Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 41025

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Fifth/Sixth/Seventh Semester

Electrical and Electronics Engineering

EE 3036 – 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 functions of insulating liquids (oil) in high-voltage equipment.

2. What is meant by global warming potential?

3. List out the dielectric performance of g^3 when compared to SF_6.

4. Mention the properties of SF_6 gas.

5. Define Green Liquid Insulators.

6. Compare and contrast the Electrical features of natural ester fluid and mineral oil.

7. List the advantages of thermosetting electrical insulating materials

8. Mention the properties of environmental friendly insulating material.

9. State evolving standards of management.

10. Mention the major applications of green insulation systems.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail about the environmental friendly design for electrical insulation system.

Or

(b) What is meant by carbon footprint? Elaborate the procedure for calculating the carbon footprint index.

12. (a) Analyze the by-products formed during the working cycle of SF_6 gas and their implications.

Or

(b) What are the alternate gases identified for insulation solutions and discuss about their impact on environmental considerations.

13. (a) Mention the alternate sources of environmental friendly liquids for dielectric medium and compare its properties with the existing hazardous dielectric materials.

Or

(b) Tabulate and analyze the characteristics of insulating fluids applied in HV equipment and describe their key properties to be taken into account while selecting the insulating fluids.

14. (a) Discuss about the alternate green solid insulators and compare its beneficial and eco-friendly properties with the conventional solid insulators.

Or

(b) What makes the existing solid dielectric materials hazardous? And what would be their impact on the environment for its continuous usage? Explain.

15. (a) Elaborate the need for various standards for green insulation systems.

Or

(b) What is the requirement of alternate insulation systems and discuss in detail about the various testing methods of the life of green insulation systems.

PART C — (1 × 15 = 15 marks)

16. (a) What are the challenges related to environmental consequences of hazardous materials presently used in the high voltage electrical systems? Analyze how the increase in population and industry push the electrical industry to adopt sustainable and environmental friendly insulation system.

Or

(b) Discuss in detail, why insulating liquid is significant in HV equipment and explicit the applications of insulating materials required for stabilizing the electrical, physical, chemical and thermal properties of the HV system.

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