

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2017****Subject Code: 2160904****Date: 16/11/2017****Subject Name: High Voltage Engineering****Time: 02:30 PM TO 05:00PM****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) Explain time lags for breakdown of gas.	03
	(b) Define Townsend's first ionization coefficients. Obtain current growth equation due to first ionization.	04
	(c) Draw and explain Marx circuit and modified Marx circuit of multistage impulse generator.	07
Q.2	(a) Explain Transformer oil testing.	03
	(b) Explain cultivation and bubble theory for liquid breakdown.	04
	(c) What are treeing and tracking ? Explain this two phenomenon in solid dielectrics.	07
	OR	
	(c) A 10-stage Cockcroft Walton circuit has all capacitors of 0.06 μF . The secondary voltage of the supply transformer is 100 KV at a frequency of 150 Hz. If the load current is 1mA, determine: (1) voltage regulation (2) The ripple (3) The optimum number of stages for maximum output voltage.	07
Q.3	(a) List advantages, disadvantages and applications of Van de Graaff generator.	03
	(b) What is impulse voltage? Discuss characteristic of it.	04
	(c) Describe the principle of Generating Voltmeter operation. List out advantages and disadvantages of Generating Voltmeter.	07
	OR	
Q.3	(a) Discuss Principle of Electrostatic Voltmeter	03
	(b) Draw circuit of series capacitor peak voltmeter. Describe different sources that contribute error in it.	04
	(c) Discuss the factor affecting spark over voltage of sphere gaps.	07
Q.4	(a) Explain metal oxide lightning arrester.	03
	(b) Discuss dielectric constant and loss factor.	04
	(c) Describe high voltage Schering bridge.	07
	OR	
Q.4	(a) Draw block diagram of Digital PD Analyser.	03
	(b) Explain equivalent circuit of partial discharge.	04
	(c) Explain testing of cables.	07
Q.5	(a) Describe Test facility provided in high voltage laboratory.	03
	(b) What is insulation co-ordination ?	04
	(c) Explain capacitance voltage transformer with advantages and disadvantages.	07
	OR	
Q.5	(a) Give comparison between positive corona and negative corona.	03

- (b) Discuss Hall effect in Hall generator. **04**
- (c) An impulse generator has 8 stages with each condenser rated for 0.16 μF and 125KV. The load capacitor available is 1000 μF . Find the series resistance and damping resistor needed to produce 1.2/50 μs impulse wave. What is the maximum output voltage of generator, if the charging voltage is 120 KV ? **07**