R13

B.Tech III Year II Semester (R13) Regular Examinations May/June 2016
POWER SEMICONDUCTOR DRIVES
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
  (a)   What is continuous and discontinuous conduction?
  (b)   Write the expression for average output voltage of full converter fed dc drives.
  (c)   Define the dynamic braking.
  (d)   What is meant by regenerative braking in DC motor?
  (e)   What are the advantages in operating choppers at high frequency?
  (f)   State the advantages of closed loop of dc drives.
  (g)   What are the two types of Static Scherbius system?
  (h)   Compare voltage source and current source inverter fed drives.
  (i)   What are the advantages of self control of synchronous motor?
  (j)   Mention some applications of cyclo-converter fed synchronous motor drive.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   Explain the speed torque characteristics of a D.C series motor connected to a three phase fully controlled converter.

OR

3   A separately excited D.C motor is supplied from 220 V, 50 Hz source through a 1-Φ half wave controlled converter. Its field is fed through 1-phase semi converter with zero degree firing angle delay. Motor resistance R_a = 0.5 Ω and motor constant = 0.5 V-sec/rad. For rated load torque 10 N-m at 1000 rpm and for continuous ripple free current, determine the firing angle delay of the armature converter.

UNIT – II

4   Describe the single phase four quadrant operation of D.C drive using dual converters.

OR

5   Draw speed-torque characteristic for regenerative braking operation of a D.C shunt motor and explain the operation.

UNIT – III

6   Derive the expressions for average motor current, ripple in motor current and average torque for chopper fed separately excited D.C motor.

OR

7   Explain the two quadrant operation of chopper fed separately excited D.C motor.

UNIT – IV

8   Discuss briefly the stator voltage control scheme of induction motor. Also draw and explain the speed torque curves.

OR

9   A static Kramer drive is used for the speed control of a 6-pole SRIM fed from 400 V, 50 Hz supply. The inverter is connected directly to the supply. If the motor is required to operate at 800 rpm, find the firing advance angle of the inverter. Voltage across the open-circuited slip rings at stand-still is 600 V. Allow a voltage drop of 0.7 V and 1.5 V across each of the diodes and thyristors respectively. Inductor drop is neglected.

UNIT – V

10   Explain the closed loop control of CSI fed synchronous motor drives

OR

11   Describe the self controlled mode of operation of synchronous motor

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