Total No. of Questions :8] *[Total No. of Printed Pages :2*

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MEPE-204

M.E./M.Tech., II Semester

Examination, December 2016

Modeling And Simulation of Drives

Time : Three Hours

Maximum Marks : 70

Note : Attempt any five questions. Each question carries equal marks. Part (a) and (b) of a questions carries 7 marks each.

1. With a neat diagram, explain the operation of a DC drive in all four quadrants when fed by a single phase dual converter. Explain why circulating current mode is preferred?

2. a) Explain the principle of closed loop control of DC drive using suitable block diagram.
   b) With the help of circuit diagram and waveforms, explain the dynamic braking of a separately excited DC motor by chopper control.

3. A 230 V separately excited DC motor takes 50 amp at a speed of 800 rpm. It has an armature resistance of 0.4Ω. The motor is controlled by a chopper with an input voltage of 230 volts and frequency of 500 Hz. Assuming continuous conduction, calculate and plot torque-speed characteristic for :
   a) Motoring operation at duty ratio of 0.3 and 0.6.
   b) Regenerative braking operation at duty ratios of 0.7 and 0.4.

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4. a) Explain the concept of constant torque and constant power control drives.
   b) Explain how the speed of a DC series motor is controlled using converters.

5. With a block schematic diagram, explain how the speed of induction motor can be controlled using closed loop scheme with Voltage Source Inverter (VSI).

6. a) Explain the general features of the induction motor drive with a current source inverter.
   b) Draw closed loop block schematic diagram of a slip controlled drive using CSI.

7. a) What is single phasing? Why should it be avoided?
   b) What are the disadvantages of induction motor operation with unbalanced supply?

8. a) What is the basic difference between true synchronous mode and self control mode for variable frequency control of synchronous motor?
   b) In variable frequency control of synchronous motor why (v/f) ratio is maintained constant up to base speed and voltage constant above base speed? Explain.

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