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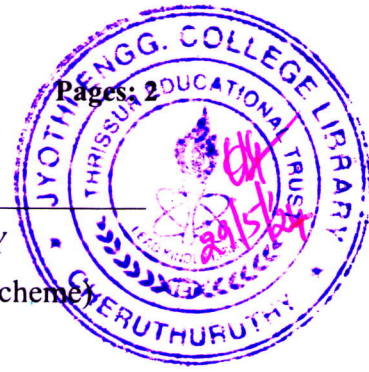
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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree (R,S) Examination May 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

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| 1 | Draw the block diagram of an AC drive system. | (3) |
| 2 | Summarise the role of back EMF in DC motors. | (3) |
| 3 | Brief the significance of the 'snubber' circuit in thyristor applications. | (3) |
| 4 | Outline the concept of natural and forced commutation. | (3) |
| 5 | Distinguish between the half-wave-controlled converter and the semi converter. | (3) |
| 6 | Explain the theory of step-up choppers. | (3) |
| 7 | Justify the statement "SCR is not recommended for inverter circuits". | (3) |
| 8 | Identify the voltage source perception in inverters. | (3) |
| 9 | List the facts for the sizing of servomotors. | (3) |
| 10 | Differentiate the open-loop and closed-loop control of the stepper motor. | (3) |

PART B

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

Module I

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| 11 | a) Illustrate the robotic application of DC motors. | (6) |
| | b) Classify the types of permanent magnet DC motors. | (8) |

OR

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|----|---|------|
| 12 | Describe the necessity of starters. Also, with suitable diagrams distinguish between the starting methods of DC motors. | (14) |
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Module II

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| 13 | a) With neat graphs, explain the static and dynamic characteristics of SCRs. | (10) |
| | b) Identify the line synchronized triggering in SCR. | (4) |

OR

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|----|---|------|
| 14 | Distinguish the various protection circuits of SCR including gate protection. | (14) |
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Module III

- 15 With neat circuit diagram, describe the four quadrant chopper drives in detail. (14)

OR

- 16 With neat circuit diagram and graphs, explain the three phase fully controlled converter with RLE load. Also, write the output voltage equations. (14)

Module IV

- 17 a) Describe the variable frequency drive with a neat block diagram. (8)
b) Compare the pulse width modulation techniques in inverters. (6)

OR

- 18 With neat circuit diagram and graphs, explain the three phase bridge inverter with 180° conduction mode. (14)

Module V

- 19 a) Identify the speed control methods of the BLDC motor. (7)
b) Illustrate the position control application of stepper motor. (7)

OR

- 20 Explain the microcontroller-based permanent magnet synchronous motor drives in detail with the help of a block diagram. (14)
