

17506

21819

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any THREE of the following: 12
- (i) State the difference between commercial and non-commercial energy sources with examples.
- (ii) Define:
- 1) Luminous intensity
 - 2) Luminous efficiency
 - 3) CRI
 - 4) Lux
- (iii) How core loss and copper loss can be reduced in Conventional Induction Motor?
- (iv) State the periodical maintenance of transformer as a energy conservation techniques.

P.T.O.

b) **Attempt any ONE of the following:**

6

- (i) List any four causes for technical losses in transmission and distribution system. Also state the technique to reduce them.
- (ii) Draw neat block diagram and explain:
 - 1) Topping cycle
 - 2) Bottoming cycle

2. **Attempt any FOUR of the following:**

16

- a) Explain following energy conservation techniques in lighting system:
 - (i) By using energy efficient luminaries.
 - (ii) By using light control gears.
- b) State any four advantages of energy efficient motors.
- c) What is VFD? State the benefits of it
- d) Compare conventional transformer and energy efficient transformer on the basis of:
 - (i) Construction
 - (ii) Material used
 - (iii) Losses
 - (iv) Application
- e) Explain:
 - (i) Electricity duty
 - (ii) Energy cost
- f) Explain energy conservation by improving load factor and power factor.

- 3. Attempt any FOUR of the following:** **16**
- a) Draw power flow diagram of Induction motor and suggest methods of improving power quality in it.
 - b) Explain contract demand and billing demand with reference to tariff.
 - c) State at least eight industries suitable for co-generation.
 - d) Which instruments are used for energy audit? Give function of any four.
 - e) Explain stepwise procedure to study, asses and evaluate the existing lighting system.
- 4. a) Attempt any THREE of the following:** **12**
- (i) Explain voltage optimization and phase current balancing.
 - (ii) State various energy conservation opportunities in transmission and distribution system.
 - (iii) Explain causes and effects of low power factor.
 - (iv) With neat diagram explain working of any one reciprocating engine and state area of application.
- b) Attempt any ONE of the following:** **6**
- (i) Explain maximum demand controller and KVAR controller for distribution system.
 - (ii) Calculate annual bill of consumer whose maximum demand is 100 kW at 0.8 p.f lagging and at 60% load factor. Tariff used is RS 100/kVA of maximum demand and RS 2/kwh consumed.

- 5. Attempt any FOUR of the following:** **16**
- a) State various techniques for energy conservation in 3 phase induction motor in industries. Explain any one in detail.
 - b) State merits of dry type transformer and available maximum rating of it.
 - c) Explain power factor incentives and load factor incentives to HT-1 category of consumer.
 - d) State the advantages of soft starter over DOL starter.
 - e) State any four questionnaires in reference to energy audit.
 - f) What is ABC analysis? How it helps in energy audit?
- 6. Attempt any FOUR of the following:** **16**
- a) List different lighting system. Explain two with examples, suggest energy efficient lighting system.
 - b) Explain the concept of daylight saving as a means for energy conservation.
 - c) How the energy conservation can be achieved in distribution system by:
 - (i) Optimization of HT and LT lines.
 - (ii) By balancing load in three phases
 - d) State the factors governing selection of co-generation.
 - e) With the help of flow chart, explain procedure of energy audit.
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