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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I SEMESTER EXAMINATIONS, APRIL/MAY 2012
POWER ELECTRONIC CONTROL OF DC DRIVES
(COMMON TO POWER ELECTRONICS, POWER ELECTRONICS &
ELECTRIC DRIVES)

Time: 3hours   Max.Marks:60

Answer any five questions
All questions carry equal marks
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1.   Explain the operation of single phase full converter fed separately excited dc motor is continuous and discontinuous mode of operation. Draw the voltage and current wave forms.

2.   Draw the circuit diagram and explain the operation of a three phase semi converter drive. Also sketch and explain the output voltage and output current wave forms for $\alpha = 90^0$ and $\alpha = 120^0$.

3.a)   Draw the flowchart for the simulation of a single quadrant, phase – controlled dc motor drive.
  b)   Discuss the implementation speed controller in the dc motor drive.

4.a)   Explain in detail the steady state analysis of chopper controlled DC motor drive.
  b)   A 200h.p. 230V, 500rpm separately excited dc motor is controlled by a chopper. The chopper is connected to a bridge diode rectifier supplied from 230V, 3-ϕ, 60 Hz ac main. The motor has $R_a = 0.04\Omega$, $L_a = 0.0015H$, $k_b = 4.172 v/rad/\sec$ $f_c = 2KHz$. The motor is running at 300rpm with 55% duty cycle. Determine the average current from steady state current wave form.

5.   Derive and develop the time – domain dynamic model of chopper controlled separately of excited dc motor drive.

6.   Explain the sixth – harmonic torque to the continuous conductors mode of phase controlled dc motor drives.

7.   Explain in detail, the dynamic simulations of the chopper controlled dc motor drive.

8.   Write a short notes on the following
        a) Shunt capacitor compensation
        b) Four quadrant chopper
        c) Hysteresis current controller

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