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10EE73

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
High Voltage Engineering

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. What are the need for generating high voltage in laboratory? Mention advantage of transmitting high voltage. (12 Marks)
b. Explain with diagram working of electrostatic precipitator. (08 Marks)
- 2 a. Derive the equation for Townsend's first and second ionization coefficient what is the condition for spark to occur. (10 Marks)
b. Explain Paschen's law with breakdown voltage pd curve. (05 Marks)
c. A steady current $600\mu\text{A}$ flows through the plane electrodes separated by a distance of 0.5cm when a voltage of 10KV is applied. Determine townsend first ionization coefficient if a current of $60\mu\text{A}$ flows when the distance of separation is reduced to 0.1cm and field is kept constant at the previous value. (05 Marks)
- 3 a. Explain the following breakdown mechanism in solid :
i) Streamer breakdown ii) Electromechanical breakdown. (10 Marks)
b. Explain the various theories that explain breakdown in commercial liquid dielectric. (10 Marks)
- 4 a. What is cascaded transformer? Explain why cascading is done. Describe with neat diagram a three stage cascaded transformer. (10 Marks)
b. A 10 stage Crookraft – Walton circuit has all capacitor of $0.06\mu\text{p}$. The secondary voltage of supply is 100KV at frequency of 150Hz. If the load current is 1mA. Determine :
i) Voltage regulation
ii) Ripple
iii) The optimum number of stage for maximum output voltage
iv) The maximum voltage. (10 Marks)

PART – B

- 5 a. Explain Marx circuit arrangement for multistage impulse generator. How a basic arrangement modified to accommodate the wave-time control resistance. (10 Marks)
b. A 12 stage impulse generator has capacitor each rated $0.3\mu\text{F}$, 150KV capacitance of test specimen is 400pf. Determine the wave-front and wave-tail resistance to produce a $1.2/50\mu\text{s}$ impulse wave. (05 Marks)
c. How is the trigatron gap used for triggering impulse generator? (05 Marks)
- 6 a. With the help of neat sketch describe the working principle of klydonograph. (07 Marks)
b. Describe the Chubbfortes and method of measuring high voltage. (06 Marks)
c. Explain the factor influencing the sparkover voltage of spheregap. (07 Marks)
- 7 a. Discuss the method of straight detection for locating partial discharge in electric equipment show partial discharge pattern. (10 Marks)
b. Explain how capacitance and $\tan \delta$ can be measured using Schering bridge. (10 Marks)
- 8 a. Write short notes on Rogowsky's coil. (05 Marks)
b. Mention the different electrical test done on circuit breaker. (08 Marks)
c. Describe various electrical test done on transformer. (07 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, $42+8=50$, will be treated as malpractice.