Code: EE6T4

III B.Tech - II Semester – Regular Examinations – May 2017

POWER SEMICONDUCTOR DRIVES
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

$11 \times 2 = 22$ M

1.
   a) What are the equivalent values of drive parameters?
   b) What is multi quadrant operation?
   c) List out the drawbacks of rectifier fed DC drives.
   d) Write a brief note on the sources employed in electric drives.
   e) What is dynamic braking and regenerative braking?
   f) What is circulating current mode operation?
   g) Define constant and variable frequency system.
   h) Draw the speed torque characteristics of induction motor.
   i) What are the types of slip power recovery system?
   j) Define torque angle.
   k) What is the advantage of constant margin angle control?

PART – B

Answer any *THREE* questions. All questions carry equal marks.

$$3 \text{ x } 16 = 48 \text{ M}$$

2. a) Explain about the choices of electric drives.   8 M

   b) Derive the expression for fundamental torque equation of electric drives.   8 M

3. a) Describe the use of three phase semi converter for the speed control of a D.C. series motor. Illustrate your answer with appropriate wave forms and also derive the rms values of source and thyristor currents?   11 M

   b) What do you understand by multi quadrant operation? 5 M

4. Derive the expressions for average motor current, RMS motor currents, torque and average motor voltage, for chopper fed D.C separately excited motor.   16 M

5. a) With neat circuit diagram and waveforms, explain dynamic braking of separately excited motor by single phase converter.   9 M

   b) A 400 V, 750 rpm, 70 A d.c shunt motor has an armature resistance of 0.3 Ω when running under rated conditions, the motor is to be braked by plugging with armature current limited to 90 A. What external resistance should be

connected in series with the armature? Calculate the initial braking torque and its value when the speed has fallen to 300 rpm.   7 M

6. a) Explain how to control the speed of 3 phase induction motor using V/F control?   11 M

   b) Explain about the physical concepts of park's transformation.   5 M