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B.E. (Full Time.) DEGREE END SEMESTER ARREAR EXAMINATIONS April/May 2019
COLLEGE OF ENGINEERING GUINDY CAMPUS, ANNA UNIVERISTY, CHENNAI
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
Sixth Semester
EE 8601 High Voltage Engineering (R-2012)

Time: 3 Hours

Max. Marks: 100

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. What is the significance of BIL in insulation co-ordination?
2. What are the causes for switching over-voltages?
3. Differentiate between conduction in pure and commercial liquid dielectrics
4. How does vacuum breakdown?
5. Derive an expression for ripple in a multistage voltage doublers circuit..
6. An 8-stage impulse generator has $0.10\mu\text{F}$ capacitors. The wave front and the wave tail resistances connected are 450Ω and 3200Ω respectively. If the load capacitor is 200pF , find the front and tail time of the impulse wave produced.
7. How a Rogowski coil is used for measuring high impulse currents?
8. Why reactive power compensation of test transformer is absolute necessary.?
9. What is the significance of power frequency wet test of a high voltage equipment.
10. Define a standard impulse voltage waveform as per IS standard with the allowable tolerances.



Part – B (5 x 16 = 80 marks)

11. (i) Explain in detail the mechanisms by which lightning strokes develop and induce overvoltage on overhead power lines? (10)
(ii) An underground cable of inductance 0.189 mH/km and of capacitance $0.3\text{ }\mu\text{F/km}$ is connected to an overhead line having an inductance of 1.26 mH/km and capacitance of $0.009\text{ }\mu\text{F/km}$. Calculate the transmitted and reflected voltage and current waves at the junction, if a surge of 200 kV travels to the junction, (i) along the cable, and (ii) along the overhead line. (6)
12. (a) From Fundamental gas Laws derive an expression for Paschen's curve. (16)

(OR)

- (b) Discuss in detail the different breakdown mechanism of solid dielectrics in practice (16)

13. (a) Explain how impulse current is generated in laboratories and thus obtain an expression for maximum output (16)

(OR)

- (b) (i) Obtain an expression for equivalent circuit parameters for 3 stage cascaded transformer. (8)
(ii) A ten stage Cockraft-Walton circuit has all capacitors of $0.06 \mu\text{F}$. The secondary voltage of the supply transformer is 100 kV at a frequency of 150Hz. If the load current is 1 mA, determine (i) voltage regulation (ii) the ripple (iii) the optimum number of stages for maximum output voltage (iv) the maximum output voltage. (8)

14. a) (i) Explain in detail how high D.C.Voltages are measured and discuss its merits and demerits. (10)

- (ii) A coaxial shunt is to be designed to measure an impulse current of 50kA. If the bandwidth of the shunt is to be at least 10MHz and if the voltage drop across the shunt should not exceed 50V, find the ohmic value of the shunt and its dimensions. (6)

(OR)

- b) (i) Explain how Resistive dividers are used for high impulse voltage measurements. (8)
(ii) Explain in detail how vertical sphere gaps are used for peak voltage measurements in Laboratory. (8)

15. a) (i) Explain the impulse testing of a 11 kV /400V Distribution transformer according to IS 2026. (10)
(ii) How digital techniques are used for locating faults. (6)

(OR)

- b) (i) Explain with relevant standards the dielectric testing of an 11 kV air break switch. (10)
(ii) Explain the synthetic testing of circuit breaker in detail. (6)

