

17506

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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.

Marks

1. (A) Attempt any **THREE** of the following :

12

- (a) State the functions of National Productivity Councils. (any four)
- (b) Define the following terms & state their units :
 - (i) Luminous intensity
 - (ii) Luminous flux
- (c) Explain the energy conservation technique “By improving power quality” for induction motor.
- (d) State and explain any four factors governing selection of induction motor.

(B) Attempt any **ONE** of the following :

06

- (a) Describe the following energy conservation methods of electrical motor.
 - (i) By motor survey
 - (ii) By matching loads with motor rating
- (b) Describe the following energy conservation methods of lighting system.
 - (i) By replacing lamp sources
 - (ii) Using light control gears

2. Attempt any FOUR of the following :**16**

- (a) Define Luminance and state recommended luminance level of any four different locations.
- (b) Explain energy conservation method in lighting system by using installation of separate transformer servo stabilizer.
- (c) Explain any two energy conservation techniques in fan.
- (d) State the need of energy conservation in electrical motor.
- (e) State the need of energy conservation in transformer.
- (f) State and explain any four technical losses in transmission and distribution systems.

3. Attempt any FOUR of the following :**16**

- (a) Compare conventional induction motor with energy efficient motor on the basis of following points :
 - (i) Noise, (ii) Cost, (iii) Effect of voltage fluctuations, (iv) Efficiency
- (b) Explain energy conservation technique in induction motor by minimizing idle and redundant running of motor.
- (c) Explain any four advantages of amorphous transformer.
- (d) State any four periodical maintenance which is necessary in transformer to achieve energy conservation.
- (e) State and explain any four commercial losses in transmission and distribution system.

4. (A) Attempt any THREE of the following :**12**

- (a) State the objectives of tariff systems.
- (b) Define the following terms related to tariff :
 - (i) Connected load
 - (ii) Unit consumed
 - (iii) Fixed charges
 - (iv) Electricity Tax
- (c) What is Time of Day tariff? How it help in energy conservation ?
- (d) Give classification of co-generation system on the basis of sequence of use and use of technology.

(B) Attempt any ONE of the following :**6**

- (a) Explain following techniques related to energy, conservation in transmission and distribution system.
 - (i) By Balancing phase currents
 - (ii) Variable technical losses (I^2R losses)
- (b) State the incentives and penalties related with power factor tariff.

5. Attempt any FOUR of the following :**16**

- (a) Explain the “mitigation of power theft” and “faulty meter replacement” for energy conservation techniques to reduce commercial losses.
- (b) With neat diagram explain the following terms :
 - (i) Steam turbine co-generation system
 - (ii) Gas turbine co-generation system

P.T.O.

17506

[4 of 4]

- (c) With neat diagram, explain use of “reactive power controller” to reduce technical losses in transmission and distribution system.
- (d) Draw block diagram of microprocessor based centralised control equipment of energy conservation and explain it.
- (e) State the four advantages of soft starter.
- (f) What is Energy flow diagram ? State its significance from Energy Audit point of view.

6. Attempt any FOUR of the following :

16

- (a) With a neat diagram, explain back pressure steam turbine co-generation system.
 - (b) With a neat diagram, explain gas engine co-generation system.
 - (c) Enlist any four energy audit instruments and also give their functions.
 - (d) Explain stepwise the “Detailed energy audit” procedure.
 - (e) Define & explain the procedure to calculate the payback period. Also state its significance.
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