

22525

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define Energy conservation.
- (b) List the energy conservation technique in Induction Motor.
- (c) List out the different technical losses that take place in transmission & distribution system.
- (d) State co-generation with suitable example.
- (e) State power factor tariff ?
- (f) List four relevant instruments to carry out energy audit.
- (g) Prepare any four questions related to energy audit.

2. Attempt any THREE of the following :

12

- (a) State the need and benefit of star labelling.



- (b) Explain the following Energy Conservation methods of electrical motor :
 - (i) Rewinding of motor
 - (ii) By operating in star mode
- (c) Explain energy conservation method in lighting system by using installation of servo stabilizer.
- (d) State any four advantages of co-generation system.

3. Attempt any THREE of the following :

12

- (a) State the need of energy conservation in transformer and material used to improve the design & performance of transformer.
- (b) State and explain any four commercial losses in transmission and distribution system.
- (c) What are the different types of tariffs ? Explain in short (any four).
- (d) State various instruments used in energy audit procedure with their functions.

4. Attempt any THREE of the following :

12

- (a) What is the Energy Conservation Act, 2001 ?
- (b) Explain how Variable Frequency Drive (VFD) can help to conserve electrical energy.
- (c) Differentiate between technical and commercial losses.
- (d) How TOD and peak-off tariff can help for energy conservation ?
- (e) State any four advantages of energy audit.

5. Attempt any TWO of the following :**12**

- (a) State the working principle & operation of APFC used in transmission & distribution system.
- (b) For the tariff of 125/kVA of maximum demand and 3.00 per unit consumed; load factor = 50%, find overall cost/unit at :
 - (i) Unity power factor
 - (ii) 0.8 p.f. consider maximum demand = 10 kVA.
- (c) Describe methods of reducing technical losses in transmission & distribution system.

6. Attempt any TWO of the following :**12**

- (a) Outline the step wise activities to be carried out to assess the performance of existing lighting system of electrical installation.
- (b) An industrial plant has incandescent load of comprising 100 nos. of 60 W, and 140 nos. of 100 W. Calculate the energy saving and simple payback period if each incandescent load is replaced by 1 × 40 W fluorescent lighting load. Lighting is required for 4000 hrs/year and cost of electricity is ₹ 6.00/kwh. Replacement cost is ₹ 150/unit.

Consider ballast consumption as 15 watt.

Given data :

- (i) 100 W incandescent lamp = 2200 lumens
 - (ii) 60 W incandescent lamp = 1320 lumens
 - (iii) 40 W fluorescent lamp = 2400 lumens.
- (c) Explain with the flow chart energy audit procedures.
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