

Roll No

EE/EX-7002 (CBGS)**B.E. VII Semester**

Examination, November 2019

Choice Based Grading System (CBGS)**Electric Drives****Time : Three Hours****Maximum Marks : 70**

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Explain the operation of single phase fully controlled converter fed separately excited D.C motor drives. 7
b) A 200V, 875rpm, 150A Separately Excited DC Motor has an Armature Resistance of 0.06Ω . It is fed from a single phase fully controlled rectifier with an ac source voltage of 220V, 50Hz, Assuming continuous conduction, calculate 7
i) Firing angle for rated motor torque and 750rpm.
ii) Firing angle for rated motor torque and -500rpm .
iii) Motor speed for $\alpha = 160^\circ$ and rated torque.
2. a) Draw the block diagram and state modes of operation of electric drive. 7
b) With relevant wave forms discuss the operation of three phase fully controlled converter fed separately excited D.C motor drives.
3. a) Discuss the operation of a four quadrant chopper fed variable speed reversible D.C series motor drive. Derive the relevant mathematical expression. 7
- b) Explain the following braking techniques of D.C motor drive in detail. 7
i) Plugging
ii) Rheostatic braking/Dynamic braking
iii) Regenerative braking
4. a) What is a Dual converter? Explain the principle of operation of dual converter in a circulating current mode. How the same is used for speed control of DC drive? 7
b) Explain the principle of Closed-loop control of a DC drives using suitable block diagram. 7
5. a) Discuss the VSI fed induction motor drive on following: 7
i) Circuit of transistor fed induction motor
ii) Waveform of line voltage in stepped shape
iii) Output voltage expression (Derivation)
b) Compare the operation of VSI and CSI fed Induction motor drive. <http://www.rgpvonline.com> 7
6. a) Write short notes on the following. 7
i) Static Kramer drive
ii) Slip power recovery static Scherbius drive
b) What are the types of Slip recovery system and draw the speed torque characteristics of rotor resistances control? 7
7. a) Draw the block diagram of closed loop operation of a synchronous motor drive and explain it in brief. 7
b) Write short notes on following: 7
i) Cycloconverter fed variable frequency induction motor drive.
ii) Separate and self control of Synchronous motor.
8. a) Discuss variable frequency control of induction motor drive, draw the relevant speed torque characteristics. 7
b) Draw and explain the circuit diagram of AC voltage controller for delta connected controller of induction motor. 7