Reg. No.															

Question Paper Code	13377

M.E. / M.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024 (JAN - 2025)

First Semester

M.E. - Power Electronics and Drives

24PPEPC105 - SPECIAL MACHINES AND CONTROLLERS

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Compare the conventional DC motor and PMBLDC motor.	2	K2	CO1
2.	Show the magnetic equivalent circuit of 2 pole PMBLDC motor.	2	K2	CO1
3.	List out the merits and demerits of PMSM.	2	K1	CO2
4.	Outline the power controllers used for PM synchronous machines.	2	K2	CO2
5.	Recall the different power controllers used for the control of switched reluctance motor.	2	K1	CO3
6.	Give the advantages of sensor less operation of switched reluctance motor.	2	K1	CO3
7.	Define stepping angle.	2	K1	CO4
8.	What is meant by lead angle in stepper motors?	2	K1	CO4
9.	Tell the applications of a hysteresis motor.	2	K1	CO5
10.	Recall the function of hysteresis control.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Explain in detail about various types of PMBLDC motor with necessary diagrams.	13	K2	CO1
		OR			
	b)	Discuss in detail about the magnetic circuit analysis of PMBLDC motor. Also draw its characteristics.	13	K2	CO1
12.	a)	Illustrate about various power controllers used for PMSM with necessary diagrams.	13	K2	CO2
		OR			
	b)	Explain the construction, working principle and operation of PMSM.	13	K2	CO2
13.	a)	Explain with a neat circuit any two configuration of power converters used for the control of switched reluctance motor.	13	K2	CO3

OR

b) Discuss the necessity of power electronic circuit in SR motor and explain its different types of converter circuits. *13 K2 CO3*

14. a) Describe the operation of variable reluctance type stepper motor with different modes of operation. *13 K2 CO4*

OR

b) Summarize about unipolar and bipolar driver circuits of stepping motor. *13 K2 CO4*

15. a) Outline the constructional features and principle operation of hysteresis motor and AC series motor. *13 K2 CO5*

OR

b) Explain the operating principle of linear induction motor with neat diagram. *13 K2 CO5*

PART - C (1× 15 = 15 Marks)

16. a) Explain commutation in ac series motor and derive the torque equation of ac series motor. *15 K2 CO1*

OR

b) A stepper motor has a step angle of 2.5, Determine, i) Resolution. ii)Number of steps per shaft to make 25 revolutions iii) Shaft speed if starting stepping frequency is 3600pulse/sec. *15 K2 CO4*