

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2018

Subject Code: 2160904

Date: 05/05/2018

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.

- Q.1** (a) Define Townsend's first and second ionization coefficients. State condition for breakdown obtained in Townsend discharge. **03**
(b) Explain purification test cell system related to liquids. **04**
(c) Describe with a neat sketch, the working of a Van de Graff generator. **07**
- Q.2** (a) Explain how a sphere gap can be used to measure the peak value of voltages. **03**
(b) What are the parameter and factors that influence voltage measurement by sphere gap? **04**
(c) Explain Electrostatic Voltmeter for high voltage measurement. **07**
- OR**
- (c) What is Paschen's law? Explain minimum voltage for breakdown under a given 'p x d' condition. **07**
- Q.3** (a) Explain front and tail times of an impulse wave with neat sketch. **03**
(b) Explain with neat sketch, testing transformer construction. **04**
(c) A 12 stage impulse generator has 0.126 μ F capacitors. The wave front and wave tail resistances connected are 800 Ω and 5000 Ω respectively. If the load capacitor is 1000pF, find the front and tail times of the impulse wave produced. **07**
- OR**
- Q.3** (a) Enlist components used in Modified Marx circuit. **03**
(b) Explain Trigatron gap. **04**
(c) Discuss the "Charge Simulation Method" for solving field problems and estimation of potential distribution. **07**
- Q.4** (a) Define statistical time lag, formative time lag and total time lag. **03**
(b) Explain drawbacks of Townsend mechanism. **04**
(c) A steady current of 600 μ A flows through the plane electrodes separated by a distance of 0.5cm when a voltage of 10kV is applied. Determine the Townsend's first ionization constant if a current of 60 μ A flows when the distance of separation is reduced to 0.1cm and the field is kept constant at previous value. **07**
- OR**
- Q.4** (a) What are the commercial liquids? **03**
(b) Enlist factors affecting ionization process and state processes responsible for gaseous breakdown. **04**
(c) Explain treeing and tracking related to solid breakdown. **07**
- Q.5** (a) What is surge arrester? **03**
(b) Discuss the importance of grounding in High Voltage Lab. **04**
(c) Discuss the method of balanced detection for locating partial discharges in electrical equipments. **07**

OR

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| Q.5 | (a) List out the common test facilities available in High Voltage Lab. | 03 |
| | (b) Explain Metal Oxide Arrestor. | 04 |
| | (c) Explain insulation coordination and statistical approach to it. | 07 |
