Subject Code-: C4307

M.Tech - I Semester [R09] Regular/Supplementary Examinations, April - 2012

SPECIAL MACHINES AND CONTROL

(Common to P&ID, PE, PE&ED and PE&PS)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions. All questions carry EQUAL marks.

1.a. Briefly explain different modes of excitations of VR stepping motor?
b. Draw the static torque curve of VR stepper motor and explain how the torque is produced?

2. a. Explain open loop operation of stepper motor? Show the dynamics of the rotor position to move over one step angle?
b. Describe why the closed loop control is necessitated over open loop control of stepper motor? [8M+4M]

3. a. Derive the torque expression for Switched reluctance motor?
b. Briefly discuss with neat diagram, the control of SRM?

4. a. Derive the emf equation of PMBLDC motor?
b. Draw and explain the speed-torque characteristics of PMBLDC motor?

5 Discuss with neat diagrams, how the vector control scheme is adapted in permanent magnet synchronous motor?

6. a. Draw and explain the characteristics of various servomotors? Show the regions of control for the suitability of applications?
b. Describe the microprocessor based applications of servomotors? [8M+4M]

7. a. Describe the schematic diagram of ac tachometer and hence explain its principle?
b. An a.c. tachometer having instrument constant of 50Hz per rev/min is connected to a device having instrument constant of 0.02 V/Hz that converts the frequency into millivolts and then another device having instrument constant of 0.05 mV/mA that converts millivolts into milliamps. Write down the overall relationship between current and speed. Calculate the output when the input speed is 900 rev/min.

8. a. Discuss goodness factor of linear induction motor? How it can be improved?
b. With the help of schematic diagram explain the control technique of DCLM?