Reg. No. : | | | | | | | | | | | |

L 1274

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Third Semester

Mechanical Engineering

EE 252 — ELECTRICAL MACHINES AND DRIVES

(Common to Mechatronics Engineering)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State the advantages of individual drive.

2. What are the different factors that influencing the choice of electrical drive.

3. Draw the speed torque characteristics of three phase induction motor.

4. What is meant by plugging?

5. What is the purpose of a starter in three phase induction motor?

6. State the use of Novolt release coil in a dc motor starter.

7. How can we get the speed above the rated value in a d.c shunt motor?

8. What are the different methods of speed control in a three phase induction motor from the stator side.

9. What is the function of a chopper?

10. What is meant by a feeder in a distribution system.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the expression for temperature rise in electrical motors. Also draw the heating and cooling curves. (10)

(ii) The thermal time constant and final steady temperature of a motor on continuous running are 30 minutes 60°C. Find out the temperature (1) after 15 minutes at this load (2) after one hour at this load. (6)

Or

(b) (i) Explain the different classes of duty of electrical drives with duty cycle diagram. (10)

(ii) The load cycle of a motor for 15 minutes in driving some equipment is as follows :

(1) 0–5 minutes – 30 h.p

(2) 5–9 minutes – No load

(3) 9–12 minutes – 45 h.p.

(4) 12–15 minutes – No load.

The load cycle is repeated indefinitely. Suggest a suitable size of the motor for these conditions. (6)

12. (a) Explain with neat sketch the different methods of braking used in dc motor. (16)

Or

(b) Explain the speed torque characteristics of different types of single phase induction motor. (16)

13. (a) Explain any two starters used in squirrel cage induction motors with a neat sketch. (16)

Or

(b) Explain the different controls circuits used in dc series and shunt motor. (16)

14. (a) (i) Explain the speed control methods of dc shunt motors. (10)

(ii) A 200 v dc series motor has a total resistance of 0.5 ohm. It runs at 800 rpm taking a input current of 10 A. Find the series resistance required to reduce the speed to 600 rpm, the input current being kept constant. Assume the magnetisation characteristic to be a straight line. (6)

Or

(b) Explain the different speed control methods used in three phase induction motors. (16)

15. (a) Explain the solid state speed control methods of dc drives using choppers and rectifiers. (16)

Or

(b) (i) Discuss the construction of any one type of substation with a neat sketch. (10)

(ii) Discuss the different methods of earthing practices used. (6)