

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech I Year II Semester Regular & Supplementary Examinations August-2023**

**ELECTRICAL TECHNOLOGY**  
(Electronics & Communications Engineering)

**Time: 3 Hours**

**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 1 | a Derive expression for generated EMF of a D.C generator.  | CO1 | L3 | 6M |
|   | b A 4-pole, long shunt, lap wound generator supplies 25 kW at a terminal voltage of 500 V. The armature resistance is 0.03 $\Omega$ , series field resistance is 0.04 $\Omega$ and shunt field resistance is 200 $\Omega$ . The brush drop may be taken as 1 V. Determine the EMF generated. | CO1 | L2 | 6M |

OR

- |   |  |     |    |     |
|---|--|-----|----|-----|
| 2 | Explain the constructional details of a D.C generator. | CO1 | L2 | 12M |
|---|--|-----|----|-----|

**UNIT-II**

- |   |   |     |    |    |
|---|---|-----|----|----|
| 3 | a Explain the working principle of D.C motor.                             | CO2 | L2 | 6M |
|   | b State the voltage and power equation of D.C motor explaining each term. | CO2 | L3 | 6M |

OR

- |   |   |     |    |    |
|---|---|-----|----|----|
| 4 | a A 250 V, 4 pole D.C shunt motor has two circuit armature winding with 500 conductors. The armature circuit resistance is 0.25 $\Omega$ , field resistance is 125 $\Omega$ and the flux per pole is 0.02 Wb. Find the speed and torque developed if the motor draws 14 A from the mains. | CO2 | L3 | 6M |
|   | b A 4 pole, 500 V DC shunt motor has 720 wave connected conductor on its armature. The full load armature current is 60 A & the flux per pole is 0.03 Wb, the armature resistance including brush contact is 0.2 $\Omega$ . Calculate the full load speed of the motor.                   | CO3 | L2 | 6M |

**UNIT-III**

- |   |   |     |    |    |
|---|---|-----|----|----|
| 5 | a With relevant phasor diagrams, explain the operation of a practical single phase transformer under no load condition. | CO4 | L2 | 6M |
|   | b Compare Core type & Shell type transformer.   | CO4 | L3 | 6M |

OR

- |   |  |     |    |     |
|---|--|-----|----|-----|
| 6 | A 5KVA, 500/250V, 50Hz, single -phase transformer has the following results:<br>From O.C Test: 500V, 1A, 50W (H.V Side is opened)<br>From S.C Test: 25V, 10A, 60W (L.V Side is shorted)<br>Determine:<br>(i)The Efficiency on Full-load, 0.8 lagging P.F.<br>(ii)The Voltage Regulation on Full-load 0.8 lagging P.F.<br>(iii) The Efficiency on 60% of Full-load, 0.8 lagging P.F.<br>(iv) The Voltage Regulation on Full-load,0.6 leading P.F. | CO7 | L4 | 12M |
|---|--|-----|----|-----|

**UNIT-IV**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 7 | a Explain construction features of wound rotor machine.  | CO5 | L2 | 6M |
|   | b A 3- $\phi$ 4 pole induction motor is supplied from 3- $\phi$ 50 Hz ac supply.<br>Find (i) synchronous speed (ii) rotor speed when slip is 4%<br>(iii) the rotor frequency when runs at 600 r.p.m. | CO5 | L3 | 6M |

OR

- |   |  |     |    |     |
|---|--|-----|----|-----|
| 8 | Derive a general expression for the torque developed in a 3-phase induction motor. | CO5 | L3 | 12M |
|---|--|-----|----|-----|

**UNIT-V**

9 Sketch and explain the open circuit and short circuit characteristics of a synchronous machine and mention the calculation of voltage regulation by the use of their results. **C06 L5 12M**

**OR**

10 Derive an EMF equation of an alternator. **C06 L4 12M**

**\*\*\* END \*\*\***