Total No. of Questions : 4]

SEAT No. :

PA-10181

[Total No. of Pages : 2

[6010]-51

B.E. (Electrical Engineering) (In-Sem)

ADVANCED ELECTRICAL DRIVES & CONTROL

(403149) (2019 Pattern) (Semester - VIII)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***

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

b) A drive has following parameters: J = 10 kg - m^2, T = 100 - 0.1 N, N-m and passive load torque, T_1 = 0.05 N, 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, motor characteristic is altered such that T = –100 - 0.01N. N-m for positive as well as negative values of N. Calculate the reversal time. **[5]**

c) Derive the criteria of steady state stability of an electrical drive system. **[5]**

OR

Q2) a) Explain multi quadrant operation of a motor driving a hoist load. **[5]**

b) What are the different components of load torque? Explain in detail. **[5]**

c) State the factors on which the choice of electrical drive depends. **[5]**

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

b) A 200 V, 875 rpm 150 A separately excited dc motor has an armature resistance of 0.06 ohm, it is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, Calculate

i) Firing angle for rated motor torque & 750 rpm.

ii) Firing angle for rated motor torque & -500 rpm. **[5]**

c) Explain regenerative braking of dc motor along with speed torque characteristics. **[5]**

OR

Q4) a) Explain operation of single phase fully controlled converter fed separately DC motor drive with suitable waveforms and derive relation between speed and firing angle. **[5]**

b) A 220 volts, 200 A, 800 rpm, dc separately excited motor has an armature resistance of 0.06 ohm. The motor armature is fed from a variable voltage source with an internal resistance of 0.04 ohm. Calculate internal voltage of variable voltage source when the motor is operating in regenerative braking at 80% of the rated motor torque and 600 rpm. **[5]**

c) Explain closed loop control of a separately excited DC motor with suitable block diagram. **[5]**

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