M.E./M.Tech. DEGREE EXAMINATION - MAY/JUNE 2008
SECOND SEMESTER

Common to Mechanical, Automobile, Metallurgy, Marine, Mechotoronics
Aeronautical, Manufacturing and Production

41C 1201 – ELECTRICAL DRIVES AND CONTROL

Time: Three hours   Maximum: 100 marks

PART A – (20 × 2 = 40 marks)
Answer ALL questions.

1. What are the factors that influence the choice of electrical drives?
2. Define "cooling time constant".
3. Compare AC and DC drives.
4. Name any four class of duty.
5. Draw the torque slip characteristics of three phase induction motor.
6. Compare electrical and mechanical braking.
7. Define synchronous speed.
8. What is meant by plugging?
9. What are the advantages and disadvantages of D.O.L. Starters?
10. Give the expression for speed for a dc motro.
11. What are the methods to reduce the energy loss during starting?
12. How reduced voltage starting of induction motor is achieved?
13. What will be the effect of change in supply voltage on the speed of dc shunt motor?
14. Give the necessity of starters in DC motors.
15. What is slip power recovery system?
16. Define slip.
17. What is firing angle?
18. What are the advantages to static Kramer system over static scherbius system?
19. Where we can employ the thyristor chopper circuit?
20. Define solid state chopper converter.

PART B – (5 × 12 = 60 marks)
Answer any FIVE questions.

21. Draw the block diagram and explain the basic elements of electric drive system. [12]
22. Draw and explain the characteristics curve of a DC motors. [12]
23. What are the types of DC motor braking? State and explain the important features of various braking methods of dc motors. [12]

24. With neat diagram explain the working principle of three point starter. Give the advantages and disadvantages. [12]

25. (a) A 250 V DC shunt motor has shunt field resistance of 250 Ω and an armature resistance of 0.25 Ω for given load torque and no additional resistance include in the shunt field circuit. The motor runs at 1500 r.p.m drawing an armature current of 20 A. If a resistance of 250 Ω is inserted in series with the field, the load torque remaining the same. Find out the new speed and armature current. Assume the magnetization curve to be linear. [6]

   (b) A 220 V, 25 kW, 850 r.p.m shunt motor draws 72.2 A when operating at rated condition. The resistances of the armature and shunt field are 0.25 Ω and 100 Ω respectively. Determine the percentage reduction in field flux in order to obtain a speed of 1650 r.p.m when armature current drawn in 40 A. [6]

26. With neat diagram explain the working of ward Leonard speed control system. Give the advantages and disadvantages. [12]

27 Describe relative merits and demerits of conventional Kramer method. With neat diagram and explain the conventional Kramer method. [12]

28. Explain any one speed control methods of three phase induction motor using thyristors. [12]