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

Third Semester

(Regulation 2004)

Mechanical Engineering

EE 1213 — ELECTRICAL DRIVES AND CONTROLS

(Common to Production Engineering)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Draw the heating and cooling curve.

2. State the advantages of group drive.

3. When regenerative braking is to be applied?

4. Draw the speed-torque characteristics of D.C series motor.

5. Name the type of induction motor which produces highest starting torque.

6. Why starter is needed for d.c. motors?

7. Write the applications of d.c. chopper.

8. State the advantage of Ward-Leonard control system.

9. What is meant by slip power recovery scheme?

10. What is v/f control in three phase induction motor?

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PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail about the factors influencing the choice of electrical drives. (8)

(ii) Determine the half-hour rating of 40 kw motor. Assume the constant losses to be equal to 80% of full load copper losses. Thermal time constant for the motor is 2 hours. (8)

Or

(b) Explain the selection of power rating for drive motors with regard to thermal over loading and load variation factors.

12. (a) Explain the various braking methods used in d.c. motors.

Or

(b) Explain the speed-torque characteristics of single phase induction motor and three phase induction motor.

13. (a) Draw and explain the typical control circuits for starting the d.c. shunt and series motor.

Or

(b) With neat diagram, explain any two starters used to start squirel cage induction motors.

14. (a) Explain about the armature and field control methods applied to d.c. motors.

Or

(b) (i) With neat diagram, explain the operation of two quadrant DC chopper fed drive. (8)

(ii) Classify the characteristics of Class A, B, C, D and E chopper drives. (8)

15. (a) Explain induction motor speed control by slip-power recovery schemes.

Or

(b) Discuss in detail how the speed of a three phase induction motor can be controlled using an ac voltage controller. Is it possible to have electrical braking in such an arrangement?

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