

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

B.Tech II Year II Semester Supplementary Examinations May/June-2024

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 60

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

UNIT-I

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|---|---|--|-----|----|----|
| 1 | a | Derive the e.m.f. equation of the DC generator. | CO1 | L2 | 6M |
| | b | A 4 pole shunt generator with lap connected armature having field and armature resistances of 50Ω and 0.1Ω respectively, supplies 100V, 40 watts of 60 lamps. Calculate the total armature current, armature current per armature path and the generated emf. Allow a constant drop of 1V per brush. | CO1 | L3 | 6M |

OR

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|---|--|--|-----|----|-----|
| 2 | | Derive the voltage – current relations of separately and self excited D.C. generator with neat sketch. | CO1 | L3 | 12M |
|---|--|--|-----|----|-----|

UNIT-II

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|---|---|--|-----|----|-----|
| 3 | | Draw and explain the characteristics of series, shunt and compound Motors. | CO2 | L2 | 12M |
| | | OR | | | |
| 4 | a | State the necessity for a starter in DC motors and also draw the schematic diagram of 3-Point Starter. | CO2 | L2 | 6M |
| | b | List the different application of DC Motor. | CO2 | L1 | 6M |

UNIT-III

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|---|---|---|-----|----|----|
| 5 | a | Deduce an expression for the EMF induced of a single-phase transformer. | CO3 | L3 | 6M |
| | b | The Iron and full load copper losses in 40 KVA single phase transformer are 450 W and 850 W respectively. Find
(i) Efficiency at 3/4th full load when the power factor of load 0.8 Lag.
(ii) The load KVA at which maximum efficiency occurs.
(iii) The Maximum Efficiency at 0.8 p.f lagging. | CO3 | L4 | 6M |

OR

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|---|---|---|-----|----|----|
| 6 | a | Explain the working principle of operation of single – phase transformer. | CO3 | L3 | 6M |
| | b | A 2200/250V transformer takes 0.5A and power factor of 0.3 on open circuit. Find the Magnetizing and working components of no load primary current. Also draw no load phasor diagram. | CO3 | L3 | 6M |

UNIT-IV

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|---|---|--|-----|----|----|
| 7 | a | Explain the principle of operation of Induction motor. | CO4 | L2 | 6M |
| | b | The rotor resistance and stand still reactance per phase of a 3-phase slip ring induction motor are 0.02Ω and 0.1Ω respectively. What should be the value of the external resistance per phase to be inserted in the rotor circuit to give maximum torque at starting? | CO4 | L3 | 6M |

OR

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|---|---|--|-----|----|----|
| 8 | a | Obtain the expressions for starting torque and maximum torque ratio of a three phase induction motor. | CO4 | L3 | 6M |
| | b | Two 440 V, 50 Hz, 4 pole, 3-phase induction motor, running at 950 rpm and 715 rpm respectively. Determine which of the two motors is running at higher slip. | CO4 | L3 | 6M |

UNIT-V

- 9 a Explain the working principle of an alternator. **CO5 L3 6M**
b A 550 V, 50 KVA single phase alternator has an effective resistance of **CO5 L4 6M**
0.2Ω. A field current of 10A produces an armature current of short
circuit and an emf of 450 V of open circuit. Calculate i) Synchronous
impedance and reactance ii) The full load regulation when the power
factor is 0.8 lagging.

OR

- 10 Explain the Synchronous impedance method for calculating the regulation **CO5 L3 12M**
of a three phase alternator.

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