

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,  $J = 10 \text{ kg} \cdot \text{m}^2$ ,  $T = 100 - 0.1 N$ , 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]