O.P.Code: 23EE0209	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Regular Examinations February-2025
DC MACHINES & TRANSFORMERS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	What are the major parts of a DC generator?	CO1	L1	2M
	b	Compare lap winding and wave winding used for DC machine armature.	CO1	L4	2M
	c	What are the losses occurring in DC motor?	CO2	L1	2M
	d	What are the precautions to be taken during starting of a DC series motor?	CO2	L1	2M
	e	Define voltage regulation of a transformer.	CO3	L1	2M
	f	Why is the rating of transformer expressed in kVA?	CO3	L4	2M
	g	Why short circuit test on a transformer performed on HV side?	CO5	L4	2M
	h	What is an auto transformer?	CO6	L1	2M
	i	Mention the transients in switching of on-load and off-load tap changers	CO5	L2	2M
	j	Write the advantages and dis-advantages of star-star connection.	CO5	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Explain the no-load characteristics for separately-excited generator.	CO1	L1	5M
	b	List out the applications of DC generator.	CO1	L1	5M
		OR			
3	a	Deduce an expression for E.M.F equation of DC Generator?	CO1	L2	6M
	b	A 4-pole generator having wound armature winding has 50 slots each slot contains 20 conductors. What will be the volage generated in the machine, when driven at 1500rpm, assuming the flux per pole to be 70 mwb?	CO1	L1	4M

UNIT-II

4	a	Explain the characteristics of DC shunt motor.	CO2	L2	5M
	b	A shunt generator supplies 96A at a terminal voltage of 200V. The armature and shunt field resistances are 0.1? and 50? respectively. The iron and frictional losses are 2000W. Find (i) Emf generated (ii) copper losses (iii) commercial efficiency.	CO2	L3	5M
		OR			
5		With the help of neat circuit diagram, explain Swinburne's test and derive the relations for efficiency (both for generator and motor). Also state the merits and de-merits of this method	CO2	L3	10M

UNIT-III

6		Explain the construction and working principle of 1Ø transformer.	CO3	L2	10M
		OR			

7		Find all-day efficiency of a transformer having maximum efficiency of 98% at 15kVA at UPF and loaded as follows. 12hrs – 2kW at 0.5pf lag 6 hrs. – 12kW at 0.8pf lag 6hrs – at no-load	CO4	L4	10M

UNIT-IV

8		With a circuit diagram how to obtain equivalent circuit by conducting O.C. & S.C. test in a single-phase transformer.	CO4	L4	10M

OR

9		Derive an expression for saving in conductor material in an autotransformer over two winding transformers of equal rating. State its merits and de-merits.	CO4	L4	10M

UNIT-V

10	a	Explain star-star connection of transformer with diagram.	CO5	L4	5M
	b	List the advantages and dis-advantages of star-star connection of transformer.	CO5	L4	5M

OR

11	a	Write the voltage and current relationships for different types of connections.	CO5	L2	5M
	b	A three phase step down transformer takes 15A when connected to 4400V mains, the turns ratio per phase is 10. Neglecting losses find the secondary line voltage, line current and output power. If the windings are connected in star-delta.	CO5	L1	5M

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