Code No: **R32025** **R10** **Set No. 1**

III B.Tech II Semester Supplementary Examinations, Dec- 2015

POWER SEMICONDUCTOR DRIVES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any Five Questions

All Questions carry equal marks

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1 Explain speed control of DC shunt motor by [15]
a) Armature voltage control method
b) Field flux control method.

2 Explain the speed control of single phase fully controlled converter to separately excited DC Motor and write the speed torque expressions for this motor. [15]

3 Describe the working of a three phase full converter fed dc separately excited motor with output voltage and current waveforms and expressions. Assuming continuous condition. [15]

4 a) A 440V, 750 rpm, 70A dc shunt motor has an armature resistance of 0.3 when running under rated conditions, the motor is to be braked by plugging with armature current limited to 90A. 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 300rpm. [8]

b) Draw the block diagram of closed loop operation of DC motor. [7]

5 a) Derive the expressions for average motor current, current Imax and I_{min} and average torque for chopper-fed dc separately excited motor. [7]

b) A 220V separately excited dc motor takes 200A at a speed of 960 rpm. It has armature resistance of 0.02 Ω. The motor is fed from a chopper which provides motoring and braking operations .the source voltage of 230V. Assuming continuous condition, calculate duty ratio of chopper for i) motoring operation at rated torque and 350 rpm and ii) braking operation at rated torque and 350 rpm. [8]

6 a) Draw the circuit diagrams of AC Voltage Controller for delta connected Controller and star connected Controller of induction motor. [8]

b) Explain the Variable frequency control of induction motor by Voltage source inverter. [7]

7 a) What is static rotor resistance control? Explain closed loop speed control with static rotor resistance control. [8]

b) What is slip power recovery? Explain static scherbius drive of wound rotor induction motor. [7]

8 a) Explain Principle and operation of self control of synchronous motor by Voltage source inverter. [8]

b) Explain differences between true synchronous mode and self control mode of variable control of synchronous motor. [7]

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