

Roll No. ....

Total No. of Questions : 08]

[Total No. of Pages : 02

**M. Tech.**

**ENERGY EFFICIENT MACHINES**

**SUBJECT CODE : PEE - 519**

**Paper ID : [E0493]**

[Note : Please fill subject code and paper ID on OMR]

**Time : 03 Hours**

**Maximum Marks : 100**

**Instruction to Candidates:**

- 1) Attempt any **Five** questions.
- 2) All questions carry equal marks.

- Q1)** (a) Discuss the concept of 'Energy Audit' and suggest some means by which energy audit is helpful in energy- conservation.
- (b) Discuss the objectives and desirable characteristics of a tariff.
- Q2)** (a) A consumer has annual consumption of 70,000 kWh. The two part tariff is Rs.100 per kW of maximum demand plus 50 paise per kWh of energy consumed. Obtain the annual bill and overall costs/kWh if the load factor is 0.45.
- (b) Explain how cost of energy expressed in two part tariff. Also mention advantages and disadvantages of this type of tariff.
- Q3)** (a) Discuss the effect of running characteristics and starting characteristics on the success of energy efficient drives.
- (b) Discuss the loss of segregation method for determination of efficiency of a motor.
- Q4)** (a) Sketch the torque-slip characteristics of an induction motor working at rated voltage and frequency. Explain the changes if :
- (i) Applied voltage is reduced to half at rated frequency, and
  - (ii) Both applied voltage and frequency are reduced to half.
- (b) A 3-phase, 50 Hz, 6-pole induction motor has a shaft output of 10kw at 930 rpm Friction and windage loss amount to be 1% of output. Total stator losses are 600W. Determine the rotor input and stator input. If the maximum torque is developed at 800rpm, calculate the starting torque at rated voltage starting.

- Q5)** (a) Explain how power factor improvement is essential for an electric system. How can the power factor be improved with nonlinear loads? Explain.
- (b) Discuss the action of motor controllers.
- Q6)** (a) Give a detail description of a polyphase induction motor supplied by adjustable frequency supply.
- (b) Discuss application of adjustable speed system to drive constant torque load.
- Q7)** (a) Discuss the net present worth method for efficiency evaluation of as system. What are the drawbacks of payback period method?
- (b) What are the various variables which should be taken into account for determining the economic feasibility of an energy system?
- Q8)** Write short notes on:
- (a) Motor life cycle.
- (b) Induction motor characteristics.
- (c) Energy conservation in drive circuit.

