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Question Paper Code: 59303

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

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)

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| 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)

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| 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: CO5-U (3)
- (i) Disruptive discharge voltage
- (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 μ F and 125 Kv. The load capacitor available is 1000 PF. Find the series resistance and the damping resistance needed to produce 1.2 / 50 μ s impulse wave. Also estimate the maximum output voltage of the generator, if the charging 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)