A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U3201

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Electrical and Electronics Engineering

21EEV201 SPECIAL ELECTRICAL MACHINES

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

1. In PMBLDC motor Field Magnet on the CO1 -U

   (a) Stator (b) Rotor (c) both (a) and b) (d) None of these

2. In PMBLDC motor rotor is ---------- CO1 -U

   (a) Permanent Magnet (b) Electromagnet (c) both a and b (d) Copper Coil

3. In PMSM the air gap flux distribution is CO1 -U

   (a) Sinusoidal (b) Quasi sinusoidal (c) both a and b (d) None of the above

4. Pmsm working principle is CO1 -U

   (a) Amphere circuital law (b) ohms law (c) magnetic locking (d) lenz law

5. What is the angle between stator direct axis and quadrature axis? CO1 -U

   (a) 90° (b) 0° (c) 45° (d) 60°

6. Types of control techniques used in SRM CO1 -U

   (a) Voltage control (b) Frequency control

   (c) v/f control (d) Hysteresis control

7. Operation of stepper motor at high speed is referred to as CO1 -U

   (a) Fast forward (b) Slewing (c) Inching (d) Jogging

8. The rotational speed of a given stepper motor is determined by solely by CO1 -U

(a) Shaft load (b) Polarity of Stator current

(c) Step pulse frequency (d) Magnitude of stator current

9. Radial airgap motor has _____ CO1 -U

(a) axial laminations (b) radial laminations

(c)both laminations (d) none of the above

10. Types of linear induction motor based on the principle of operation CO1 -U

(a) Linear Induction motor (b) Linear synchronous motor

(c) DC commutator linear motor (d) All the above

PART – B (5 x 2= 10Marks)

11. What are the advantages of brushless dc motor drives? CO1 -U

12. What are the assumptions made in the derivation of EMF equation for PMSM CO1 -U

13. Illustrate the different modes of operation of switched reluctance motor. CO1 -U

14. What is stepper motor? CO1 -U

15. List the applications of synchronous reluctance motors. CO1 -U

PART – C (5 x 16= 80Marks)

16. (a) Explain the Construction & principle of operation of PMBLDC motor CO1 U (16)

Or

(b) Sketch the structure of power controller for PMBLDC motor & Explain the functions of each block CO1 U (16)

17. (a) Explain the construction and working principle of operation of PMSM CO2 Ana (16)

Or

(b) Integrate a suitable microprocessor for the control of permanent magnet synchronous motor. CO2 Ana (16)

18. (a) Draw the cross sectional view of switched reluctance motor and explain the principle of Operation CO3 U (16)

Or

	(b)	Describe the following: (i) Role of microprocessors in control of switched reluctance motor (ii) Sensorless operation	CO3 U	(16)
19.	(a)	Describe in detail the construction and working of variable reluctance stepper motor.	CO4 U	(16)
		Or		
	(b)	Draw and explain drive circuits and their performance characteristics for stepper motor	CO4 U	(16)
20.	(a)	(i) Give a detailed technical note on the variable reluctance motor and the advantages. (ii) Investigate the performance of the synchronous reluctance motor with neat phasor diagram.	CO5 U	(8+8)
		Or		
	(b)	Summarize the constructional details, principle of operation and the application of Hysteresis motor	CO5 U	(16)