On the basis on following data calculate payback period for replacement of old motor with energy

efficient motor. Take cost of electricity is Rs 5/kWh. The demand charges Rs. 310/kVA per month. [8]

Description	Old motor	Energy Efficiency Motors
Rating of machine	15HP	15HP
Loading percentage	80%	80%
Operating hours per annum	6500	6500
Efficiency near full load	85%	93%
Power factor near full load	0.85 lag	0.89 lag
Capital cost	--	Rs. 50000/-
Scrap value	Rs. 5000/-	--

b) Discuss the financial appraisal criteria. [8]

OR

Q11)a) Calculate net present value for an investment of Rs. 1000000 for retrofit. The energy savings realised for five years are Rs. 150000, Rs. 200000, Rs. 250000, Rs. 300000 and Rs. 250000/- With discounting factor is 12% judge the economic feasibility of the project. [8]

b) Explain with suitable example break even analysis. How it is different from others? [8]

