Reg No.:_____          Name:_____

# APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S,FE) Examination May 2025 (2019 Scheme)
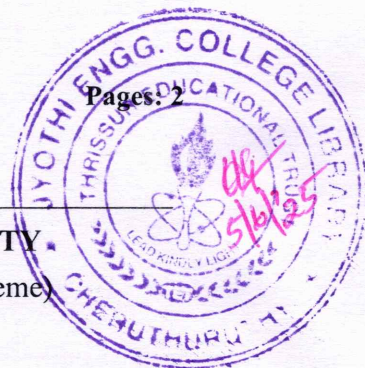
**Course Code: MRT201**

**Course Name: ELECTRICAL MACHINES & DRIVES**

Max. Marks: 100                                       Duration: 3 Hours

## PART A

### *Answer all questions. Each question carries 3 marks*      Marks

| | | |
|---|---|---|
| 1 | Explain in detail about the role of comutators in dc machines. | (3) |
| 2 | Derive equation for torque of a dc motor | (3) |
| 3 | Briefly explain the losses in a transformer. | (3) |
| 4 | A 3 phase 4 pole 50 $H_z$ induction motor runs at a speed of 1460 rpm. Determine the synchronous speed, percentage of slip and the frequency of rotor current. | (3) |
| 5 | Briefly explain double revolving field theory. | (3) |
| 6 | Derive emf equation of an alternator. | (3) |
| 7 | Briefly explain about universal motor. | (3) |
| 8 | Sketch V-I characteristics of SCR | (3) |
| 9 | What are the factors effecting the choice of an electric drive? | (3) |
| 10 | Briefly explain a note on load equalization. | (3) |

## PART B

### *Answer any one full question from each module. Each question carries 14 marks*

### Module 1

| | | |
|---|---|---|
| 11 | With neat sketch explain in detail the construction of a DC machine | (14) |
| 12 | (a) With necessary equations and circuit diagram explain different types of DC motors | (8) |
| | (b) A 4-pole, 240 V, wave connected shunt motor gives 11.19 KW when running at 1000rpm, draws armature and field currents of 50A and 1A respectively. It has 540 conductors. Its resistance is 0.1ohm. Assuming a drop of 1Volt per brush, Find(a) total torque, (b) useful torque, (c) useful flux per pole, (d) rotational losses and (e) efficiency | (6) |

## Module 2

13  With neat sketch explain the construction, types and working principle of practical transformer.   (14)

14  Explain the working principle of three phase induction motors with neat sketch.   (14)

## Module 3

15  (a) Why single phase induction motors are not self-starting? How can it be made self-starting?   (4)

(b) Explain different types of single phase induction motors?   (10)

16  (a) Explain the construction of alternator with neat sketch.   (6)

(b) Numerate the steps with necessary equation for finding voltage regulation of alternator using synchronous impedance method.   (8)

## Module 4

17  Explain the basic working principle and different types of stepper motor.   (14)

18  With necessary circuit diagram and wave form explain single phase fully controlled bridge rectifier with R load   (14)

## Module 5

19  Explain in detail about fundamental torque equations   (14)

20  Explain in detail about three phase induction motor drives.   (14)

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