

Printed pages: 2  
Paper Id: 120618

Sub Code: NEE-021

Roll No. 

--	--	--	--	--	--	--	--	--	--

**B.TECH**  
**(SEM VI) THEORY EXAMINATION 2017-18**  
**HIGH VOLTAGE ENGINEERING**

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

1. **Attempt all questions in brief.** **2 x 10 = 20**
- a) What do you mean by ionization process of gases?
  - b) Explain thermal mechanism of breakdown in liquid dielectric.
  - c) What are the properties of composite dielectric?
  - d) Explain ripple voltage with full wave rectifier.
  - e) Explain a simple voltage doubler circuit.
  - f) Why are capacitance voltage dividers preferred for high ac voltage measurements?
  - g) Describe generating voltmeter used for the measurement of high voltage.
  - h) What is Hall generator.
  - i) Explain dc amplifier circuit for resistivity measurement.
  - j) What do you mean by Disruptive discharge voltage?

## SECTION B

2. **Attempt any three of the following:** **10 x 3 = 30**
- a) Explain the phenomenon of treeing and tracking in solid insulating materials under electrical stress. How does it lead to the breakdown?
  - b) Explain various theories that explain breakdown in commercial liquid dielectrics.
  - c) What is the basic principle of electrostatic machine? Explain Electrostatic generator.
  - d) Explain how a sphere gap can be used to measure the peak value of voltage. What are the parameters and factors that influence such voltage measurement?
  - e) Explain different high voltage test performs on HVDC power apparatus.

## SECTION C

3. **Attempt any one part of the following:** **10 x 1 = 10**
- (a) Explain Paschen's law . How do you account for the minimum voltage for the breakdown under a given 'p x d' condition?
  - (b) Explain Streamer theory that explain breakdown in gases.
4. **Attempt any one part of the following:** **10 x 1 = 10**
- (a) Explain the generation of high frequency ac voltages and derive the relation for output voltage in terms of efficiency.
  - (b) An impulse generator has eight stages with each condenser rated for 0.2  $\mu\text{f}$  and 100 kV. The load capacitor available is 1 nf. Calculate series resistance and the damping resistance needed to produce 1.2/50 $\mu\text{s}$  impulse wave. What is the maximum output voltage of the generator, if the charging voltage is 115 volt.
5. **Attempt any one part of the following:** **10 x 1 = 10**
- (a) Explain the construction and working of an electrostatic voltmeter for very high voltage also gives its merits and demerits.
  - (b) Give the systematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltage. Explain the arrangement used to minimize error.

**6. Attempt any one part of the following:**

**10 x 1 = 10**

- (a) Explain partial discharge tests on high voltage cables. How is a fault in the insulation located in this test.
- (b) Explain the method of impulse testing of high voltage transformers. What is the procedure adopted for locating the failure.

**7. Attempt any one part of the following:**

**10 x 1 = 10**

- (a) What are the different types of resistive shunts used for impulse current measurement? Discuss their merits and demerits.
- (b) Describe Mole's arrangement for measuring high dissipation factors in the low frequency range.