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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S) Examinations April 2026 (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		Enumerate the applications of permanent magnet brushless DC motor.	(3)
2		What are the features of permanent magnets used in permanent magnet DC motors.	(3)
3		Describe the various types of windings employed in a stepper motor.	(3)
4		Draw and explain the dynamic characteristics of a stepper motor.	(3)
5		Explain the relevance of the rotor position sensor in the operation of a switched reluctance motor.	(3)
6		List any two causes for noise in a switched reluctance motor and explain how they can be mitigated.	(3)
7		Explain the role of servomotors in automation systems.	(3)
8		Enumerate the applications of the servomotor.	(3)
9		Draw the equivalent circuit and phasor diagram of a repulsion motor.	(3)
10		Explain the relevance of compensating winding in an AC series motor. Also draw its phasor diagram.	(3)

PART B

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

Module I

11		With a neat sketch, explain the principle of operation of a permanent-magnet Brushless DC motor with 180 ° commutation.	(14)

OR

12	a)	With a neat block diagram explain the sensor less control scheme of permanent magnet synchronous motor.	(7)
	b)	With neat sketches, explain the construction and working of a permanent magnet synchronous motor.	(7)

Module II

13	a)	With neat sketches and truth tables, explain the different modes of operation of a four-phase six-pole single-stack variable reluctance stepper motor.	(14)

OR

14 a) Explain the construction and any one mode of operation of a multi stack variable reluctance motor. (10)

b) Explain the microstepping operation in a hybrid stepper motor. (4)

Module III

15 a) With a neat circuit diagram, explain the working of any two power electronic converter circuits of a switched reluctance motor. (8)

b) From fundamentals, derive the expression for the torque developed in the synchronous reluctance motor. (6)

OR

16 a) Explain with figures, the construction of any two rotor configurations of a synchronous reluctance motor. (8)

b) With the help of a block diagram, explain any one control scheme of a switched reluctance motor. (6)

Module IV

17 a) With neat sketches, explain the construction of various types of rotors used for an AC servomotor. (9)

b) Draw and explain the torque-speed characteristics of a DC servomotor. (5)

OR

18 a) Derive the expression for the transfer function of a field-controlled DC servomotor. Also, draw its block diagram. (8)

b) With a neat figure, explain the construction and operation of a series-split-field DC servomotor. (6)

Module V

19 a) Derive the expression for thrust of linear force developed in a linear induction motor. Also enumerate any three advantages of linear motor over rotational motor. (8)

b) Explain the transverse edge and end effects in a linear induction motor. (6)

OR

20 a) Explain the construction and principle of operation of a hysteresis motor. Sketch and explain the torque speed characteristics of a hysteresis motor. (10)

b) Draw and explain the equivalent circuit and phasor diagram of a universal motor. (4)

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