Total No. of Questions : 10]

SEAT No. :

P3194

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B.E. (Electrical)

POWER ELECTRONICS CONTROLLED DRIVES

(2012 Course) (Semester - II) (403148)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) What is an Electric drive? Discuss essential parts of Electric Drive with the help block diagram. **[5]**

b) A drive has the following parameters : **[5]**

J = 1 kg-m^2, T=15– 0.01N, N-m and passive load torque T_1 = 0.005N, N-m; where N is the speed in rpm.

Initially the drive is operating in steady state. Now it is to be reversed. For this moor characteristics is altered such that, T= –15 – 0.01N, N-m for positive as well as negative values of N. Calculate the reversal time.

OR

Q2) a) Explain DC. dynamic braking of 3 phase induction motor along with speed torque curves. **[5]**

b) Explain nature and classification of load torques. **[5]**

Q3) a) Explain operation of chopper controlled separately excited DC motor drive with suitable waveforms. **[5]**

b) A 230 V, 960 rpm & 200A separately excited DC motor has an armature resistance of 0.02 Ω. The motor is required to hold the rated load torque by Dynamic Braking at 1200 rpm without emf exceeding 230V. Calculate the value of external resistance to be connected across armature & braking torque. **[5]**

OR

P.T.O.

Q4) a) Explain plugging method for braking operation of DC shunt motor. **[5]**

b) Explain regenerative braking of VSI fed induction motor drives. **[5]**

Q5) a) Sketch the closed loop control for speed control of 3 phase induction motor using Current Source Inverter. Explain the speed control strategy. **[8]**

b) Write a short note on Servo drives. **[8]**

OR

Q6) a) Write a short note on commutatorless DC motor drive. **[8]**

b) Explain with block diagram vector control of three phase Induction motor. **[8]**

Q7) a) What are the control strategies for Permanent magnet synchronous motor drive? How constant torque angle control is used? **[8]**

b) Write a short note on speed controller in PMBLDC motor. **[8]**

OR

Q8) a) Draw neat diagram and explain vector control of PM synchronous motor. **[8]**

b) Describe the operation of PMBLDC motor drive. State its advantages. **[8]**

Q9) a) Write a short note on any two, **[10]**

i) Torque requirement of traction drive at low speed when it is just being started and during free running condition.

ii) Selection criteria of motors.

iii) Requirements of drive for Textile mill operations.

b) How motor duty, heating and cooling affects the temperature of motor? **[8]**

OR

Q10)a) Explain the industrial application of electrical drives in

i) Centrifugal pumps

ii) Paper mills **[10]**

b) What are the various motor duty patterns? How motors are classified based on duty. **[8]**

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