Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Regular Examination June 2023 (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 significance of hall effect sensors in Brushless DC motors.	(3)
2	List any three applications of Permanent magnet Synchronous motor.	(3)
3	Define detent torque and holding torque of a stepper motor.	(3)
4	What are the factors on which the step angle of a single stack variable reluctance stepper motor depends?	(3)
5	Draw and explain split link circuit configuration power converter circuit for switched reluctance motor.	(3)
6	What are the advantages of Synchronous Reluctance motors?	(3)
7	Explain series split field DC servomotor with neat figure.	(3)
8	Why damping is necessary for AC servomotors?	(3)
9	Why compensating winding is used in AC series motor?	(3)
10	Compare Slotless Linear synchronous Motors and Slotted Linear Synchronous Motors.	(3)

PART B

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

Module I

11	a)	Explain the principle of operation of Permanent magnet Brushless DC motors for 120^0 commutation with necessary diagrams and truth tables.	(14)

OR

12 a) Draw the block diagram for sensorless control of Permanent magnet Synchronous motor. (4)

b) Explain the construction and principle of operation of Permanent magnet DC motors with neat diagrams. (10)

Module II

13 a) Draw and explain the static and dynamic characteristics of stepper motor. (10)

b) Explain monofiliar and bifiliar windings. (4)

OR

14 a) Describe the various modes of operation of Hybrid stepper motor. (14)

Module III

15 a) Explain the principle of operation of 8/6 switched reluctance motor with neat diagrams. (14)

OR

16 a) Why rotor position sensor is required for the operation of switched reluctance motor? (4)

b) With neat diagram explain the construction of Synchronous Reluctance Motor? (10)

Module IV

17 a) Draw the Torque speed curves of an AC servomotor for various value of control voltage. (4)

b) Explain various types of rotor constructions for AC servomotors. (10)

OR

18 a) Derive the transfer function of the armature controlled DC Servomotor. (9)

b) Compare field controlled and armature controlled DC servomotor. (5)

Module V

19	a)	Develop the equivalent circuit of Linear Induction motor and describe main factors affecting its performance.	(10)
	b)	What are the advantages of linear motors?	(4)

OR

20	a)	Explain the constructional differences between Permanent Magnet Linear Synchronous motors with Active reaction rail and Permanent Magnet Linear Synchronous motors with Passive Reaction Rail.	(10)
	b)	Draw and explain torque -speed characteristics of Hysteresis Motor.	(4)

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