

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (R,S) Examinations April 2026 (2019 Scheme)



Course Code: RAT304
Course Name: ELECTRIC DRIVES AND CONTROL

Max. Marks: 100

Duration: 3 Hours

6PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | Compare AC and DC servomotors. | (3) |
| 2 | Discuss the advantages of BLDC motors over conventional DC motors. | (3) |
| 3 | What do you mean by latching current and holding current of a SCR? | (3) |
| 4 | Illustrate the structure of a power diode with relevant sketches. | (3) |
| 5 | Explain current limit control of choppers. | (3) |
| 6 | Illustrate the step-up mode operation of chopper with relevant diagrams. | (3) |
| 7 | Draw the block diagram representation of variable voltage variable frequency drive. | (3) |
| 8 | Justify the statement "SCR is not recommended for inverter circuits". | (3) |
| 9 | Explain the open loop control of Stepper Motor. | (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.

Module I

- | | | |
|----|---|-----|
| 11 | a) Illustrate the working of a 3-point starter used in dc motor with suitable diagrams. | (8) |
| | b) Derive the torque equation of a dc motor. | (6) |

OR

- | | | |
|----|--|------|
| 12 | Explain the construction and working principle of variable reluctance and permanent magnet stepper motors with necessary sketches. | (14) |
|----|--|------|

Module II

- | | | |
|----|--|-----|
| 13 | a) Explain the optocoupler and pulse transformer-based isolation used for power semiconductor devices. | (8) |
| | b) Explain the structure of a Power MOSFET. | (6) |

OR

- 14 Explain the construction, modes of operation and VI characteristics of SCR with relevant diagrams. (14)

Module III

- 15 a) Explain the four-quadrant operation of chopper-controlled dc motor drive (8)
b) Write a short note on regenerative braking control of choppers (6)

OR

- 16 Graphically explain Single phase fully controlled bridge rectifier with RL Load (14)
(Both Continuous and discontinuous conduction modes).

Module IV

- 17 a) Briefly explain the concept of sinusoidal PWM and its significance. (8)
b) Compare Voltage Source Inverter and Current Source Inverter. (6)

OR

- 18 Illustrate the working of a 3-phase bridge inverter with an R load operating in 120° conduction mode, using necessary diagrams and equations (14)

Module V

- 19 a) Explain the speed control of BLDC drive system using Hall sensors (8)
b) What is the principle behind sensor-less control of motor speed? (6)

OR

- 20 Explain in detail the microcontroller-based Permanent Magnet Synchronous Motor drives, supported by a block diagram. (14)
