

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

III SEMESTER

**EE 9211 ELECTRICAL DRIVES AND CONTROL**

(Common to Mechanical, Mechanical (Tamil), Manufacturing, Printing and Mining)

Time: 3 hours

Max Marks: 100

Answer ALL Questions

**PART-A**

10 x 2 = 20

1. Mention some of the advantages and disadvantages of group drive.
2. What is the function of a relay and mention some of their types?
3. Why dc series motors to be started with load?
4. What is the function of a rectifier and how does it control the speed of a dc motor?
5. What are the advantages of wound rotor induction motor over squirrel cage IM?
6. How the Induction motor speed is controlled by stator frequency variation method?
7. Why starter is needed for starting a motor?
8. What are the different types of starters that are used for a dc motor?
9. What are the different types of Insulating material used in electrical machines?
10. An electric motor is subjected to a load torque variations as given below,  
240 N.m for 20 min  
140 N.m for 10 min  
300 N.m for 10 min  
200 N.m for 20 min  
Find the torque equivalent.

**PART-B**

5 x 16 = 80

- 11(i). What is the need for a fuse and discuss about HRC fuse. (6)
- (ii) With a neat diagram explain the construction and working of a latching relay. (10)
- 12(a). Explain the construction and working of a ward Leonard system and mention its advantages and disadvantages.

[OR]

12 (b). Explain the single-phase half wave and full wave bridge rectifiers for the control of a dc shunt motor and draw its waveforms.

13(a). Explain the speed control of a three-phase IM using three-phase bridge inverter  $-120^\circ$  mode of conduction.

[OR]

13(b)(i). Explain the pole changing method of speed control for a squirrel cage IM. (10)

(ii). Explain the stator voltage variation method of a wound rotor IM. (6)

14(a). With a neat diagram explain the working of a DC motor starter using time delay relays.

[OR]

14(b). Explain the working of a wound rotor IM starter using frequency sensing relay.

15(a). Derive for heating and cooling curve of a motor with necessary assumptions and draw the curve.

[OR]

15(b). A motor has a thermal heating constant of 45 min. When the motor runs continuously on full load, its final temperature rise is  $80^\circ\text{C}$ . (a) What would be the temperature rise after 1 hour, if the motor runs continuously on full load? (b) If the temperature rise on 1 hour rating is  $80^\circ\text{C}$ , find the maximum steady state temperature at this rating. (c) How long will the motor take for its temperature to rise from  $50^\circ\text{C}$  to  $80^\circ\text{C}$ , if it is working at its 1-hour rating?