

End Semester Examinations - 2015-16 Even Semester - May 2016

14EE3004 Solid State DC Drives

Set B

Time : 3 hrs
Total Marks: 100

1. a. Explain about the speed torque conventions and multiquadrant operation of DC Drives. (10)
b. What are the classifications of Power Modulator? (10)

OR
2. a. How the constant torque and constant horse power operation is achieved in speed control of DC drives. (10)
b. Classify the components of load torque. (10)
3. a. With neat waveforms, explain the classes of motor duty cycle. (15)
b. A motor has a heating time constant of 60 min and cooling time constant of 90 min. When run continuously on full load of 20kW, the final temperature rise is 40° C. What load motor can deliver for 10 min if this is followed by a shunt down period long enough for it to cool? (5)

OR
4. a. Describe how to select the motor rating for intermittent periodic duty. (10)
b. A rolling mill driven thyristor converter-fed dc motor operates on a speed reversing duty cycle. Motor field current is maintained constant at the rated value. Moment of inertia referred to the motor shaft is 5000Kg-m². (10)

Duty cycle consists of the following intervals:

 - (i) Rolling at full speed (100 rpm) and at a constant torque of 2500 N-m for 10 sec.
 - (ii) No Load operation for 1 sec at full speed.
 - (iii) Speed reversal from 100 to -100 rpm in 5 sec.
 - (iv) No load operation for 1 sec at full speed.
 - (v) Rolling at full speed and at a torque of 2500 N-m for 15 sec.
 - (vi) No load operation at full speed for 1 sec.
 - (vii) Speed reversal from -100 to 100 rpm in sec.
 - (viii) No load operation at full speed for 1 sec.
5. Explain the operation of a single phase controlled bridge converter driven separately excited DC Motor to give single quadrant operation.

OR
6. Explain the operation of a single phase controlled bridge converter driven separately excited DC Motor to give single quadrant operation.
7. Draw the power circuit diagram and explain the Multi quadrant operation of chopper fed dc separately excited motor. (Any two quadrant operation and four quadrant operation)

OR
8. Discuss about the Dynamic Simulation of Chopper fed DC Drive.
9. Explain the closed loop Current control of separately excited DC motor by PI controller.

Wishing you All the Best
