



B.E / B.Tech (Full Time) Degree Examination Nov/Dec 2011

Electrical and Electronics Engineering

EE 9352 High Voltage Engineering

VI semester

Time: 3 Hours

Answer for ALL Questions

Max. Marks: 100

Part - A(2X 10 =20)

1. What are the different methods employed for lightning protection of over head lines?
2. What are the requirements of a ground wire for protecting power conductors against direct lightning stroke?
3. State the properties of composite dielectrics.
4. What do you mean by intrinsic strength of a solid dielectric?
5. A ten stage impulse generator has 0.50 μF Condenser wave front and wave tail resistances are 250Ω and 2500Ω respectively. If the load capacitance is 1nF , determine the wave front and wave tail times of the impulse wave.
6. Mention the advantages and disadvantages of series- parallel resonant circuit for generating high a.c. Voltages.
7. A generating voltmeter has to be designed so that it can have a range from 10 to 220kV d.c. If the indicating meter reads a minimum current of $5\mu\text{A}$ and maximum current of $50\mu\text{A}$, what should the capacitance of the generating voltmeter be?
8. What are the different types of resistive shunts used for impulse and high frequency measurements?
9. Define: Air density correction factor and Humidity correction factor
10. Mention the different electrical testes done on circuit breakers.

Part B (5 X 16 = 80)

11. i. Explain the various theories that explain breakdown in commercial liquid Dielectrics.(10)
ii. Discuss about the different types of "Time lag."(6)

12. a.i. Explain the different theories of charge formation in clouds.(8)
- ii. Explain the variation of current and voltage on an overhead line when one end of the line is short circuited.(8)

(OR)

- 12.b. i. Discuss about the various over voltage protection techniques.(8)
- ii. Explain the causes for power frequency over voltages in powers systems. (8)

13.a.i. Describe with neat diagram the principle of operation, application and limitations of Van de Graf Generator.(8)

- ii. An impulse current generator has total capacitance of $15\mu\text{F}$, The charging voltage 125kV, the circuit inductance 2 mH and the dynamic resistance 1Ω . Determine the peak current and wave shape of the wave.(8)

(OR)

13.b. Explain the Marx circuit arrangement for multistage impulse generators. How is the basic arrangements modified to accommodate the wave time control resistances.(16)

14.a.i. Draw Chubb-Forescue circuit for measurement of peak value of a.c. voltages and discuss its advantages over other methods.(10)

- ii. Discuss the advantages and limitations of an electrostatic voltmeter for high voltage measurement.(6)

(OR)

14.b.i. A co axial shunt is to be designed to measure an impulse current of 50kA. If the bandwidth of the shunt is to be at least 10 MHz and if the voltage drop across the shunt should not exceed 50V. find the ohmic value of the shunt and its dimensions. (10)

- ii. What are the conditions to be satisfied by a potential divider to be used for impulse measurement.(6)

15.a. Describe an impulse testing procedure for power transformer and bushing.(10+6)

(OR)

15.b. Explain the different aspects of insulation design and insulation co-ordination adopted for EHV systems.(10+6)
