Code No.: 9A02601/R09

B.Tech. III Year II Semester Regular & Supplementary Examinations

Set-4

April/May - 2013

POWER SEMICONDUCTOR DRIVES

(Electrical and Electronics Engineering)

Time: 3 Hours | Max. Marks: 70

*Answer any **FIVE** Questions*

***All** Questions carry **equal** marks*

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1. (a) Write down the basic performance equations for a D.C series motor sketch characteristics of constant torque drive and constant power drive regions.

   (b) A 200 V, 1200 r.p.m, 200 A separately excited D.C motor is fed from 1-ϕ, fully controlled converters with an A.C source 230 V, 50 Hz supply. The thyristor is triggered continuously by a D.C signal. The resistance of armature circuit is 0.05 Ω. Find the motor speed for firing angle 90 ^{o} and rated torque.

2. The speed of a separately excited D.C motor is controlled by means of a 3 phase semi-converter from a 3 phase 415 V 50 Hz supply. The motor constants are inductance 10 mH, resistance 0.9 ohm and armature constant 1.5 v/rad/s. Calculate speed of the motor at a torque of 50 Nm when the converter is fired at 45^{o}. Neglect losses in the converter.

3. Explain with proper circuit diagram speed-torque characteristics of D.C motor under dynamic braking, for the following types,

   (a) Separately excited D.C motor

   (b) Series motor.

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

5. Describe the operation of a A.C voltage controller fed three phase induction motor with neat circuit diagram and waveforms.

6. With help of a neat block diagram, explain the closed loop control of PWM inverter fed induction motor drive with regenerative braking.

7. (a) What are the advantages of static rotor resistance control over conventional methods of rotor resistance control?

   (b) Why has the static Kramer drive a low range of speed control?

8. Explain the closed loop operation of synchronous motor drives with neat sketches.