Q.P. Code: 16EE212 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

ELECTRICAL TECHNOLOGY

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	a	Derive the e.m.f. equation of the DC generator.	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.	6M

OR

2	a	Describe the different types of generator.	6M
	b	A 4-pole DC compound generator has armature, series field and shunt field resistances of 1Ω, 0.5Ω and 100 Ω respectively. This generator delivers 4kW at a terminal voltage of 200V and Allow 1V per brush for contact drop. Calculate the induced e.m.f for both long shunt and Short shunt.	6M

UNIT-II

3	a	State the necessity for a starter in DC motors and also draw the schematic diagram of 3-Point Starter.	6M
	b	List the different application of DC Motor.	6M

OR

4	a	Deduce an expression for torque developed in the armature of DC motor.	6M
	b	A 120V DC shunt motor has armature and shunt field resistances of 0.2Ω and 60Ω it runs at 1800 rpm when it takes full load current of 40A. Find the speed of motor while it is operating at half full load, terminal voltage remaining the same.	6M

UNIT-III

5	a	Explain the working principle of operation of single - phase transformer.	6M
	b	A 3000/200V, 50Hz single phase transformer is built on a core having an effective cross sectional area of 150 sq.cm and have 80 turns in low voltage winding. Calculate (i) the value of maximum flux density (ii) the no.of turns in HV winding.	6M

OR

6	a	Deduce an expression for the EMF induced of a single-phase transformer.	6M
	b	In a transformer, the core loss is found to be 52 W at 40 Hz and 90 W at 60 Hz; both losses being measured at the same peak flux density. Compute the hysteresis and eddy current losses at 50 Hz.	6M

UNIT-IV

7	a	Explain the constructional details of 3-phase induction motor.		7M
	b	A 6-pole, 50 Hz induction motor has a slip of 2.5%. Find the actual speed and slip speed.		5M

OR

8	a	Derive condition for maximum torque under running condition of 3-phase induction motor.		6M
	b	A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate (i) The synchronous speed (ii) The speed of the motor when slip is 4% and (iii) The rotor current frequency when the motor runs at 600 rpm.		6M

UNIT-V

9	a	Explain the working principle of a three-phase alternator.		6M
	b	For a 3-phase winding with 4-slots per pole per phase and with the coil span of 10 slots, evaluate the pitch and distribution factor.		6M

OR

10	a	Explain the theory of operation of a synchronous motor.		6M
	b	A 550 V, 50 KVA single phase alternator has an effective resistance of 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.		6M

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