APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
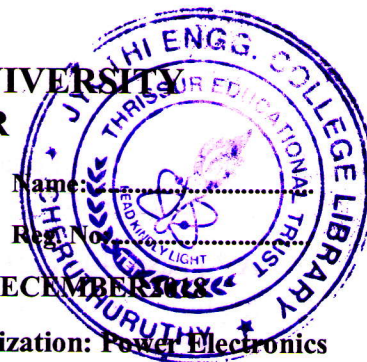## 08 PALAKKAD CLUSTER

Q. P. Code :PE 0821118(A)　　　　　　(Pages: 2)

Name:....................

Reg No:....................

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2018

Branch: Electrical an Electronics　　　　　　Specialization: Power Electronics

08EEE7211 (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.

Q.no.	Module 1	Marks
1.a	Compare the constructional feature Hybrid stepper motor with normal PM stepper motor	3
	Answer b or c	
b	With the help of relevant waveforms, explain the static and dynamic characteristics of stepper motor	6
c	Explain with the help of relevant block diagram on the microprocessor control of stepper motor.	6

Q.no.	Module 2	Marks
2.a	What are the merits and demerits of a classic converter for SRM control	3
	Answer b or c	
b	With the help of circuit diagram and operational waveforms, explain the following of a typical Dump-C converter for SRM control (i) Operation (ii) merits and demerits.	6
c	Explain single pulse and PWM modes of SRM. How current limits in the motor and inverter components are controlled.	6

Q.no.	Module 3	Marks
3.a	Explain the basic principle of synchronous reluctance motor	3

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b With the help of phasor diagram, derive the torque equation of Synchronous reluctance motor   **6**

c A 3 phase, 400V, 50 Hz, star connected synchronous reluctance motor with negligible armature resistance, has direct and quadrature axis reactance values are given as $X_{sd}=8$ ohms and $X_{sq} = 2$ ohms respectively. For a Load torque of 80 N-m, Calculate (i) load angle (ii) line current. Neglect rotational losses   **6**

Q.no.	Module 4	Marks
4.a	Explain the principal of operation of BLDC motor	3

Answer b or c

b	Compare the principle of position detection using optical and Hall elements in Permanent magnet brushless DC motor.	6
c	Compare mechanical and Electronic commutators in PM-BLDC motors	6

Q.no.	Module 5	Marks
5.a	With suitable diagram explain about BLDC square wave motor	4

Answer b or c

b	Explain different modes of PWM control of a BLDC motor.	8
c	Explain the microprocessor-based control of BLDC motor with suitable block diagram	8

Q.no.	Module 6	Marks
6.a	Describe the phasor diagram of a PMSM	4

Answer b or c

b	Obtain the equation for torque of Permanent magnet synchronous motor	8
c	Explain the principle of vector control for PMSM	8