Roll I	No.:	

National Institute of Technology, Delhi

Name of the Examination: B. Tech.

Mid-Semester Examination Sept. - Oct., 2019

Branch

:EEE

Semester

:VII

Title of the Course

:Electrical Drives

Course Code :EEB401

Time: 2 Hours

Maximum Marks: 25

Note: All questions are compulsory.

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1	A motor is used to drive a hoist. Motor characteristics are given by					
	Quadrants I and II: $T = 200 - 0.2$ N, N-m					
	Quadrants III and IV: $T = -200 - 0.2N$, N-m, where N is the speed in rpm.					
	When hoist is loaded, the net load torque is $T_l = 100$, N-m and when it is unloaded,					4
	the net load torque is $T_l = -80$, N-m. Obtain the equilibrium speeds for operation					Marks
	in all four quadrants.					
2.	. A motor dr	rives four load, two ha	ave rotational i	motion and two tra	nslational motion.	
	. A motor drives four load, two have rotational motion and two translational motion. Moment of the inertia of the motor is 1.2 kg-m ² . Motor runs at a speed of 1000 rpm.					
		are the details about t				
	Load	Type of Motion	Speed	Inertia/Mass	Torque/Force	
	1.	Rotational	200 rpm	7 kg-m^2	10 N-m	4
	2.	Rotational	200 rpm	5 kg-m^2	6 N-m	Marks
	3.	Translational	10 M/s	10 kg	20 N	Marks
	J.	I I diisidiloiidi	101.15			
	4.	Translational	10 M/s	20 kg	30 N	
	Calculate t	Translational the equivalent inertiang of the motor, assur	of the system	referred to the me	otor shaft and the	
3.	Calculate t	he equivalent inertia	of the system ning negligible	referred to the moleons in the transmi	otor shaft and the ssion system.	3
3.	Calculate t power ratio	the equivalent inertiang of the motor, assume	of the system ning negligible drive with the f	referred to the moleons in the transmit	otor shaft and the ssion system.	
3	Calculate t power ratio	the equivalent inertiang of the motor, assum	of the system ning negligible drive with the f	referred to the moleons in the transmit	otor shaft and the ssion system.	3 Marks
3	Calculate t power ratio	the equivalent inertiang of the motor, assume	of the system ning negligible drive with the f	referred to the moleons in the transmit	otor shaft and the ssion system.	
3	Calculate t power ratio Calculate t J = 10 kg-n	the equivalent inertiang of the motor, assume	of the system ning negligible drive with the f d $T_l = 5 + 0.6\omega$	referred to the moleons in the transmi	otor shaft and the ssion system.	
	Calculate t power ratio Calculate t $J = 10 \text{ kg-n}$ A motor eq	the equivalent inertiang of the motor, assuming time of a confusion, $T = 15 + 0.5\omega_{\rm m}$, and	of the system ning negligible drive with the f d $T_l = 5 + 0.6\omega$ rel has to suppl	referred to the moleon loss in the transmistration of the transmistr	otor shaft and the ssion system. rs:	Marks
	Calculate t power ratio Calculate t J = 10 kg-n A motor eq followed by	the equivalent inertiang of the motor, assume the starting time of a con ² , $T = 15 + 0.5\omega_{\text{m}}$, and quipped with a flywhere	of the system ning negligible drive with the f d $T_l = 5 + 0.6\omega$ rel has to suppling enough for t	referred to the moleon loss in the transmit ollowing parameter m y a load torque of the flywheel to rega	otor shaft and the ssion system. rs: 600 N-m for 10 sec in its full speed. It	Marks
	Calculate t power ration Calculate t J = 10 kg-n A motor equivalent followed by is desired to the power ration.	the equivalent inertiang of the motor, assume the starting time of a con ² , $T = 15 + 0.5\omega_m$, and quipped with a flywhery a no load period long to limit the motor to	of the system ning negligible drive with the form of $T_l = 5 + 0.6\omega$ rel has to supple enough for the requence of 450 N	referred to the moleon loss in the transmistration of the flywheel to regard.	otor shaft and the ssion system. rs: 600 N-m for 10 sec in its full speed. It be the moment of	Marks
	Calculate t power ration Calculate t J = 10 kg-n A motor equivalent followed by is desired to inertia of the control of the calculate to the calculate the	the equivalent inertiang of the motor, assuming the starting time of a con ² , $T = 15 + 0.5\omega_{\text{m}}$, and quipped with a flywher y a no load period long to limit the motor to the flywheel? The no length of the starting time of a contraction of the starting time of the sta	of the system ning negligible drive with the following $T_l = 5 + 0.6\omega$ and the system of the syste	referred to the moloss in the transmit following parameter m y a load torque of 6 he flywheel to rega f-m. What should the motor is 600 rpi	otor shaft and the ssion system. rs: 600 N-m for 10 sec in its full speed. It be the moment of m and it has a slip	Marks
	Calculate t power ration Calculate t J = 10 kg-m A motor equation of the control of the contro	the equivalent inertiang of the motor, assume the starting time of a con ² , $T = 15 + 0.5\omega_m$, and quipped with a flywhery a no load period long to limit the motor to	of the system ning negligible drive with the form of $T_l = 5 + 0.6\omega$ seel has to supply enough for the reque to 450 Norm of the sume the motor of the sum of the su	referred to the moloss in the transmistration of the flywheel to regard from What should the motor is 600 rpm r speed-torque characteristics.	otor shaft and the ssion system. rs: 600 N-m for 10 sec in its full speed. It be the moment of m and it has a slip racteristics to be a	Marks

5.	A drive consisting of semiconductor converter fed dc motor, runs according to the following periodic duty cycle: i. Acceleration from standstill to 1000 rpm in 10 sec at uniform acceleration. ii. Running at 1000 rpm and torque value of 800 N-m for 8 sec. iii. Braking from 1000 rpm to standstill in 10 sec at uniform deceleration. iv. Remains idle for 20 sec. Determine torque and power ratings of the machine. Assume forced cooling and constant field current. J = 100 kg-m².	4 Marks
6.	Explain the different methods of speed sensing.	3
		Marks
7.	Explain the basic block diagram of an electric drive.	4
		Marks