



**B.E./B.Tech(Full Time) DEGREE END SEMESTER EXAMINATIONS April/May. 2014  
COLLEGE OF ENGINEERING GUINDY, ANNA UNIVERSITY, CHENNAI  
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH**

**Sixth Semester**

**EE 9352 High Voltage Engineering  
(Regulations 2008)**

**Time: 3 Hours**

**Max. Marks: 100**

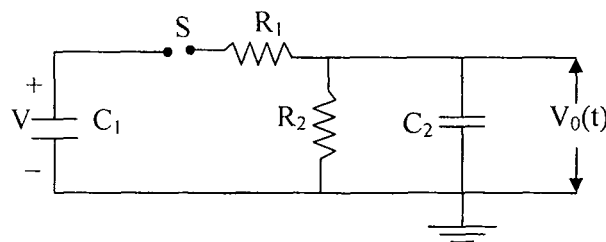
Answer ALL questions

**PART – A (10 x 2 = 20 Marks)**

1. What is the practical significance of reduced BIL.
2. How does corona affect the transmission lines?
3. Name four solid insulating materials used in practices?
4. Why both electrical and thermal properties are important for liquid dielectrics used in transformers?
5. Compare series and parallel resonant circuits
6. Give the circuit used for producing long rectangular current pulses.
7. Calculate the atmospheric correction factors if the laboratory temperature is  $37^{\circ}\text{C}$ , atmospheric pressure is 750 mmHg and the wet bulb temperature is  $27^{\circ}\text{C}$ .
8. Draw the phasor diagram of a capacitance voltage transformer.
9. Compare routine and type test conducted on high voltage power apparatus.
10. What is the necessity of earthing and shielding arrangements in high-voltage laboratories?

**PART – B (5 x 16 = 80 Marks)**

- 11 Explain in detail the different ionizations process and thus derive the criterion for breakdown of gaseous dielectrics from the classical gas laws. (16)
  12. (a) Explain with suitable case studies the causes for switching over voltages and the control schemes used in each case. (8 + 8)
- (OR)**
- (b) (i) Explain the different mechanism of cloud charging and discharging (8)  
(ii) Discuss the various protective schemes employed against lightning surges. (8)
13. (a) Analyze the circuit given below and hence derive an expression for  $V_o(t)$  (16)



**(OR)**

(b) A Cockcroft-Walton type voltage multiplier has ten stages with capacitances, all equal to  $0.04\mu\text{F}$ . The supply transformer secondary voltage is 120 kV at a frequency of 150Hz. If the load current to be supplied is 10mA, find (a) percentage ripple, (b) the regulations, and (c) the optimum number of stages for minimum regulation or voltage drop and (d) the maximum output voltage.

(16)

14. (a) (i) How are peak voltage measurements affected in a Vertical sphere arrangement, Explain in detail. (10)

(ii) Explain the optical method used for measuring impulse currents with their relative merits. (6)

(OR)

(b) (i) Explain how high d.c. voltages are measured in laboratories. What are the parameters and factors that influence such voltage measurements? (12)

(ii) A resistance divider of 1400kV (impulse) has a high voltage arm of  $16\text{k}\Omega$  and a low voltage arm consisting 16 members of  $250\Omega$ , 2 watt resistors in parallel. The divider is connected to a CRO through a cable of surge impedance  $75\Omega$  and is terminated at the other end through a  $75\Omega$  resistor. Calculate the exact divider ratio. (4)

15. (a) Explain with relevant standards the dielectric testing on an 11 kV air break switch. What are the possible faults? (16)

(OR)

(b) Explain the impulse testing of a 22 kV /400V Distribution transformer according to IS 2026. How are digital techniques used to locate faults? (16)