

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:2160912****Date:04-07-2023****Subject Name:Design of DC Machines and Transformer****Time:10:30 AM TO 01:30 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define specific magnetic loading & specific electric loading	03
	(b) What is Carter's Co-efficient? What is its usefulness in the design of dc machine?	04
	(c) Derive the output equation of a 3-phase transformer.	07
Q.2	(a) List the factors that influence the separation of D and L of a dc machine.	03
	(b) What are the advantages and disadvantages of stepped cores?	04
	(c) Discuss in details about the design of field coil of a dc machine.	07
	OR	
	(c) Describe about the various cooling methods of a transformer	07
Q.3	(a) Why circular coils are preferred in transformers?	03
	(b) What are the factors affecting the choice of flux density of core in a transformer?	04
	(c) Describe in detail about the effect of frequency on Iron losses	07
	OR	
Q.3	(a) What is magnetization curve?	03
	(b) What are the advantages and disadvantages of stepped cores?	04
	(c) Derive the output equation of a d.c. machine	07
Q.4	(a) What are the points to be considered while fixing up the dimensions of the slot?	03
	(b) How is the length of commutator designed?	04
	(c) Explain the effects of choice of number of poles in a DC Machine on, (1) Frequency of flux reversal (2) Weight of iron (3) Weight of copper and (4) Length of commutator.	07
	OR	
Q.4	(a) State the relation between the armature and the commutator diameter for various ratings of D.C. machines	03
	(b) What is the condition for minimum cost in the design of transformers?	04
	(c) Determine the main dimensions of a 350kVA, 3 phase, 50Hz, Star/delta, 11000 / 3300 V core type distribution transformer. Assume distance between core centres is twice the width of the core	07
Q.5	(a) How the tertiary winding is connected? Why?	03
	(b) Explain what is leakage reactance and state the assumptions made in the calculations of leakage reactance of core type transformer	04
	(c) Explain the various factors that affect the choice of number of poles of a DC machine.	07
	OR	
Q.5	(a) What are the effects of armature reaction?	03
	(b) Write short notes on . Slot insulation in d.c. machines	04
	(c) Derive an expression for the number of cooling tubes required to limit the temperature rise in a 3 phase transformer. Design its tank dimensions and show them pictorially	07
