U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE6PE3ED **Max Marks: 100**
Course: Control of Electric Drives **Date: 17.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Describe the Electric drive with a neat block diagram.	*CO1*	*PO1*	**07**
	b)	Obtain the fundamental toque equation of a motor load system.	*CO1*	*PO1*	**05**
	c)	A motor drives two loads. One has rotational motion. It is coupled to the motor through a reduction gear with a=0.1 and an efficiency of 90 %. The load has a moment of inertia of 10 kg-m^2 and a torque of 10 N-m. Other load has translation motion and consists of 1000 kg weight to be lifted up at a uniform speed of 1.5 m/s. coupling between this load and the motor has an efficiency of 85 %. Motor has an inertia of 0.2 kg-m^2 and runs at a constant speed of 1420 rpm. Determine equivalent inertia to the motor shaft and power developed by the motor.	*CO1*	*PO2*	**08**
		UNIT - II			
2	a)	With a neat waveform demonstrate the three-phase fully controlled converter control of DC separately excited DC motor when α=60° and α=90°.	*CO3*	*PO1*	**12**
	b)	A 220 V, 200 A, 800 rpm DC separately excited motor has an armature resistance of 0.06 Ω. The motor armature is fed from a variable voltage source with an internal resistance of 0.04 Ω. Calculate the internal voltage of the variable voltage source when the motor is operating in regenerative braking at 80 % of the rated motor torque and 600 rpm.	*CO3*	*PO2*	**08**
		OR			
3	a)	Demonstrate single phase semi controlled converter control of DC separately excited DC motor.	*CO3*	*PO1*	**10**
	b)	A 220 V,970 rpm, 100 A DC separately excited motor has an armature resistance Of 0.05 Ω. It is braked by plugging from an initial speed of 1000 rpm. Calculate: (i) Resistance to be placed in the armature circuit to limit braking current to `twice the full load. (ii) Braking torque. (iii) Torque required when speed fallen to zero.	*CO3*	*PO2*	**10**

			UNIT - III			
	4	a)	Analyze the induction motor performance when it is fed from a non-sinusoidal voltage supply.	*CO4*	*PO4*	**10**
		b)	With a neat sketch demonstrate the rotor resistance starter and auto transformer starter.	*CO4*	*PO1*	**10**
			UNIT - IV			
	5	a)	Explain V/F control with relevant characteristics and also explain what is necessary of maintaining the V/F ratio constant	*CO4*	*PO3*	**10**
		b)	Demonstrate the control of the induction motor by using the current source inverter.	*CO4*	*PO1*	**10**
			OR			
	6	a)	Demonstrate the control of the induction motor by using the voltage source inverter.	*CO4*	*PO3*	**10**
		b)	Define and explain slip power recovery and explain static Scherbius drive.	*CO4*	*PO3*	**10**
			UNIT - V			
	7	a)	With a neat sketch explain the construction and working principle of a switched reluctance motor.	*CO2*	*PO1*	**10**
		b)	With a neat sketch explain different types of rolling mills.	*CO2*	*PO1*	**10**

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