

B.E. Electrical VII CBGS

30

Elective-I H.V.E.

QP Code : 6121

(3 Hours)

[Total Marks :80]

N. B.

- (1) Question No. 1 is compulsory.
- (2) Attempt any three questions out of remaining questions.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data if necessary.

1. Attempt any four :-
 - a) What are electro-negative gases? Why is the breakdown strength higher in these gases compared to that in other gases. 20
 - b) Explain the phenomenon of 'tracking' in solid insulating materials under electrical stress. How it can be minimized.
 - c) With a neat sketch explain trigatron spark gap used in impulse generators.
 - d) What are commercial liquid dielectrics, and how are they different from pure liquid dielectrics?
 - e) With a neat sketch explain Hall Generators for measurement of high currents.
2.
 - a) Explain with neat diagrams the principle of operation of an Electrostatic voltmeter. Discuss its advantages and limitations for high voltage measurements. 10
 - b) Why is Cockcroft-Walton circuit preferred for voltage multiplier circuits? Explain its working with a schematic diagram. 10
3.
 - a) What is Paschen's law? How do you account for the optimum voltage for breakdown under a given 'pXd' condition? 10
 - b) Describe in brief various tests carried out on overhead line insulators. 10
4.
 - a) Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement? 10
 - b) In an experiment in a certain gas it was found that the steady state current is 5.5×10^{-8} A at 8 KV at a distance of 0.4 cm between the plane electrodes. Keeping the field constant and reducing the distance to 0.1 cm results in a current of 5.5×10^{-9} A. Calculate Townsend's primary ionization coefficient α . 10
5.
 - a) Explain the various theories that explain breakdown in commercial liquid dielectrics. 10
 - b) What is 'thermal breakdown' in solid dielectrics, and how is it practically more significant than other mechanisms. 10
6.
 - a) Describe the construction, principle of operation and application of 3-stage Marx generator circuit. 10
 - b) What are the various factors to be considered while designing a High Voltage Laboratory? 10