APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

7211(A)-17Dec-1 (Pages: 2) Name .....

Reg.No:.....

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2017

Branch: Electrical Engineering **Specialization: Power Electronics**

08EE 7211(A) SPECIAL ELECTRICAL MACHINES AND DRIVES

Time:3 hours **Max.marks: 60**

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Qn.no	Module 1	Marks
1.a.	Describe the construction of single stack variable reluctance stepper motor	3
	Answer (b or c)	
b. i.	Explain the working principle of single phase stepper motor	4
ii.	A stepper motor is wound for two phases and has 4 poles. It has 20 rotor poles. Find its step angle and resolution	2
c. i.	Explain about the microprocessor based control of stepper motor	3
ii.	Derive the torque equation for variable reluctance stepper motor	3

Qn.no	Module 2	Marks
2 .a.	List out the advantages and disadvantages of SRM	3
	Answer (b or c)	
b. i.	Explain the construction of SRM	4
ii.	A four phase 8 pole SRM has six rotor teeth. Find the step- angle and commutation frequency for a speed of 6000rpm	2
c.	Describe the various power converter circuits used for supplying SRM	6

Qn.no	Module 3	Marks
3. a.	Derive the torque equation and of SyRM	3
	Answer (b or c)	
b.	Discuss the various types of rotors used in SyRM	6
c. i.	Explain the working of SyRM	4
ii.	Draw the torque-angle and torque-speed characteristics of SyRM	2

Qn.no	Module 4	Marks
4. a.	Compare BLDC motor with Conventional DC motor	3
	Answer (b or c)	
b.	Describe the principle of operation of BLDC	6
c. i.	Explain the construction of BLDC motor	3
ii.	Compare mechanical and electronic commutators	3

Qn.no	Module 5	Marks
5. a.	With suitable diagram explain about BLDC square wave motor	4
	Answer (b or c)	
b.	What is meant by sensor less control of BLDC motor	8
c.	Explain the microprocessor based control of BLDC motor with suitable block diagram	8

Qn.no	Module 6	Marks
6.a.	Sketch the phasor diagram and write any five applications of PMSM	4
	Answer (b or c)	
b.	Explain the principle of vector control for PMSM	8
c. i.	Derive the EMF equation of PMSM	5
ii.	A three phase, 4- pole, star connected synchronous motor has 72 slots with 20 conductors per slot. The flux/pole is 0.05Wb and the speed is 1500rpm. Assuming the full pitched coil, Find the line and phase voltage	3