Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3170917 Date:08-12-2023

Subject Name: High Voltage Engineering

Time: 10:30 AM TO 01:00 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 the terms: breakdown, ionization, and homogeneous field.	**03**
	(b)	Explain treeing and tracking related to solid breakdown.	**04**
	(c)	Describe the working of a Van de Graff generator with a neat sketch.	**07**
Q.2	**(a)**	Explain with diagrams, full wave rectifier circuit for producing high d.c.voltages.	**03**
	(b)	Draw and explain Marx circuit and modified Marx Circuit of multistage impulse generator.	**04**
	(c)	What is paschen's law? Explain minimum voltage for breakdown under a given pd condition.	**07**
		OR	
	(c)	Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement?	**07**
Q.3	**(a)**	Draw & Discuss Equivalent circuit of partial discharge.	**03**
	(b)	Explain particle exchange mechanism for vacuum breakdown.	**04**
	(c)	Explain capacitance voltage Transformer with its schematic representation, Equivalent circuit and its phasor diagram.	**07**
		OR	
Q.3	**(a)**	Discuss post breakdown phenomenon.	**03**
	(b)	What are the commercial liquids? Explain purification test cell system relatedto liquids.	**04**
	(c)	Explain electrostatic voltmeter in brief.	**07**
Q.4	**(a)**	Explain front and tail times of an impulse wave with neat sketch.	**03**
	(b)	How Potential Divider method used for measurement of high voltage DC with its limitations.	**04**
	(c)	Discuss the modified Marx circuit and components used in it, for generating an impulse wave.	**07**
		OR	
Q.4	**(a)**	Draw block diagram of Digital PD Analyser.	**03**
	(b)	Discuss Rod Gap Arrester.	**04**
	(c)	What is capacitance voltage transformer (CVT)? Explain tuned CVT for voltage measurement with phasor diagram.	**07**
Q.5	**(a)**	List out the common test facilities available in High Voltage Lab.	**03**

	(b)	Explain with neat sketch, testing transformer construction.	**04**
	(c)	Define Townsend's first and second ionization coefficients. Obtain Current growth equation due to first and second ionization.	**07**

OR

Q.5	**(a)**	What is partial Discharges?	**03**
	(b)	Discuss Hall effect in Hall generator.	**04**
	(c)	Explain how partial discharges in an insulation system or equipment can bedetected and displayed.	**07**

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