8E4110

B.Tech. VIII Semester (Main/Back) Examination - 2013
Electrical Engineering
8EE2 Electric Drives and Their Control
(Common for 8EE2, 8EX2)

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one question** from each unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Suggest the suitable conventions about the signs of torque and speed for multi quadrant operations of drives.

     Explain the four quadrant operation of a motor, driving a hoist load.   **(10)**

   b) Write short note on steady state stability of drives.   **(6)**

OR

1. a) Explain the load equalisation in electric drives. How can the load equalisation be done for fluctuating loads?   **(8)**

   b) Differentiate between active and passive load torque with example.   **(8)**

Unit - II

2. a) Explain electric breaking for DC seperately excited motor, with suitable connection diagrams and speed torque curves.   **(6)**

   b) Explain 1-ϕ full converter fed DC shunt motor drive, with suitable circuit diagram, related waveforms and also derive the equation of any o/p voltage of rectifier. Also obtain expression for speed and draw speed torque characteristics of drive under this control.   **(10)**

OR

2. a) Explain why a DC series motor is more suitable to with torque overloads than other DC motors.   **(6)**

b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05Ω. It is braked by plugging from an initial speed of 1000 rpm. Calculate : -

(i) Resistance to be placed is armature circuit to limit braking current to twice the full load value.

ii) Braking torque

iii) Torque when speed has fallen to zero. **(10)**

Unit - III

3. a) The usefull full load torque of 3phase 6 pole 50 Hz induction motor is 162.84 Nm. The rotor emf is observed to make 90 cycles per minute. Calculate :-

i) motor output

ii) cupper loss in motor

iii) motor input   rtuonline.com

iv) efficiency if mechanical torque lost in windage and friction is 20.36 Nm and stator losses are 830 w. **(10)**

b) What is the purpose of using a starter for induction motor? Describe different types of starter used. **(6)**

OR

3. a) What is electric braking? What are the advantages and disadvantages of electric braking? Explain plugging for various motors. **(8)**

b) What are the advantages of variable frequency control of induction motor drive? Explain variable frequency control scheme. **(8)**

Unit - IV

4. a) Write short note on cycloconverter fed induction motor drive. **(8)**

b) Write short note on static scherbius drives. **(8)**

OR

4. a) Explain PWM principle for speed control of induction motors. **(8)**

b) Explain slip energy recovery scheme for 3-φ induction motor drives. **(8)**

Unit - V

5. a) Write short note on closed loop control of synchronous motor. **(8)**

b) For synchronous motor drives explain the mode of variable frequency control. **(8)**

OR

5. a) Distinguish b/w cylindrical rotor and salient pole type synchronous motor drive. **(8)**

b) Explain the braking of synchronous motor with VSI. Draw the speed torque characteristic for regenerative braking. **(8)**