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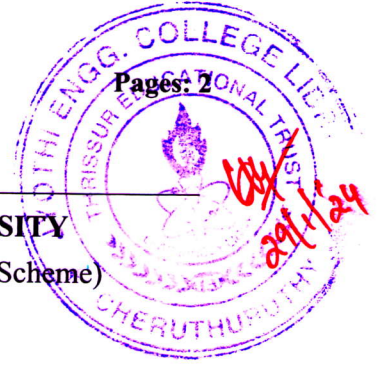
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (S, FE) Examination January 2024 (2019 Scheme)



Course Code: RAT304

Course Name: ELECTRIC DRIVES AND CONTROL

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

		Marks
1	List different types of stepper motors	(3)
2	Describe the advantages of electric drives	(3)
3	Define latching current and holding current	(3)
4	Explain the light triggering of SCR	(3)
5	Describe the armature control method for speed control of DC motor	(3)
6	Explain the step up mode operation of chopper	(3)
7	Discuss about sinusoidal PWM control	(3)
8	Compare methods to control output voltage of inverter.	(3)
9	Explain the principle of microcontroller based permanent magnet synchronous motor drives	(3)
10	What are the components of a servo system?	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

- 11 a) Explain the construction and working of a permanent magnet type stepper motor (8)
b) Deduce characteristics of dc series motor from suitable equations (6)

OR

- 12 a) Explain the working of a 4-point starter used in dc motor (9)
b) Explain the significance of back emf in DC motor (5)

Module II

- 13 a) Describe the operation of R-triggering circuit used in SCR (8)
b) Explain the different turn on methods of SCR (6)

OR

- 14 a) Discuss the different isolation methods used for power semiconductor devices. (8)
b) Explain the switching characteristics of Power BJT (6)

Module III

- 15 a) Describe the four quadrant operation of chopper (8)
b) With suitable diagrams, explain the operation of a single phase full converter with RL load (6)

OR

- 16 a) Explain the inverter mode of operation of a single phase fully controlled converter drive (9)
b) Write a short note on regenerative braking control of choppers. (5)

Module IV

- 17 a) Explain the working of 3-phase bridge inverter with R load and 120° conduction mode using circuit diagram and waveforms. (12)
b) Differentiate CSI and VSI (2)

OR

- 18 a) Describe the working of single phase full bridge voltage source inverter with R-load using necessary diagrams. (8)
b) Compare single pulse width and multiple pulse width modulation (6)

Module V

- 19 a) Explain how hall sensors are used to achieve speed control in BLDC motors (8)
b) Write a short note on closed loop control of stepper motors. (6)

OR

- 20 a) What is a self-controlled motor? How is self-control achieved in synchronous motors? (8)
b) What is the principle behind sensorless control of motor speed? (6)
