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Reg. No.												

Question Paper Code	21352

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

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.	Define recoil permeability.	*2,K1,CO1*
2.	List out the various kinds of permanent magnets.	*2,K1,CO1*
3.	Give some potential application of SynRM.	*2,K1,CO2*
4.	Write down the expressions for power input and Torque of a PMSM.	*2,K1,CO2*
5.	List the types of current control techniques.	*2,K1,CO3*
6.	Define the phase winding of SRM.	*2,K1,CO3*
7.	Define: Slewing frequency and stepping frequency of stepper motor.	*2,K1,CO4*
8.	Define: Maximum starting torque and maximum starting frequency of stepper motor.	*2,K1,CO4*
9.	List the main difference in construction of an A.C series motor and a D.C series motor.	*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

11.	a)	Illustrate the constructional aspects of mechanical and electronic commutator of PMBLDC Motor.	*13,K2,CO1*
		OR	
	b)	Explain the following (i) B-H loop (ii) Demagnetization Characteristics.	*6,K2,CO1* *7,K2,CO1*
12.	a)	With a neat sketch, derive and explain the torque – speed characteristics of PMSM.	*13,K2,CO2*
		OR	
	b)	Explain the constructional feature of axial and radial flux SynRM.	*13,K2,CO2*
13.	a)	Describe the Hysteresis type and PWM type current regulator for one phase of Switched Reluctance motor.	*13,K2,CO3*

OR

b) What is the necessity of converter circuits for Switched Reluctance Motor? Draw and explain different types of converter circuits in detail. *13,K2,CO3*

14. a) Explain in detail the multi stack Variable Reluctance Stepping motor. *13,K2,CO4*

OR

b) Explain in detail the linear and non – linear analysis of stepper motor. *13,K2,CO4*

15. a) Explain the construction and working of Linear Induction motor. *13,K2,CO5*

OR

b) Explain Hysteresis motor with neat sketches the principle of operation and the application. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) (i) Develop and explain the various operating modes of Switched Reluctance motor. *8,K3,CO3*

(ii) Develop the various stator current modes in SynRM. *7,K3,CO2*

OR

b) (i) Develop the voltage and torque equation of Switched Reluctance motor. *8,K3,CO3*

(ii) Illustrate the phasor diagram of the permanent magnet synchronous motor. *7,K3,CO2*