

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2018****Subject Code:2160904****Date:30/11/2018****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) State & Explain Paschen's Law. **03**
(b) Explain Finite Element Method. **04**
(c) Define Townsend's first and second ionization coefficients. Obtain Current growth equation due to first and second ionization. **07**
- Q.2** (a) What is Thermal breakdown in solid dielectric. **03**
(b) Discuss properties of good solid dielectric. **04**
(c) Explain Purification and Breakdown tests for liquid Dielectric. **07**
- OR**
- (c) What is Electric stress? Explain Electric field stress in homogeneous isotropic materials. **07**
- Q.3** (a) Draw & explain characteristics of Lightning Impulse Voltage wave. **03**
(b) What is difference between Marx circuit and modified Marx circuit. **04**
(c) An impulse generator has eight stages with each condenser rated for 0.16 μF and 125 KV. The load capacitor available is 1000 pF. Find the series resistance and the damping resistance needed to produce 1.2/50 μs impulse wave. What is the maximum output voltage of the generator, if the charging voltage is 120 KV ? **07**
- OR**
- Q.3** (a) List out different techniques to measure high voltages. **03**
(b) What is the principle of operation of resonant transformer? List out advantages and disadvantages of it. **04**
(c) Explain capacitance voltage Transformer with its schematic representation, Equivalent circuit and its phasor diagram. **07**
- Q.4** (a) Explain principle of Electrostatic voltmeter and limitation of it for high voltage measurement. **03**
(b) List out the Difference between Uniform field and Non-uniform field. **04**
(c) What is meant by insulation co-ordination ? How are the protective devices chosen for optimal insulation level in a power system? **07**
- OR**
- Q.4** (a) Discuss Rod Gap Arrester. **03**
(b) Discuss Digital PD instrument. **04**
(c) Discuss measurement of Dielectric constant and loss tangent of capacitor. **07**
- Q.5** (a) Draw & Discuss Equivalent circuit of partial discharge. **03**
(b) Explain High ohmic series Resistance with Micro-ammeter with its advantages and disadvantages for High Voltage DC measurement. **04**
(c) Explain high voltage Testing on Insulators. **07**

OR

- Q.5** (a) What is a Tesla coil? How are damped high-frequency oscillations obtained from Tesla coil ? **03**
- (b) Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltages. **04**
- (c) Explain Classification of High Voltage Laboratories. **07**

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