

Code: R7410202

R7

IV B.Tech I Semester (R07) Supplementary Examinations, May 2012

POWER SEMICONDUCTOR DRIVES
(Electrical & Electronics Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. (a) Explain the operation of a single phase fully controlled rectifier control of d.c separately excited motor for continuous conduction mode.
(b) A 200 V, 1500 rpm, 10 A separately excited d.c motor is fed from a single phase fully controlled rectifier with an a.c source of 230 V, 50 Hz. $R_a = 2 \Omega$. Conduction is assumed to be continuous. Calculate the firing angle for half the rated torque and 500rpm.
2. (a) Describe the operation of a three phase fully controlled rectifier control of d.c motor with relevant diagrams.
(b) A 220 V, 1000 rpm, 50 A separately excited d.c motor with $R_a = 0.5 \Omega$ is fed from a three phase full converter. Available a.c source has a line voltage of 400 V, 50 Hz. Determine the value of firing angle when the motor is running at 900 rpm and rated torque.
3. (a) Explain the multi quadrant operation of separately excited d.c motor fed from dual converter.
(b) Describe briefly about the methods of electric braking.
4. (a) Draw and explain the operation of chopper control of separately excited d.c motor with relevant waveforms.
(b) A 220 V, 24 A, 100 rpm separately excited d.c motor has an armature resistance of 2Ω . Motor is controlled by a chopper with frequency of 500 hz and a source voltage of 230 V. Calculate the duty ratio for 1.2 times rated torque and 500 rpm.
5. (a) Explain the control of induction motor with a.c voltage controllers.
(b) Briefly explain the speed torque characteristics of a three phase induction motor.
6. (a) Compare VSI fed and CSI fed induction motor drives.
(b) Discuss the VSI control of induction motor.
7. (a) What is slip power recovery scheme? Explain with relevant diagrams.
(b) Discuss the static Scherbius drive with relevant diagrams.
8. (a) Draw and explain the self-controlled synchronous motor drive employing load commutated thyristor inverter.
(b) Draw the closed loop control of current regulated VSI fed sinusoidal PMAC motor drive.
