

Reg. No. :

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

Question Paper Code : 81292

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh Semester

Electrical and Electronics Engineering

EE 3701 — HIGH VOLTAGE ENGINEERING

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the sources of switching surges?
2. State the necessity for insulation coordination in substation.
3. How the Townsends breakdown criteria.
4. Why the sharp edges should be avoided in high voltage handling equipments?
5. Differentiate the switching surge from impulse voltage.
6. Suggest suitable methods for measuring high dc voltage.
7. Give the Indian standards for testing high voltage equipments.
8. Justify the significance of fog test in high voltage line insulators.
9. Mention the applications of high dc voltage.
10. State the role of high voltage in biomedical applications.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the causes of power frequency over voltage in power system and protection techniques against these over voltage.

Or

- (b) How does the charge formation occur in the cloud, explain in detail and also model the lightning that falls on an object?

12. (a) Derive the Townsend's breakdown criteria from the primary and secondary ionization process in uniform field.

Or

- (b) Deduce the theories involved in the breakdown mechanism of liquid dielectrics.
13. (a) Explain the operation of Cock Craft Walton multiplier and derive the expression for voltage regulation.

Or

- (b) Explain the measurement of power frequency high voltage using potential transformer and CVT.
14. (a) How the status of the power transformer is accessed with standard testing procedures.

Or

- (b) Explain the testing procedures for circuit breaker and isolators.
15. (a) How the high voltage is used in electrostatic precipitation and particle separation? Explain in detail.

Or

- (b) Write a note on the following high voltage applications :
- (i) Pumping (4)
 - (ii) Propulsion (4)
 - (iii) Ozone generation. (5)

PART C — (1 × 15 = 15 marks)

16. (a) How electrostatic force principle is used for the measurement of power frequency AC voltage and derives the expression relating the electrostatic force and the voltage to be measured.

Or

- (b) Explain the horizontal Sphere gap setup for high voltage measurement and analyze the factors affecting the measurement.