

Code No: H4302/R13

M. Tech. II Semester Regular/ Supplementary Examinations, July-2016

ELECTRIC DRIVES – II

(Common to PE, P & ID, PE & ED, PE & D, EM & D)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions
All Questions Carry Equal Marks

1. a Explain briefly about VSI fed induction motor drive 6
 b Explain closed loop speed control of induction motor drive with stator resistance 6
 2. a Explain briefly slip power recovery scheme and draw the equivalent circuit 6
 b Draw the flowchart for the computation of the slip energy recovery controlled induction motor drive 6
 3. a Explain vector control of converter fed inverter drive briefly. 6
 b Prove that the transfer function between the rotor flux linkage and its command is unity; from that, prove that the transfer relationship between the torque and its command is unity in the indirect vector controller for the induction machine. Assume that the machine and controller parameters match and that there is no time delay between the currents and their commands. 6
 4. A 6 MW, 3-Phase, 11 kV, Y-connected, 6-pole, 50 Hz, 0.9(leading) power factor synchronous motor has $X_s = 9 \Omega$ and $R_s = 0$. Rated field current is 50 A. Machine is controlled by variable frequency control at constant (V/f) ratio up to the base speed and at constant V above base speed. Determine
 - a Torque and field current for the rated armature current, 750 rpm and 0.8 leading power factor 3
 - b Armature current and power factor for half the rated motor torque, 1500 rpm and rated field current 3
 - c Armature current and power factor for regenerative braking power output of 4.2 MW at 750 rpm and rated field current. 3
 - d Torque and field current for regenerative braking operation at rated armature current, 1500 rpm and unity power factor 3
 5. a Explain permanent magnet synchronous motor drive briefly 6
 b Explain VSI fed BLDC motor drive briefly 6
 6. a List out the motors used in railway traction and explain briefly 6
 b Explain Pulsewidth Modulated voltage source inverter squirrel cage induction motor drive with neat diagram. 6
 7. a Explain the difference between conventional dc and ac traction drives 6
 b Draw the power electronic control circuit for electric vehicle and explain briefly 6
 8. a Describe the operation of a variable reluctance stepper motor. What is micro stepping? 6
 b Explain drive circuits for unipolar and bipolar stepper motor 6
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