

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019****Subject Code: 2160904****Date: 11/12/2019****Subject Name: High Voltage Engineering****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS	
Q.1	(a) Define the terms: breakdown, ionization and homogeneous field.	03	
	(b) Explain the time lags for breakdown.	04	
	(c) Describe the solid breakdown mechanism due to treeing and tracking.	07	
Q.2	(a) Explain with diagrams, full wave rectifier circuit for producing high d.c. voltages.	03	
	(b) Explain cascade transformers connection for generation of high voltage alternating voltage.	04	
	(c) Explain Paschen's Law.	07	
OR			
Q.3	(c) Describe the generating voltmeter used for measuring high d.c. voltage.	07	
	(a) Explain suspended particle theory for liquid breakdown.	03	
	(b) Explain particle exchange mechanism for vacuum breakdown.	04	
Q.3	(c) Explain measurements of radio interference voltage.	07	
	(a) Discuss post breakdown phenomenon.	03	
	(b) Explain purification method for liquid dielectric.	04	
Q.4	(c) Explain power frequency test and impulse test for bushings.	07	
	(a) Why is a Cockcroft-Walton circuit preferred for voltage multiplier circuits?	03	
	(b) Explain working of Cockcroft-Walton circuit with schematic diagram.	04	
Q.4	(c) What is capacitance voltage transformer (CVT)? Explain tuned CVT for voltage measurement with phasor diagram.	07	
	OR		
	(a) Enlist factors affecting the sparkover voltage of sphere gaps.	03	
Q.5	(b) Describe the principle and construction of Electrostatic voltmeter.	04	
	(c) Explain arrangement and working of modified Marx circuit for impulse generator with schematic diagram.	07	
	(a) Explain loss of charge method to measure dc resistance.	03	
Q.5	(b) What do you mean by insulation co-ordination? How are the protective devices chosen for optimal insulation level in a power system?	04	
	(c) Explain the high voltage Schering bridge for the $\tan \delta$ and capacitance measurement.	07	
	OR		
Q.5	(a) Why are earthing and shielding arrangements needed in the Schering bridge measurement?	03	
	(b) What are the partial discharges? Show the different partial discharge patterns.	04	
	(c) What are the mechanisms by which lightning strokes develop and induce overvoltages on transmission line?	07	
