Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE) (2011 Onwards E-III)
B.Tech.(Electrical & Electronics) (2011 & 2012 Batch E-III)
(Sem.–7,8)

ENERGY EFFICIENT MACHINES

Subject Code : BTEE-805D
Paper ID : [A3044]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. Write briefly :

a. Under what circumstances does existing motor need to be replace with an energy efficient motor?

b. A 60-Hz, four-pole induction motor reaches its rated power when the slip is 4%. What is the rotor speed at rated power?

c. What is energy audit? Why audit is required in electrical system?

d. State essential parts of electrical drives.

e. How should motor inspection and maintenance be planned?

f. What is energy conservation? Why we need energy conservation?

g. What is need of star rating and labeling programme for electric motors?

h. Why electrical drives are needed for fan and pumps?

i. What are the advantages of electric drives?

j. What do you understand by energy management? Why it is essential?

SECTION-B

2. Draw the characteristic of an induction motor.

3. How energy efficient motors are different from conventional motors?

4. A factory has a maximum load of 240 kW at 0.8 p.f. lagging with an annual consumption of 50,000 units. The tariff is Rs 50 per kVA of maximum demand plus 10 paise per unit. Calculate the flat rate of energy consumption. What will be annual saving if p. f. is raised to unity?

5. What are the main factors which decide the choice of electrical drive for a given application?

6. What are the factors on which energy saving of electrical drive depends?

SECTION-C

7. Which are different losses in an electric motor? How do they effect efficiency?

8. a. Discuss the disadvantages of a low power factor. Explain the causes of low power factor of the supply system.

   b. A single phase motor connected to 400 V, 50 Hz supply takes 31.7A at a power factor of 0.7 lagging. Calculate the capacitance required in parallel with the motor to raise the power factor to 0.9 lagging.

9. Write a note on following (**any two**) :

   a. Direct measurement methods

   b. Harmonics

   c. Loss segregation methods