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Total number of pages: 02

Total number of questions: 05

M.Tech. || EE || 3rd Sem

Energy Efficient Machines

Subject Code: MTEE-301A (RP)

Paper ID: M118

Time allowed: 3 Hrs

Max Marks: 100

Important Instructions:

- Attempt all questions
- Each question carries equal marks
- Assume any missing data.

Q. 1. Compare various types of efficiency determination methods and which one is CO2 better amongst all? Explain motor efficiency labeling and energy efficient motor standards.

OR

Describe briefly standard motor efficiency and the loss of segregation method CO2 for efficiency determination of a motor. Also explain the various factors affecting the efficiency of a motor.

Q. 2. Discuss the effect of running characteristics and starting characteristics on the CO1 success of energy efficient drives.

OR

Explain the concept of energy conservation in industries and agricultural CO1 sector. How energy management and auditing is done as far as energy efficient machines are concerned?

Q. 3. Explain why the power factor improvement is essential for a power system CO3 and how can it be improved in sinusoidal systems with non linear loads?

OR

a) Describe briefly harmonics in induction motor and where the capacitors CO3 should be placed to improve the power factor of the system?

b) What is the full load power factor of 50 H.P, 1800 rpm induction motor operating at 230V, 3 Phase, 60 Hz, power system with permitted efficiency of 0.915? What is KVAR rating to improve the power factor to 0.989?

Q. 4. What is adjustable speed system? Explain its applications for fans, pumps and CO4 constant torque loads.

OR

Why poly phase induction motors are supplied by adjustable frequency power CO4 supplies? Explain varying duty applications, voltage variation and over motoring.

Q. 5. What is motor life cycle? What are the various parameters effecting the life of CO5 the motor? Explain the direct savings and payback analysis method and what is efficiency calculation factor?

OR

a) Explain two part tariff method, present worth method with constant power CO5 costs and with increasing power costs.

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 800 rpm, calculate the starting torque at rated voltage starting.