

Code: 23EE3302

II B.Tech - I Semester – Regular Examinations - DECEMBER 2024**DC MACHINES AND TRANSFORMERS
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.

2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.

3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.

4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

		BL	CO
1.a)	List any two applications of DC generator.	L1	CO1
1.b)	What is back emf in DC motor?	L2	CO2
1.c)	Why a starter is necessary for a DC motor?	L2	CO2
1.d)	Name any four applications of DC series motor.	L1	CO1
1.e)	Define the all day efficiency of transformer.	L3	CO3
1.f)	Define the regulation of transformer.	L3	CO3
1.g)	Discuss the necessary conditions for parallel operation of transformer.	L3	CO3
1.h)	Compare two winding transformer with auto transformer.	L3	CO3
1.i)	Draw the open delta connection in 3-phase transformer.	L4	CO5
1.j)	Discuss the impacts of harmonics in 3-phase transformer.	L4	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	Explain the methods of excitation in DC generators and explain shunt, series and compound generators.		L3	CO2	10 M
OR					
3	a)	Explain in detail the armature reaction in the DC machines and state its effect.	L3	CO2	5 M
	b)	Analyze the methods to minimize the armature reaction.	L4	CO4	5 M
UNIT-II					
4	In a DC machine, the total iron loss is 8KW at its rated speed and excitation. If excitation remains the same, but speed is reduced by 25%, the total loss is found to be 5KW. Calculate the hysteresis and eddy current losses at (i) full speed, (ii) half the rated speed.		L4	CO4	10 M
OR					
5	Explain the Swinburne's test in DC machine.		L4	CO4	10 M
UNIT-III					
6	Discuss in detail how the mutual induction principle is working on a single phase transformer with needed diagrams.		L3	CO3	10 M
OR					

7	a)	Analyze the various types of losses in a single phase transformer.	L4	CO5	5 M
	b)	Develop the equivalent circuit of a single phase transformer.	L4	CO5	5 M
UNIT-IV					
8	Construct the equivalent circuit of auto-transformer.		L4	CO5	10 M
OR					
9	a)	Elaborate the OC test on transformer with appropriate diagrams.	L4	CO5	5 M
	b)	Explain in detail the construction and working principle of Auto transformer.	L3	CO3	5 M
UNIT-V					
10	Explain the Scott connection operation with necessary circuit diagrams.		L4	CO5	10 M
OR					
11	A 500KVA, 3 phase, 50Hz transformer has a voltage ratio (line voltages) of 33/11KV and is delta/star connected. The resistances per phase are: high voltage 35Ω, low voltage 0.876 Ω and the iron loss is 3050W. Calculate the value of efficiency at full load and one half of full load with 0.8 lagging power factor.		L4	CO5	10 M