

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2020****Subject Code:2160912****Date:20/01/2021****Subject Name:Design of DC Machines and Transformer****Time:02:00 PM TO 04:00 PM****Total Marks: 47****Instructions:**

1. Attempt any **THREE** questions from Q.1 to Q.6
2. **Q.7 is compulsory.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

		MARKS
<b>Q.1</b>	(a) Define specific magnetic and Electrical loading.	<b>03</b>
	(b) Explain the Factors affecting size of machines	<b>04</b>
	(c) Determine the main dimensions of the 3 limb core (i.e., 3 phase, 3 leg core type transformer), the number of turns and cross-sectional area of the conductors of a 350 kVA, 11000/ 3300 V, star / delta, 3 phase, 50 Hz transformer. Assume: Volt / turn = 11, maximum flux density = 1.25 T. Net cross-section of core = $0.6 d^2$ , window space factor = 0.27, window proportion = 3: 1, current density = 250 A/cm <sup>2</sup> , ON cooled (means oil immersed, self-cooled or natural cooled) transformer having $\pm 2.5\%$ and $\pm 5\%$ tapping on high voltage winding.	<b>07</b>
<b>Q.2</b>	(a) What are the advantages and disadvantages of stepped cores?	<b>03</b>
	(b) Describe about the effect of frequency on Iron losses.	<b>04</b>
	(c) Estimate the no-load current of a three phase transformer	<b>07</b>
<b>Q.3</b>	(a) Explain Why circular coils are preferred in transformers?	<b>03</b>
	(b) List out different types of windings used in power and distribution transformer.	<b>04</b>
	(c) Discuss about cooling of transformer using cooling tubes	<b>07</b>
<b>Q.4</b>	(a) Only List the design aspects of dry type transformer	<b>03</b>
	(b) Show that losses in transformer are proportional to the cube of its linear dimensions	<b>04</b>
	(c) Drive the expression for leakage reactance of transformer with primary and secondary cylindrical coil of equal length .state clearly the assumption made.	<b>07</b>
<b>Q.5</b>	(a) In which way the air gap length influence the design of machines?	<b>03</b>
	(b) List the factors that influence the separation of D and L of a dc machine. What is square pole criterion?	<b>04</b>
	(c) Discuss the choice of number of poles used in a D.C machine	<b>07</b>
<b>Q.6</b>	(a) Write a short not on slot insulation of D C machine.	<b>03</b>
	(b) Enumerate the procedure for shunt field design	<b>04</b>
	(c) Discuss in detail about the design of commutator and brushes in D C machine.	<b>07</b>

- Q.7 (a)** Prove that in designing the D.C machine the torque is proportion to the volume of active materials. **05**
- OR
- Q.7 (a)** What do you understand by armature reaction in D C machine .Explain any one methods to reduce this? **05**

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