

AIB
19/11/16 AN

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 21511

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Sixth Semester

Electrical and Electronics Engineering

EE 2353/EE 63/10133 EE 603 — HIGH VOLTAGE ENGINEERING

(Regulations 2008/2010)

(Common to PTEE 2353/10133 EE 603 – High Voltage Engineering for
B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering –
Regulations 2009/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the factors that influence the lightning induced voltage on transmission line?
2. Why a simple spark gap cannot offer full protection against over voltages?
3. Name the various secondary ionization processes involved in gaseous dielectric breakdown.
4. What are electronegative gases? Give its significance.
5. How is the circuit inductance controlled and minimized in impulse current generator?
6. Mention the specification of impulse current as per Indian Standards.
7. What are the drawbacks of series resistance micro-ammeter technique in HVAC measurements?
8. How the stray effect of capacitance potential divider is minimized for impulse measurements?
9. Distinguish between flash over and puncture.
10. Define safety margin as applied to insulation co-ordination.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the sources of switching surges? Explain the characteristics of switching surges with typical wave shapes. (10)
- (ii) Discuss the various controlling methods of over voltages due to switching and power frequency. (6)

Or

- (b) (i) A long transmission line is energized by a unit step voltage of 1.0 V at the sending end and is open circuited at the receiving end. Construct the Bewley Lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$. (10)
- (ii) Write a short note on ground rods as protective devices. (6)
12. (a) (i) Discuss the important properties of composite dielectrics. (6)
- (ii) Discuss the various mechanism of breakdown in composite dielectrics. (10)

Or

- (b) State why the very high intrinsic strength of a solid dielectrics is not fully realized in practice? Explain the different mechanisms by which breakdown occurs in solid dielectrics in practice. (16)
13. (a) (i) Explain the Marx circuit arrangement for multistage generator. How is the basic arrangements modified to accommodate the wave time control resistances? (10)
- (ii) How are the wave front and wave tail time controlled in impulse generator circuit? (6)

Or

- (b) (i) With a neat sketch, describe the construction and working of a Van de Graaff generator. (10)
- (ii) Explain the functions and operation of a trigatron gap. (6)
14. (a) (i) Discuss the construction and vertical arrangement of sphere-gap. Explain the procedures for peak-value measurement of high voltage DC, AC and impulse voltages using standard sphere gap. (10)
- (ii) Explain the parameters and factors that influence the sphere-gap measurements. (6)

Or

- (b) (i) Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for measuring impulse voltages. Explain the arrangement used to minimize errors. (10)
- (ii) What are the requirements of a digital storage oscilloscope for impulse and high frequency measurements in HV test circuits? (6)
15. (a) (i) Discuss with a circuit arrangements, the detailed procedure for conducting impulse voltage testing of HV power transformer. (8)
- (ii) Explain the procedure adopted for detection and location of fault during impulse voltage testing. (8)

Or

- (b) Explain the different aspects of insulation design and insulation coordination adopted for EHV systems. (16)