Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: EE402

Course Name: Special Electrical Machines

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Draw and explain the Torque speed curves of an AC servomotor for various values of control voltage	(5)
2		Define Step angle and detent torque for a Stepper motor.	(5)
3		Explain working principle of two–pole single-phase AC series motor with diagram.	(5)
4		Explain why rotor position sensor is required for the operation of switched reluctance motor.	(5)
5		What are the advantages of PMBLDC motor over DC motor?	(5)
6		Differentiate trapezoidal type BLDC motor and sinusoidal type PMBLDC motor	(5)
7		Enumerate linear motors and list any four applications.	(5)
8		Write short note on linear induction motor.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	Explain the types of series split field DC servomotor.	(4)
	b)	With relevant diagrams explain field controlled DC Servomotors	(6)
10	a)	Explain any two modes of excitation used in three phase permanent magnet stepper motor.	(5)
	b)	Explain the construction of multi stack Variable reluctance stepper motor with neat sketches.	(5)
11	a)	Compare the performance of AC and DC servo motors and list the applications.	(6)
	b)	Define the following terms as applied to a Stepper motor (1) Start-stop mode (2) Slewing mode.	(4)

PART C

Answer any two full questions, each carries 10 marks.

12	a)	Draw the phasor diagram of AC series motor and derive the voltage equation	(5)
	b)	Derive the torque equation of hysteresis motor	(5)

13 a) With neat sketches explain the construction and operation of 6/4 SRM (10)

14 a) Write short notes on the principle of hysteresis motor with necessary diagrams (5)

b) Draw and explain n+1 switches and diode configuration power converter for SRM. (5)

PART D

Answer any two full questions, each carries 10 marks.

15 Explain the principle of operation of PMBLDC motor for 120^0 commutation with neat circuit diagram. (10)

16 With necessary diagrams explain Longitudinal flux linear switched reluctance motor and Transverse flux linear switched reluctance motor. (10)

17 a) Draw and explain the performance characteristics of PMBLDC motor. (6)

b) Derive the expression for linear force. (4)

****

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

Course Code: EE402

Course Name: SPECIAL ELECTRIC MACHINES

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Explain the constructional details and importance of Drag Cup Servomotor	(5)
2		Explain the dynamic characteristics of stepper motor.	(5)
3		What are the advantages and limitations of Universal motor?	(5)
4		Draw and explain n+1 switches and diode configuration power converter for SRM	(5)
5		Compare Mechanical Commutation and Electronic Commutation?	(5)
6		Differentiate trapezoidal type BLDC motor and sinusoidal type PMBLDC motor	(5)
7		Write short note on linear synchronous motor.	(5)
8		List the application of linear motor	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	a)	List the applications of Servomotors	(4)
	b)	With relevant diagrams explain armature controlled DC Servomotors	(6)
10	a)	With neat sketches, explain the constructional details and working principle of variable reluctance stepper motor. List any four applications of stepper motor.	(10)
11	a)	Compare the performance of AC and DC servo motors	(4)
	b)	Discuss 2 phase ON mode excitation of three phase and four phase stepper motors	(6)

PART C

Answer any two full questions, each carries 10 marks.

12	a)	Why compensating winding is used in AC series motor? Draw series motor with different types of compensating windings	(5)
	b)	Discuss the torque speed characteristics of hysteresis motor	(5)
13	a)	With neat sketches explain the construction and operation of 8/6 SRM	(10)

14 a) Explain the torque-speed characteristics of SRM with necessary diagrams (6)

b) What are the modifications to be made in DC series motor to operate it in AC supply? (4)

PART D

Answer any two full questions, each carries 10 marks.

15 a) Explain the principle of operation of PMBLDC motor for 180^0 commutation with neat circuit diagram. (10)

16 a) With necessary diagrams explain Longitudinal flux linear switched reluctance motor and Transverse flux linear switched reluctance motor. (10)

17 a) Derive the torque equation of PM BLDC motor (6)

b) Derive the expression for linear force. (4)

****