APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code: **PE0821311A-I** (Pages: 2)

Name: .....

Reg. No: .....

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2021

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

08EE7211(A) SPECIAL ELECTRICAL MACHINES AND DRIVES

(Common to PE)

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.

Q. No.	Module 1	Marks
1. a	What are the modes of excitation in stepper motor?	3
	Answer b or c	
b	Discuss the working of single stack Variable Reluctance stepper motor	6
c	Discuss the static and dynamic characteristics of stepper motor.	6

Q. No.	Module 2	Marks
2. a	What are the merits and demerits of Switched Reluctance Motors?	3
	Answer b or c	
b	Explain the classical converter circuit for SRM control with the help of circuit diagram and operational waveform.	6
c	Explain the Microprocessor based control of Switched Reluctance Motors	6

Q. No.	Module 3	Marks
3. a	Mention the applications of synchronous reluctance motors	3

Answer b or c

b	Draw and explain the phasor diagram and obtain the characteristics of Synchronous Reluctance motors.	6
c	Discuss the various types of rotors used in Synchronous Reluctance Motors.	6

Q. No.	Module 4	Marks
4. a	Compare mechanical and electronic commutation.	3

Answer b or c

b	Explain the principle of operation of a BLDC motor with neat sketches.	6
c	Discuss the role of Hall Sensors in Brushless DC motors	6

Q. No.	Module 5	Marks
5. a	A permanent magnet DC motor has an armature resistance of 1.03Ω. It draws a current of 1.25 A at no load with 50 V supply and running at 2100 rpm. Find (a) speed -voltage constant and (b) rotational losses.	4

Answer b or c

b	Explain the sensorless control of BLDC motor in detail.	8
c	Obtain the emf and current waveforms in a BLDC square wave motor with 180^0 current sheet.	8

Q. No.	Module 6	Marks
6. a	What are the features of Permanent Magnet Synchronous Motors	4

Answer b or c

b	Draw and explain the phasor diagram of PMSM	8
c	Discuss Sensor less control of PMSM	8