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| <b>UNIT I</b> |
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| <b>Chapter 1 : Breakdown in Gases</b> | <b>1-1 to 1-27</b> |
|---------------------------------------|--------------------|

**Syllabus :** Ionization process in gas, Townsend's Theory, Current growth equation in presence of primary and secondary ionization processes, Townsend's breakdown criterion, Primary and secondary ionization coefficients, Limitations of Townsend's theory, Streamer mechanism of breakdown, Paschen's Law and its Limitations, Corona discharges for point plane electrode combination with positive and negative pulse application, Time lag for and factors on which time lag depends. (Numerical on Townsend's theory and Paschen's law).

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**UNIT II**

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**Chapter 2 : Breakdown in Liquids and Solid Dielectrics**

**2-1 to 2-27**

**Syllabus :**

1. Breakdown in Liquid Dielectrics : Pure and commercial liquids, Different breakdown theories: Breakdown in Pure liquid and breakdown in commercial liquids: Suspended Particle theory, Cavitations and bubble theory, Thermal mechanism of breakdown and Stressed Oil volume theory.
2. Breakdown in Solid Dielectrics : Intrinsic breakdown : electronic breakdown, avalanche or streamer breakdown, electromechanical breakdown, thermal breakdown, treeing and tracking phenomenon, Chemical and electrochemical breakdown, Partial discharge (Internal discharge), Composite dielectric material, Properties of composite dielectrics, breakdown in composite dielectrics.  
  
(Numerical on theories of liquid and solid dielectric materials).



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**UNIT III****Chapter 3 : Generation of High Voltages and Current****3-1 to 3-32****Syllabus :**

- a) Generation of high ac voltages - Cascading of transformers, series and parallel resonance system, Tesla coil.
- b) Generation of impulse voltages and current - Impulse voltage definition, wave front and wave tail time, Multistage impulse generator, Modified Marx circuit, Tripping and control of impulse generators, Generation of high impulse current.

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**UNIT IV**

**Chapter 4 : Measurement of High Voltage and High**
**Currents**
**4-1 to 4-30**

**Syllabus** : Sphere gap voltmeter, electrostatic volt meter, generating voltmeter, peak reading voltmeter, resistive, capacitive and mixed potential divider, capacitance voltage transformer, cathode ray oscilloscope for impulse voltage and current measurement, measurement of dielectric constant and loss factor, partial discharge measurements. Measurement of high power frequency a.c using current transformer with electro-optical signal converter, Radio interference measurements.

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### UNIT VI

#### Chapter 6: High Voltage Testing of Electrical Apparatus and H V Laboratories 6-1 to 6-30

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