Reg. No.												

Question Paper Code	12358

B.E. / B.Tech. -DEGREE EXAMINATIONS, NOV / DEC 2023

Fifth Semester

Mechanical and Automation Engineering

20EEPW501 - ELECTRICAL DRIVES AND ACTUATORS WITH LABORATORY

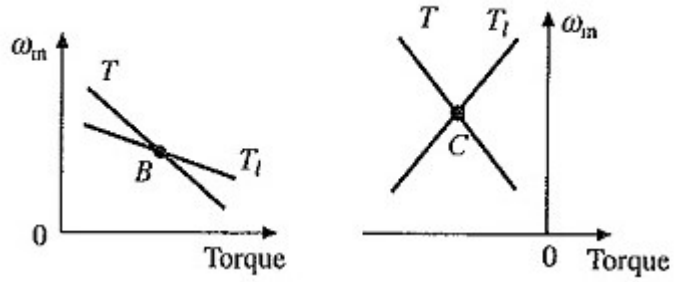
(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	What is a snubber circuit?	*2,K1,CO1*
2.	Distinguish between relay and switch.	*2,K2,CO1*
3.	Write the equations governing motor load dynamics.	*2,K1,CO2*
4.	Examine the stability of drive	*2,K3,CO2*



5.	List out the applications of PMDC motor.	*2,K1,CO3*
6.	Enlist the types of BLDC motors.	*2,K1,CO3*
7.	Define step angle.	*2,K2,CO4*
8.	Enlist the types of stepper motors.	*2,K1,CO4*
9.	What is a liner electrical motor?	*2,K1,CO5*
10.	Give the application of VF drives.	*2,K2,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Demonstrate the switching characteristics of power IGBT with neat circuit diagram and waveforms.	*13,K2,CO1*
		OR	
	b)	Discuss with neat sketch explain the turn on and turn off characteristic of SCR .	*13,K2,CO1*

12. a) Explain in details, acceleration, deceleration, starting and stopping of a motor. *13,K3,CO2*

OR

b) A variable speed d.c. drive has rated power of 10 kW, rated speed of 1500 rpm drives a load that comprises a constant load of T_L = 30 Nm. The inertia of the drive system is 0.10kg.m^2. Calculate the time taken to accelerate the load from zero to 800 rpm, assuming the drive develops rated torque during the acceleration phase. *13,K3,CO2*

13. a) Explain the construction and operation of Permanent Magnet DC motor. *13,K2,CO3*

OR

b) (i) Write short notes on DC servo motor. *7,K2,CO3*
(ii) Discuss about H – Bridge motor driver. *6,K2,CO3*

14. a) Explain the construction and principle of operation of a stepper motor. *13,K2,CO4*

OR

b) Illustrate with neat sketch, explain closed loop control of stepper motor. *13,K3,CO4*

15. a) Discuss the principle of operation of a variable frequency drive. Also, mention their merits, demerits and applications. *13,K3,CO5*

OR

b) Discuss the following:
(i) Linear Electrical Motors *7,K2,CO5*
(ii) PMSM *6,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) Compare AC servo motor and DC servo motor. *7,K3,CO5*
(ii) Write a detailed note on the bipolar dives for stepper motors. *8,K3,CO4*

OR

b) (i) Describe the CSI and VSI fed synchronous motor drive in detail. *8,K3,CO5*
(ii) Illustrate about modes of excitation of stepper motor. *7,K3,CO4*