

Code No: A4304,C4204,C4304,C5404

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations, March/April 2011

POWER ELECTRONIC CONTROL OF DC DRIVES

(COMMON TO POWER ELECTRONICS, POWER AND INDUSTRIAL DRIVES, POWER ELECTRONICS, POWER ELECTRONICS AND ELECTRIC DRIVES)

Time: 3 hours

Max. Marks: 60

Answer any five questions  
All questions carry equal marks

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1. Draw and explain the power circuit of single phase semi converter feeding a separately excited dc motor. Explain the operation in both continuous and discontinuous armature current modes with suitable wave forms. [12]
2. Explain the operation of a three phase full converter drive. Also, sketch and explain the output voltage and output current waveforms at firing angle of  $60^\circ$ ,  $90^\circ$  and  $120^\circ$ . [12]
3. a) Explain the closed loop operation of two quadrant converter controlled separately excited dc motor using a suitable block diagram.  
b) A freewheeling diode reduced the harmonics in the output current. This is true for triggering angles above a certain values. What is that limiting triggering angle? [6+6]
4. Explain the operation of the closed loop speed controlled separately excited dc motor chopper drive. [12]
5. a) Draw the flow chart for the dynamic simulation of chopper controlled dc motor drive.  
b) Discuss command current generator and current controller. [6+6]
6. Discuss the control circuit design for a two quadrant chopper circuit. [12]
7. Discuss in detail the harmonic and its associated problems in phase controlled dc motor driver. [12]
8. Write short notes on the following
  - a) Addition of freewheeling diode in controlled bridge rectifier.
  - b) Principle of operation of four quadrant chopper.
  - c) The factor which limit the high frequency operation of chopper. [12]

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