Reg. No.												

Question Paper Code	12696

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

First Semester

M.E - Power Electronics and Drives

20PPEPC105 - SPECIAL MACHINES AND CONTROLLERS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Mention the some applications of PMBL DC motor.	2	K1	CO1
2.	List out the various kinds of permanent magnets.	2	K1	CO1
3.	Compare PMSM and PMBLDC motors.	2	K2	CO2
4.	Write the torque equation of the SynRM.	2	K1	CO2
5.	What is basic principle of operation of switched reluctance motor?	2	K1	CO3
6.	Give the expression for torque of a Switched Reluctance motor.	2	K1	CO3
7.	Mention the different types of stepper motor.	2	K1	CO4
8.	Define maximum starting torque and maximum starting frequency of stepper motor.	2	K1	CO4
9.	Write the expression of Thrust force of LIM.	2	K1	CO5
10.	What is the necessity of having laminated yoke in an ac series motor?	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Estimate the EMF equations of the permanent magnet brushless DC motor.	13	K2	CO1
		OR			
	b)	Explain in detail the various rotor position sensors used in permanent magnet brushless DC Motor.	13	K2	CO1
12.	a)	Explain the construction and working principle of operation of PMSM.	13	K2	CO2
		OR			
	b)	Explain the working of variable reluctance type and hybrid type SynRM.	13	K2	CO2
13.	a)	Explain the construction and working of Switched Reluctance motor.	13	K2	CO3
		OR			

	b)	Draw and explain torque – speed characteristics of Switched Reluctance motor.	*13*	*K2*	*CO3*
14.	a)	Illustrate construction and various modes of excitation of Permanent Magnet stepper Motor.	*13*	*K2*	*CO4*
		OR			
	b)	Derive the mechanism of torque production in VR stepper motor.	*13*	*K2*	*CO4*
15.	a)	Illustrate the construction and working principle of hysteresis motor.	*13*	*K2*	*CO5*
		OR			
	b)	Explain the performance characteristics of Linear Induction motor and hysteresis motor.	*13*	*K2*	*CO5*

PART - C (1 × 15 = 15 Marks)

16.	a)	Discuss in detail about different types of power driver circuits for stepper motor.	*15*	*K2*	*CO4*
		OR			
	b)	Describe the various power controller circuits to Switched Reluctance motor and explain the operation of any one scheme with suitable circuit diagram.	*15*	*K2*	*CO3*