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Question Paper Code : 11283

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Fifth/Sixth/Seventh/Eighth Semester

Electrical and Electronics Engineering

**EE3036 — SUSTAINABLE AND ENVIRONMENTAL FRIENDLY HV
INSULATION SYSTEM**

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the importance of measuring carbon footprint.
2. What is CO₂ equivalent?
3. List physical properties of SF₆.
4. Define recycling of SF₆ gas.
5. Define flammability of liquid dielectrics.
6. List the chemical properties affecting performance in transformers.
7. What is fire hazard associated with solid dielectrics?
8. Define fire retardancy in solid dielectrics.
9. List key requirements for insulation materials.
10. Write the two standards for green insulation systems.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the importance of global warming potential in comparing greenhouse gases.

Or

- (b) Discuss strategies to reduce carbon footprint in industry.

12. (a) Explain the mechanisms by which SF₆ acts as an insulating and arc-quenching gas.

Or

- (b) Discuss environmental hazards and global warming potential of SF₆.

13. (a) Explain chemical, thermal, and fire hazards associated with mineral oil in electrical equipment.

Or

- (b) Describe applications of eco-friendly liquid dielectrics in transformers and capacitors.

14. (a) Discuss the hazardous environmental and health effects of PVC, epoxy, and other synthetic polymers used in insulation.

Or

- (b) Compare conventional synthetic dielectrics and bio-based solid dielectrics in terms of environmental impact and performance.

15. (a) Describe standard testing procedures for dielectric breakdown, insulation resistance, and fire tests.

Or

- (b) Explain major applications of alternate insulation systems in power equipment.

PART C — (1 × 15 = 15 marks)

16. (a) Explain alternate green gaseous insulation for HV systems based on dielectric strength, environmental impact, safety and applicability.

Or

- (b) Explain the hazardous effects of traditional liquid dielectric materials and justify the needs for environmental friendly liquid insulation.