

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM****IV B. Tech I Semester Regular/Supplementary Examinations OCT/NOV 2025****HIGH VOLTAGE ENGINEERING****(EEE)**

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions. **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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**UNIT-I**

1. a) Illustrate Townsend's Current Growth Equation. [7M]  
b) Describe the Paschen's Law of Equation's and plot their related graphs. [7M]  
(OR)
2. Describe Finite Element Method for evaluation of field distribution. Discuss the procedure associated with this method and mention its advantages and limitations. [14M]

**UNIT-II**

3. a) Explain the mechanism of breakdown in pure and commercial liquid dielectrics. [7M]  
b) Discuss the breakdown mechanisms in composite solid dielectrics with examples. [7M]  
(OR)
4. a) Explain Avalanche or Streamer Breakdown Phenomenon with neat sketch. [7M]  
b) A solid specimen of dielectric has a dielectric constant of 4.2, and  $\tan \delta = 0.001$  at a frequency of 50 Hz. If it is subjected to an alternating field of 50 kV/cm, calculate the heat generated in the specimen due to the dielectric loss. [7M]

**UNIT-III**

5. a) Describe the working and principle of a Vande-Graaff generator for generation of high DC voltages. [7M]  
b) Explain the voltage multiplier circuit with a neat diagram and derive the output voltage expression. [7M]  
(OR)
6. a) Explain different methods for generation of high frequency AC voltages. [7M]  
b) Explain the construction and working of a Tesla coil and its applications in high-voltage testing. [7M]

**UNIT-IV**

7. a) Describe the circuits used for generating impulse currents and methods of wave shape control. [7M]  
b) Illustrate tripping and control of impulse generators? [7M]  
(OR)
8. a) Explain the Marx circuit used for generating impulse voltages with a neat schematic diagram. [7M]  
b) Derive the expression for impulse wave shape using RLC circuit analysis? [7M]

**UNIT-V**

9. a) Explain the principle of operation of Generating Voltmeters with their relative advantages and limitations. [7M]  
b) Explain the measurement of impulse voltages using potential dividers and CRO. [7M]  
(OR)
10. a) Discuss the Hall generator and Rogowski coil methods for measurement of impulse currents. [7M]  
b) Explain the different methods of measuring high impulse currents with their relative merits and demerits. [7M]

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