**14115**

**17506**

3 Hours/100 Marks

Seat No. | | | | | | | | |

***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****.*
*(5) Use of non-programmable Electronic Pocket Calculator is* ***permissible****.*
*(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 importance and need of energy conservation in present scenario.
   ii) Explain energy conservation method in lighting system by using installation of separate transformer servo stabilizer.
   iii) Explain the following energy conservation methods of electrical motor.
      a) Matching motor rating with required load.
      b) Rewinding of motors.
   iv) State various instruments used in energy audit procedure with functions.

   B) Attempt **any one** of the following : **6**
   i) What is co-generation ? Explain any five factors governing the selection of co-generation system.
   ii) Explain working of automatic star delta convertor and state its advantages.

2. Attempt **any four** of the following : **16**
   a) Write opportunities for energy conservation in transformer.
   b) State and explain various reasons of technical losses in transmission and distribution system.

**P.T.O.**

**MARKS**

c) Define the terms :

i) electricity duty

ii) connected load

iii) electricity tax

iv) tariff structure

d) Explain the procedure for assessing existing lighting system in a facility.

e) State the working and applications of following energy conservation equipments.

i) soft starter

ii) power factor controller.

f) Draw energy flow diagram and state its three significance.

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

a) Explain energy conservation technique in induction motor by minimizing the idle and redundant running of motor.

b) With the help of neat labeled diagram explain working of Gas-turbine co-generation system.

c) A consumer has a maximum demand of 100 KW at 30% load factor. If tariff is Rs. 90/KW of maximum demand plus 10 paise per KWh. Find the overall cost per KWh.

d) What is ABC analysis ? State its three advantages referred to energy audit projects.

e) Write comparison between energy efficient motor and conventional induction motor (any four point).

**MARKS**

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

   i) State four benefits of Variable Frequency Drives (VFDs).

   ii) Explain energy conservation techniques in transmission and distribution system by

      i) reducing $I^2R$ losses

      ii) balancing phase currents.

   iii) State the incentives and penality related with p.f. tariff.

   iv) Explain the importance of amorphous core transformers from the energy conservation point of view.

   B) Attempt **any one** of the following : **6**

   a) What are the different types of tariffs ? Explain each **(any four)**.

   b) State need of energy conservation in electrical motors. Explain the effect of following parameter on three phase induction motor.

      i) harmonic distortion

      ii) voltage unbalance.

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

   a) State the advantages of soft starter with reference to D.O.L. starter.

   b) State and explain various factors governing the selection of 3-phase induction motor.

   c) Compare conventional core transformer with amorphous core transformer

   on the basis of

      i) initial cost of installation

      ii) construction used

      iii) material required

      iv) losses.

**MARKS**

d) Give classification of cogeneration system on the basis of the sequence of energy generation.

e) Draw block diagram of microprocessor based centralised control equipment of energy conservation and explain it.

f) State any four advantages of energy audit.

6. Attempt **any four** of the following : **16**

a) State commercial losses in transmission and distribution system. Also state the remedies.

b) What is power factor tariff ? Explain how it help in energy conservation ?

c) Draw layout of steam turbine cogeneration system and label it.

d) Explain the need of reactive power compensation in transmission and distribution system from energy conservation point of view.

e) Write four objectives of tariff system.

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