Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)

Course Code: EET426

Course Name: SPECIAL ELECTRIC MACHINES

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1	Explain the working principle of a PMDC motor.	(3)
2	List any three applications of PMSM.	(3)
3	Explain monofilar and bifilar windings.	(3)
4	What is step angle? Derive the equation for step angle.	(3)
5	What are the advantages of Synchronous Reluctance Motors?	(3)
6	Why do we require a position sensor for the operation of an SRM?	(3)
7	List three requirements to be satisfied by a good servomotor.	(3)
8	Explain the principle of operation of an AC Servomotor.	(3)
9	What are the advantages of LIMs.	(3)
10	Explain the modifications to be done in a DC series motor so as to operate satisfactorily on AC supply.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	With neat diagrams, explain the principle of operation of BLDC motors. List three applications of BLDC motor.	(10)
	b)	Compare BLDC motor and conventional DC motor	(4)

OR

12	a)	How are permanent magnets magnetized? Differentiate axial and parallel magnetizations.	(6)
	b)	.Explain with block diagram the self-control scheme for permanent magnet synchronous motor	(8)

Module II

13	a)	Explain the construction and working of a Hybrid stepper motor.	(10)
	b)	List the advantages and applications of hybrid stepper motor.	(4)

OR

14	a)	Explain closed loop control of stepper motors.	(8)
	b)	Compare constructional differences between variable reluctance and permanent magnet stepper motors with diagram.	(6)

Module III

15	a)	Derive the torque equation of a switched reluctance motor.	(7)
	b)	Explain the constructional details of a synchronous reluctance motors.	(7)

OR

16	a)	Explain the power converter circuit used for a Switched reluctance motor having bifilar windings.	(7)
	b)	With a block diagram explain a control scheme for SRM.	(7)

Module IV

17	a)	Derive the transfer function of an armature-controlled DC Servomotor and represent it in block diagram.	(8)
	b)	Explain the constructional features of a drag cup servomotor.	(6)

OR

18	a)	Compare AC and DC servomotors.	(5)
	b)	With relevant diagrams explain series split field DC Servomotors. List the differences between armature- controlled and field- controlled DC servomotors	(9)

Module V

19	a)	Give the constructional details of universal motors. List any four applications of it	(6)
	b)	Explain the construction and working of a repulsion motor	(8)

OR

20	a)	Classify LSMs. With the aid of necessary diagrams explain any two types of LSMs	(10)
	b)	Explain the working of a hysteresis motor	(4)

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