



17506

21415

3 Hours/100 Marks

Seat No.

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- Instructions :** (1) **All** questions are **compulsory**.
(2) Answer **each** Section on **same/separate** answer sheet.
(3) Answer **each next** main question on a **new** page.
(4) Illustrate your answers with neat sketches **wherever** necessary.
(5) Figures to the **right** indicate **full** marks.
(6) Assume suitable data, if **necessary**.
(7) Use of **Non-programmable Electronic Pocket Calculator** is **permissible**.
(8) Mobile Phone, Pager and any other Electronic Communication devices are **not permissible** in Examination Hall.
(9) **Use** of Steam tables, logarithmic, Mollier's chart is **permitted**.

MARKS

1. A) Attempt **any three** :

12

- Write meaning of each of the following abbreviations :
NPC, MEDA, BEE, MNRE.
- State recommended illumination level for each of the following :
Nonworking area in a office, workshop, theater, godown.
- Explain how Variable Frequency Drive (VFD) can helps to conserve electrical energy.
- Explain why frequent rewinding of induction motors reduces its efficiency.

P.T.O.

**MARKS****B) Attempt any one :****6**

- a) Write any six techniques that are to be adapted while designing energy efficient motors as compared to conventional induction motors.
- b) An energy conservation project of Rs. 5 lakhs saves 20 units of energy daily. If rate of electricity is Rs. 7 per unit, calculate Pay Back Period. Comment on this Pay Back Period whether investment should be done or not. Also write risk involved in this investment. Assume no. of working days is 250.

2. Attempt any four :**16**

- a) Explain how energy conservation can be obtained by replacing light sources (lamps) only.
- b) Explain how energy conservation can be obtained by periodic survey of lights.
- c) A good quality of core material reduces core losses in I.K. and transformers. Explain.
- d) With reference to Trans and Distr. system explain why reactive power should be compensated for conserving electric energy.
- e) Write any six energy conservation techniques that are to be considered while designing lighting for an educational institute for energy conservation.

3. Attempt any four :**16**

- a) Explain how energy can be conserved in induction motor by improving power quality.
- b) Explain how energy can be conserved by operating two transformers in parallel.
- c) Explain when induction motors are run in star connection under 30% load condition, how energy is conserved.
- d) Explain how Amorphous transformers are efficient as compared to conventional transformers.
- e) Explain how balancing of phase currents conserve energy in transmission line.



MARKS

4. A) Attempt **any three** : **12**
- a) Write meaning of each of the following terms with reference to tariff connected load, load factor, max.demand, average load.
 - b) State any four advantages of co – generation system.
 - c) Explain how TOD and peak-off tariff can helps for energy conservation.
 - d) State any four objectives of tariff.
- B) Attempt **any one** : **6**
- a) Explain how losses are increased in Trans and Distr. system due to each of following. Low power factor, low transmission voltage, transmission line voltage imbalance.
 - b) An industrial consumer having a maximum demand of 100 kW maintains a load factor of 65%. The tariff rates are Rs. 900 KVA of maximum demand per annum plus Rs. 2.85 per KWH of energy consumed. If the average power factor is 0.8 lagging, calculate the total energy consumed per annum and annual electricity bill.
5. Attempt **any four** : **16**
- a) Explain how energy can be conserved by reducing commercial losses.
 - b) Explain how motion detectors can be used for energy conservation.
 - c) With the help of conceptual diagram explain what is cogeneration.
 - d) Explain how each of following conserves energy in lighting system voltage stabilizers, dimmers.
 - e) Explain any four advantages of centralized control equipment for conserving energy.
 - f) Explain how soft structures helps to conserves energy.



6. Attempt **any four**.

16

- a) Write different steps of energy audit of an industry.
 - b) Prepare any eight questions related to energy audit of a shopping mall.
 - c) Classify cogeneration system based on sequence of energy generation. Explain working of each of them with diagram.
 - d) State any four factors on which cogeneration system is selected.
 - e) Explain use of ABC analysis in energy audit project.
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