

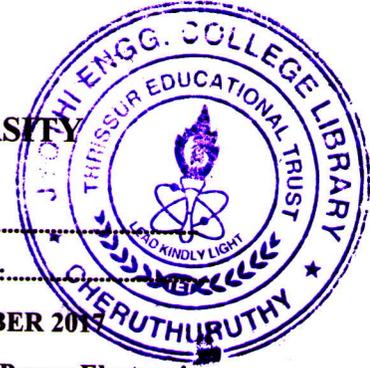
**APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY  
08 PALAKKAD CLUSTER**

7211(A)-17Dec-1

(Pages: 2)

Name .....

Reg.No:.....



**THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2013**

**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.

<b>Qn.no</b>	<b>Module 1</b>	<b>Marks</b>
1.a.	Describe the construction of single stack variable reluctance stepper motor	3
<b>Answer (b or c)</b>		
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
<b>Qn.no</b>	<b>Module 2</b>	<b>Marks</b>
2 .a.	List out the advantages and disadvantages of SRM	3
<b>Answer (b or c)</b>		
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