UNIT - V

9. Discuss and compare the following methods for synchronous motor control

   a) Separate control

   b) Self control

OR

10. Explain the following operation of synchronous motor drive fed from a USI.

    a) Open loop control

    b) Closed loop control

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EX - 802(NGS)

B.E. VIII Semester

Examination, June 2014

Electrical Drives

Time : Three Hours

Maximum Marks : 7t

Note : All Questions carry equal marks.

UNIT-I

1. a) Explain the working of a single phase fully controlled converter fed separately excited D.C. motor drive and derive the relevant mathematical expression for continuous conduction mode.

   b) A 200V, 875 rpm, 150 amps separately excited d.c motor has an armature resistance of $0.06\,\Omega$. It is fed from a single phase fully controlled converter rectifier with an a.c source voltage of 220V, 50HZ. Assuming continuous conduction calculate

      i) Firing angle for rated motor torque and 750 rpm.

      ii) Motor speed for $\alpha = 160°$ and rated torque.

OR

2. a) With relevant wave forms discuss the operation of three phase fully controlled converter fed separately excited D.C motor drive.

b) Discuss rectifier control of D.C series motor drive fed from a single phase half controlled converter. Derive the mathematical expression required for plotting of speed torque characteristics.

UNIT-II

3. a) Explain multiquadrant operation of separately excited D.C motor drive fed from a dual converter.

   b) A 220V, 1500 rpm, 50 A, separately excited D.C motor with armature resistance of 0.5Ω is fed from a circulating current. Dual converter with three phase a.c source voltage of 165V (line). Determine converter firing angle for the following operating points

      i) Motoring operation at rated motor torque and 1000 rpm.

      ii) Braking operation at rated motor torque and -1000 rpm.

OR

4. a) Discuss the operation of a four quadrant chopper fed variable speed reversible D.C series motor drive. Derive the relevant mathematical expression.

   b) A 230V, 1200 rpm, 15 A separately excited D.C motor has an armature resistance of 1.2Ω motor is operated under dynamic braking with chopper control. Braking resistance has a value of 20Ω.

      i) Calculate duty ratio of chopper for motor speed of 1000 rpm and braking torque equal to 1.5 times rated motor torque.

UNIT-III

5. Give reasons for the following

   i) Why stator voltage control is suitable for speed control of induction motor drive in fan and pumps.

   ii) Stator voltage control is an inefficient method of induction motor speed control.

OR

6. For variable frequency control of induction motor drive explain the following points.

   i) For speeds below base speed (V/δ) ratio is maintained constant.

   ii) For speeds above base speed terminal voltage is maintained constant.

UNIT-IV

7. a) Compare the operation of VSI and CSI fed induction motor drive.

   b) With the help of relevant mathematical derivation and waveforms, explain the operation of static scherbius drive.

OR

8. Discuss static rotor resistance control scheme of induction motor drive.