Roll No .....

EX - 702

B.E. VII Semester

Examination, December 2013

Electrical Drives

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All questions carry equal marks.

1. a) Explain the operation of a single phase semi-controlled converter fed separately excited D.C. motor drive.
   b) A 220 V, 960 rpm, 12.8 A, separately excited d.c. motor has an armature circuit resistance and inductance of 2Ω and 150MH. It is fed from a single phase half controlled rectifier with an a.c. source voltage of 230V, 50Hz. Calculate:
      i) Motor torque for $\alpha = 60°$ and speed = 600 rpm.
      ii) Motor speed for $\alpha = 60°$ and T = 20N – m. Assume continuous conduction.

2. a) With suitable wave forms and mathematical expression, explain the operation of three phase fully controlled converter fed separately excited D.C. motor drive.
   b) A 80 k.W., 440V, 800 rpm d.c. motor is operating at 600 rpm developing 75% rated torque is controlled by a 3ϕ, 6 pulse. Thyristor converter fed drive. If the back emf at rated speed is 410V, determine the triggering angle of the converter. A/C input supply to the converter is 3 phase, 415V, 50Hz.

3. a) Discuss the operation of a four quadrant drive with the help of a suitable example.
   b) Explain the following braking techniques of D.C. motor drive in detail.
      i) Plugging
      ii) Rheostatic braking/dynamic braking.
      iii) Regenerative braking.
4. a) Discuss the operation of a four quadrant chopper fed variable speed reversible D.C. series motor drive.
   b) Explain multiquadrant operation of a separately excited D.C. motor drive fed from a dual converter in detail.
5. a) Explain stator voltage control method of induction motor drive and give reason for the following:
   Stator voltage control method is suitable for fan type of load.
   b) Discuss variable frequency control of induction motor drive, draw the relevant speed torque characteristics; and derive. The mathematical expression showing the relationship of max torque and operating frequency.
6. a) Compare the operation of VSI and CSI fed induction motor drive.
   b) Discuss static rotor resistance control scheme of Induction motor drive.
7. With the help of relevant block diagram discuss the following scheme of slip power recovery.
   i) Static scherbius drive
   ii) Static kramer drive.
8. Write short notes on any two of the following :
   i) Separate and self control of synchronous motor.
   ii) Closed loop operation of synchronous motor drive.
   iii) Two quadrant chopper fed D.C. drive.
   iv) Cyclo converter fed variable frequency Induction motor drive.

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