Code No: A4304, A5404 NR 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

- 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 $\alpha = 90^{\circ}$ and $\alpha = 120^{\circ}$.
- 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, $3-\phi$, 60 Hz ac main. The motor has $R_a = 0.04\Omega$, $L_a = 0.0015H$, $k_b = 4.172v/rad/sec$ $f_c = 2KHz$. 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
