Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S3 (S) Examinations May 2026 (2024 Scheme)

## Course Code: PCMRT302

## Course Name: ELECTRICAL MACHINES & DRIVES

Max. Marks: 60 Duration: 2 hours 30 minutes

### PART A

*(Answer all questions. Each question carries 3 marks)*

| | | CO | Marks |
|---|---|---|---|
| 1 | Sketch and explain the open circuit characteristics of dc generator. | 1 | (3) |
| 2 | List any three properties of ideal transformer. | 1 | (3) |
| 3 | Derive the torque equation of a three-phase induction motor | 2 | (3) |
| 4 | Sketch and explain the phasor diagram of capacitor start single phase induction motors. | 2 | (3) |
| 5 | Explain the working principle of universal motors | 3 | (3) |
| 6 | Explain single phase inverter with the help of circuit diagram. | 3 | (3) |
| 7 | List any three advantages of an electrical drives. | 4 | (3) |
| 8 | Briefly explain the term load equalization. | 4 | (3) |

*(Answer any one full question from each module, each question carries 9 marks)*

### Module -1

| | | | | |
|---|---|---|---|---|
| 9 | a) | With neat sketch explain the construction of a dc machine | 1 | 9 |
| 10 | a) | Derive EMF equation of a transformer | 1 | 4 |

| | | | | |
|---|---|---|---|---|
| | b) | Briefly explain no load test on transformer and explain the phasor diagram obtained from the no load test | 1 | 5 |

**Module -2**

| | | | | |
|---|---|---|---|---|
| 11 | a) | A 746KwW 3 phase 50Hz 16 pole induction motor has rotor resistance and reactance of 0.02 ohm and 0.15 ohm respectively. Full load torque obtained at 360 rpm. Calculate slip and slip corresponding to maximum torque | 2 | 4 |
| | b) | Explain Torque slip characteristics of an Induction motor | 2 | 5 |
| 12 | a) | Explain why single-phase induction motors are not self-starting and describe any two types available in single phase induction motor. | 2 | 9 |

**Module -3**

| | | | | |
|---|---|---|---|---|
| 13 | a) | Explain different types of servo motors. | 3 | 9 |
| 14 | a) | Explain the operational modes of SCR and plot its V-I characteristics | 3 | 9 |

**Module -4**

| | | | | |
|---|---|---|---|---|
| 15 | a) | Explain the basic elements of an electric drive in detail | 4 | 9 |
| 16 | a) | Explain multi quadrant operation of an electric drive with relevant diagrams. | 4 | 9 |

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