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Question Paper Code	12831
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Sixth Semester

Electrical and Electronics Engineering
20EEEL602 - HIGH VOLTAGE ENGINEERING

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	Marks	K- Level	CO
1. List the different methods employed for lightning protection of overhead lines.	2	K1	CO1
2. What is meant by corona?	2	K1	CO1
3. What are the factors which affect the breakdown voltage of gaseous dielectrics?	2	K1	CO2
4. Mention the specifications of impulse current as per Indian Standards.	2	K2	CO2
5. Define the terms (a) Impulse voltages (b) Chopped wave.	2	K1	CO3
6. Draw a simple voltage doubler circuit.	2	K2	CO3
7. Why are the capacitive voltage dividers preferred for high AC voltage measurements?	2	K2	CO4
8. What is a mixed potential divider? How is it used for impulse voltage measurements?	2	K1	CO4
9. What is Basic Impulse Insulation Level?	2	K1	CO5
10. Compare the withstand voltage with flashover voltage.	2	K2	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Explain the mechanisms by which lightning strokes develop and induce overvoltage on overhead power lines.	13	K2	CO1
OR			
b) i) What are the requirements of a ground wire for protection of transmission line against direct lightning stroke? Explain how they are achieved in practice.	7	K2	CO1
ii) Describe the various steps to draw the Bewley-Lattice diagram of successive reflections.	6	K2	CO1
12. a) Explain the Townsend's ionization processes which leads to current growth in gaseous mediums. Also derive the condition for breakdown in gases.	13	K2	CO2

OR

- b) i) Explain Treeing and Tracking in solid dielectrics. 7 K2 CO2
ii) How Breakdown occurs due to internal discharge? 6 K2 CO2
13. a) i) With a neat sketch, explain the construction and working of a Van de Graff generator. 7 K2 CO3
ii) A ten stage Cockcroft-Walton voltage multiplier circuit has all capacitors of 0.05 μ F. The secondary voltage of the supply transformer is 120 Kv at a frequency of 150 Hz. If the load current is 1.2 mA, determine the following (i) voltage regulation, (ii) percentage of ripple voltage, (iii) the optimum number of stages for maximum output voltage and (iv) the maximum output voltage. 6 K3 CO3

OR

- b) From the basic Marx circuit develop the modern multistage impulse generator circuits and explain the significance of its various parameters. 13 K3 CO3
14. a) Discuss the effect of nearby earthed objects, humidity and dust particles on the measurement of voltages using sphere gaps. 13 K2 CO4

OR

- b) Explain with neat diagram the principle of operation of an Electrostatic Voltmeter. Discuss its advantages and limitations for high voltage measurements. 13 K2 CO4
15. a) Explain briefly the various tests to be carried out on a bushing. 13 K2 CO5

OR

- b) Explain in details about the procedure for conducting dielectric, impulse voltage and short circuit current tests on high voltage circuit breakers. 13 K2 CO5

PART - C (1 \times 15 = 15 Marks)

16. a) i) How a tuned CVT can be used for HVAC measurement in substation? 7 K2 CO4
ii) Explain how the protective devices are chosen for optimum insulation level in a power system. 8 K2 CO5

OR

- b) i) Explain the methods for measurement of High DC current. 7 K2 CO4
ii) Explain the various methods of testing the insulators. 8 K2 CO5