Total No. of Questions : 4]

SEAT No. :

PB-273

[Total No. of Pages : 2

[6270]-61

B.E. (Electrical Engineering) (Insem)

ADVANCED ELECTRICAL DRIVES AND CONTROL

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

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

Instructions to the candidates:

1) ***Answers Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume Suitable data if necessary.***
5) ***Use of non-programmable calculators is allowed.***

Q1) a) What is electrical Drive? Explain essential parts of Electrical Drive with the help of block diagram. **[7]**

b) A weight of 500kg is being lifted up at a uniform speed of l.5m/s by a winch driven by a motor running at a constant speed of 1000rpm. The moment of inertia of motor and winch are 0.5 kg-m^2 and 0.3 kg-m^2 respectively. Calculate motor torque and equivalent moment of inertia referred to motor shaft. In the absence of weight, motor develops a torque of 100 Nm when running at 1000 rpm. **[8]**

OR

Q2) a) Explain steady state stability and derive the criteria of steady state stability of an electrical drive system. **[7]**

b) Explain Multi quadrant operation and speed torque conventions of a motor driving a hoist load. **[8]**

Q3) a) Explain three-phase fully controlled converter drives fed separately excited DC Motor with suitable waveform and derive relation between speed and firing angle. **[7]**

P.T.O.

b) A 220V, 1500rpm, 10A, separately excited DC motor is fed from a single phase fully controlled rectifier with an AC source of 230V, 50Hz. Ra=2Ω. Conduction can be assumed to be continuous. Calculate **[8]**

i) Firing angle for rated motor torque and speed of-l000rpm.

ii) Firing angle for rated motor torque and speed of 1200rpm.

iii) Motor speed for $\alpha = 160°$ at rated torque.

OR

Q4) a) Explain operation of two quadrant chopper controlled separately excited DC motor drive with suitable waveform. **[7]**

b) List type of braking in DC motor and explain any one braking operation of DC motor with diagram and speed torque characteristic. **[8]**

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