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Reg. No. : | | | | | | | | | | |

Question Paper Code: 59303

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Electrical and Electronics Engineering

15UEE903- HIGH VOLTAGE ENGINEERING

(Regulation 2015)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 3 = 15 Marks)

1.	What are the sources of switching surges?	CO1- U
2.	What is tracking? and treeing?	CO2- R
3.	What are the limitations of Van de Graff generator?	CO3- U
4.	Define Hall effect.	CO4- U
5.	Write the reference atmospheric condition according to Indian standard.	CO5- U

PART – B (5 x 14= 70 Marks)

6.	(a)	(i) Derive the mathematical model for lightning discharges and explain them.	CO1-U	(6)
		(ii) Show the charge distribution patterns in the cloud by the Simpson's theory.	CO1-U	(8)
		Or		
	(b)	Discuss the step by step procedure for constructing Bewley's Lattice Diagram with an example.	CO1-U	(14)
7.	(a)	(i) Name some of the important practical solid dielectrics and mention their dielectric properties.	CO2-U	(6)
		(ii) Explain why electronegative gases have high breakdown stress.	CO2-U	(8)
		Or		
	(b)	Explain the various theories of breakdown mechanism of the commercial liquid dielectrics.	CO2-U	(14)

8.	(a)	With a neat circuit explain the working principle of a Cockcroft – Walton voltage multiplier circuit. .	CO3-U	(14)
		Or		
	(b)	(i) Explain the need for generating high voltages.	CO3-U	(4)
		(ii) Describe with a neat diagram, the working principle of the following high voltage producing apparatus of Resonant transformer.	CO3-U	(10)
9.	(a)	What is Capacitance Voltage Transformer? Explain with phasor diagram how a tuned CVT can be used for high voltage measurement in power systems.	CO4-U	(14)
		Or		
	(b)	Explain how a sphere gap can be used to measure the peak value of voltages? also discuss the parameters and factors that influence such voltage measurement.	CO4-U	(14)
10.	(a)	Explain the different aspects of insulation design and insulation co-ordination adopted in EHV systems.	CO5-U	(14)
		Or		
	(b)	Explain the following terms used in HV testing as per the standards: (i) Disruptive discharge voltage	CO5-U	(3)
		(ii) Creepage distance	CO5-U	(2)
		(iii) Impulse voltage	CO5-U	(3)
		(iv) 100% flash over voltage	CO5-U	(3)
		(v) With stand voltage	CO5-U	(3)

PART – C (1 x 15= 15Marks)

11.	(a)	An impulse generator has eight stages with each condenser rated for 0.16 μF and 125 Kv. The load capacitor available is 1000 PF. Find the series resistance and the damping resistance needed to produce 1.2 / 50 μs impulse wave. Also estimate the maximum output voltage of the generator, if the changing voltage is 120 KV.	CO3-App	(15)
		Or		
	(b)	Explain the working of Cockcroft-Walton voltage multiplier circuit with a neat sketch.	CO5-U	(15)