CBCS SCHEME

USN | | | | | | | | | | |

18EE56

Fifth Semester B.E. Degree Examination, Dec.2024/Jan.2025
High Voltage Engineering

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the Townsend's current growth equation along with current growth in the pressure of secondary processes. **(10 Marks)**

b. Classify the breakdown mechanism in liquids and explain any one mechanism. **(10 Marks)**

OR

2 a. Explain Intrinsic breakdown and thermal breakdown in detail. **(10 Marks)**

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 Townsends's primary ionization coefficient α. If the breakdown occurred when the gap distance was increased to 0.9 cm, what is the value of γ? **(10 Marks)**

Module-2

3 a. Describe, with a neat sketch the working of Van de Graaff generator. What are the factors that limit the maximum voltage obtained? **(10 Marks)**

b. Explain one method of controlled tripping of impulse generator. Why is controlled tripping necessary? **(10 Marks)**

OR

4 a. Why is a Cockcroft – Walton circuit preferred for voltage multiplier circuits? Explain its working with a schematic diagram. **(10 Marks)**

b. Give the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accodomate the wave time control resistances? **(10 Marks)**

Module-3

5 a. Describe the generating voltmeter used for measuring high dc voltage. Also mention advantages and Limitations. **(10 Marks)**

b. What is Rogowski coil? Explain with a neat diagram its principle of operation for measurement of high impulse currents. **(10 Marks)**

OR

6 a. Draw Chubb – Fortescue circuit for measurement of peak value of ac voltages. Discuss its advantages over other methods. **(10 Marks)**

b. Explain how a sphere gap can be used to measures the peak value of voltages. What are the parameter and factors that influence such voltage measurement? **(10 Marks)**

Module-4

7 a. Explain theories of charge formation in clouds. **(10 Marks)**

b. Explain mechanism of lightning stroke in detail. Derive the mathematical model for lightning. **(10 Marks)**

OR

8 a. Narrate the characteristics of switching surges. Explain switching over voltages in EHV and UHV systems. **(10 Marks)**

b. Explain in detail the principles of Insulation coordination on high voltage and extra high voltage power systems. **(10 Marks)**

Module-5

9 a. Explain the high voltage Schering bridge for the tan δ and capacitance measurement of insulators or bushings. **(10 Marks)**

b. Explain the testing of transform in detail. **(10 Marks)**

OR

10 a. Explain partial discharge detection using straight detector method. **(10 Marks)**

b. Explain the testing of Insulators and Bushing in detail. **(10 Marks)**

* * * * *