

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  $0.06\Omega$ . 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  $-500$ rpm.
  - 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. 7
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. 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

\*\*\*\*\*