

Roll No.

Total Pages : 3

007704

December 2023

B.Tech. (EL)-VII Semester

HIGH VOLTAGE ENGINEERING (ELPE 714)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What do you mean by intrinsic strength of a solid dielectric? (1.5)
- (b) What is intrinsic breakdown? (1.5)
- (c) Give any four applications of insulating materials. (1.5)
- (d) Name the different types of standard tests conducted on high voltage apparatus. (1.5)
- (e) What are the limitations of Townsend's theory? (1.5)
- (f) What are the conditions in the gases that govern the ionization process? (1.5)
- (g) What is a voltage surge? Draw a typical lightning voltage surge. (1.5)

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- (h) Differentiate flashover and puncture. (1.5)
- (i) What are the equipment and devices needed for conducting impulse test on HV equipments? (1.5)
- (j) What is a surge diverter? (1.5)

PART-B

2. (a) A steady current of 600 microampere flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 KV is applied. Determine the Townsend's First ionization coefficient if a current of 60 microampere flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value. (5)
- (b) Discuss various factors which affect breakdown of gases. (10)
3. (a) A ten stage Cockroft-Walton circuits has all capacitors of 0.06 microfarad. The secondary voltage of the supply transformer is 100 KV at a frequency of 150 Hz. If the load current is 1 MA, determine (1) Voltage regulation (2) the ripple (3) The optimum number of stages for maximum output voltage (4) the maximum output voltage. (8)
- (b) Explain briefly various theories of breakdown in liquid dielectrics. (7)
4. Draw a neat exact equivalent circuit of an impulse Generator and indicate the significance of each parameter being used. (15)

5. (a) Discuss the different methods of measuring high DC voltages. What are the limitations in each method? (10)
- (b) Define the terms : (1) impulse voltages (2) chopped wave (3) Impulse flash over voltages. (5)
6. (a) What are the causes for switching and power frequency over voltages? How are they controlled in power systems? (10)
- (b) What is a surge diverter? Explain its function as a shunt protective device. (5)
7. Why is grounding very important in high voltage laboratory? Describe a typical grounding system used. (15)