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

Total No. of Questions : 18

B.Tech. (EE) (2012 Onwards E-III) (Sem.–7)

ENERGY EFFICIENT MACHINES

Subject Code : BTEE-805D

M.Code : 71945

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS 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 have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Write briefly :

1. How is an energy efficient motor different than a standard motor?
2. Do energy efficient motors require more maintenance?
3. Should one rewind my standard-efficiency motor or purchase an energy efficient motor?
4. What horsepower, speed and voltage ranges are available?
5. What is the efficiency of an energy efficient motor at different load points?
6. What is the power factor of an energy efficient motor?
7. Can a standard motor be rewound as an energy efficient motor?
8. Is the service factor any different from that of a standard motor?
9. What is the payback period for selecting an energy efficient versus a standard-efficiency motor?
10. Aren't energy efficient motors unsuitable for adjustable speed drive applications?

SECTION-B

11. Write some applications of constant torque and variable torque loads. Write a short note on a 'Multi-Speed Motor'.

12. How do you size the capacitor rating required for an induction motor? Write some strategies for correcting poor power factor in motors.

13. Comment on 'Construction Aspects' how an "Energy Efficient Motor" is different from a "Standard Motor"? List down some ill-suited applications for 'Energy Efficient Motors'.

14. Why 'Induction Motors' are so popular over all types of motors? How do you define percentage unbalance in voltage?

15. Why is it beneficial to operate motors in star mode for under loaded motors? What is the thumb rule for installing capacitors to motor terminal?

SECTION-C

16. A 4-pole 415 V 3-phase, 50 Hz induction motor runs at 1440 RPM at .88 pf lagging and delivers.

    10.817 kW. The stator loss is 1060 W, and friction & windage losses are 375 W. Calculate

    A. Slip, B. Rotor Copper loss, C. Line current and D. Efficiency

17. What are the effects of harmonics on motor operation and performance? Calculate the annual energy-savings and simple payback from replacing an existing standard motor with a premium efficiency Motor versus repairing a standard efficiency motor with a sample example.

18. Discuss direct measurement method and loss segregation method to determine the efficiency of energy efficient methods.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.