

22525

21222

3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- Instructions :**
- (1) Answer each next main Question on a new page.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Assume suitable data, if necessary.
 - (4) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE :

10

- (a) Explain the National Scenario related to Energy demand and supply.
- (b) Define Energy Audit as per Energy Conservation Act, 2001.
- (c) List out any four energy conservation techniques applicable to induction motor.
- (d) List out the energy conservation equipments suitable for electrical motors.
- (e) Specify any two types of Energy efficient transformers.
- (f) Define the term "Simple payback period" and state how it helps in Energy Audit Project.
- (g) Draw a neat labelled Energy flow diagram for an Induction Motor.

2. Attempt any THREE :

12

- (a) State the role of MEDA in present energy scenario.
- (b) State the need of energy conservation for transformers in present energy scenario.
- (c) Explain the technical & commercial losses in power system.
- (d) Explain the method for optimum use of energy sources in the chemical industries.

- 3. Attempt any THREE :** **12**
- (a) Identify five and explain any two energy conservation techniques for transformer.
 - (b) Illustrate with neat sketch the working of Automatic power factor controller as an energy conservation equipment.
 - (c) State the benefits of Availability Based Tariff and Time-off-day Tariff.
 - (d) State any four major energy audit instruments and explain their uses.
- 4. Attempt any FOUR :** **12**
- (a) Differentiate the star labelled electrical equipments from non-labelled electrical equipments on any four factors.
 - (b) Explain the following energy conservation technique suitable for induction motors – operating in star mode – improving the power quality.
 - (c) Explain the energy conservation technique adopted for a lighting system using the energy efficient lamp sources.
 - (d) Identify the factors to be considered for selection of cogeneration system for a facility.
 - (e) Provide probable questionnaire to carry out energy audit of an electrical workshop.
- 5. Attempt any TWO :** **12**
- (a) Explain the methods to reduce technical losses in the transmission and distribution systems (any three).
 - (b) Explain the topping cycle co-generation technique.
 - (c) Describe the different steps involved in detailed energy audit procedure.

6. Attempt any TWO :**12**

- (a) A manufacturing plant is fed with three phase 400 V, 50 Hz supply and runs from 9.00 to 17.00 Monday to Friday. During the operating period the demand is constant at 60 kVA. Calculate the monthly energy bill if demand charge is ₹ 260/ kVA per month and unit charge is ₹ 2/unit p.f. is 0.94.
- (b) Describe the incentives and penalties related to following tariffs :
- Power factor tariff
 - Time-off-day tariff
 - Load factor tariff
- (c) The existing illumination scheme of an electrical installation is having 40 lamps of 40 watt each. If the tariff is flat rate with ₹ 2/unit and fixed charge of ₹ 140/- month. Calculate the monthly energy bill. If the lamps are replaced with energy efficient lamps giving same level of illumination with 25 watt rating and if the replacement cost per lamp is ₹ 250. Calculate the payback period.
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