

Enroll No

Q.P. Code
UT 3067

**Unit Test -I ( 2025-26)**  
 T.Y. B.Tech.-MDM-III

**Course Code: EEMD301**

**Course Name: Electrical Machines**

Day & Date: Thursday 14/08/2025  
 Time: 3:45 TO 4:45

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
  - 2) Figures in rounded ( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
  - 3) CO is the index number of the Course Outcome statement.
  - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
  - 5) Assume suitable data if necessary.
  - 6) Use of non-programmable calculators is allowed

- |     |   |   | Marks | BT Level | COs |
|-----|---|---|-------|----------|-----|
| Q.1 | A | Describe the Fleming's Left Hand Rule (3 marks) and Fleming's Right Hand Rule (3 marks) with neat sketch.   | 6 M   | BL2      | CO1 |
|     | B | Derive EMF equation of DC Generator.  | 4 M   | BL4      | CO1 |
|     |   | <b>OR</b>   |       |          |     |
|     |   | Derive torque equation OF DC motor.   |       |          |     |
|     | C | A 6 pole, armature has 480 conductors and is rated at 1500 rev/min (rpm) and useful flux per pole is 20mWb, calculate generated voltage for<br>1. Lap connected armature (2 Marks)<br>2. Wave wound armature (1 Marks)  | 3 M   | BL4      | CO1 |
| Q.2 | A | Sketch a labeled single-phase transformer (2 marks) and explain the functional role of each component in the device's operation (6 marks).  | 8 M   | BL3      | CO2 |
|     | B | A 20 KVA, 440/220V, single phase 50 Hz transformer has iron and full load copper losses as 300 watt and 500 watt respectively calculate:<br>(i) Efficiency at full load and 0.8 P.F. lagging (2 marks).<br>(ii) Efficiency at half load and unity P.F. (2 marks).                                     | 4 M   | BL4      | CO2 |
|     |   | <b>OR</b>   |       |          |     |
|     |   | A 25 KVA, Single-phase transformer has 250 turns on the primary and 40 turns secondary windings. The primary is connected to 1500 volt, 50 Hz mains. Calculate<br>i) Primary and secondary current on full load (2 marks)<br>ii) Secondary e.m.f. (1 mark)<br>iii) Maximum flux in the core. (1 mark) |       |          |     |

