

R13

Code No: 117DQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 2023

HIGH VOLTAGE ENGINEERING
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Why the temperature classification is not done for liquids and gases? [2]
- b) Mention the solid insulation applications in power capacitors? [3]
- c) State Paschen's law. [2]
- d) Mention the properties of composite dielectric. [3]
- e) Define front and tail times of an impulse wave. [2]
- f) What are the factors that influence the spark over voltages of sphere gaps? [3]
- g) What is the function of surge arrestor? [2]
- h) Differentiate between different types of over voltages in a power system. [3]
- i) How is lossy dielectric represented? [2]
- j) Define the terms.
 - i) Withstand voltage
 - ii) Flashover voltage
 - iii) 50% flash over voltage. [3]

PART – B

(50 Marks)

- 2.a) How is the insulation arrangement done for different parts in switchgear.
 - b) Discuss briefly the "Charge Simulation Method" for solving field problems and estimation of potential distribution. [5+5]
- OR**
- 3.a) Discuss the insulation requirements for HV capacitors.
 - b) Distinguish between Boundary Element Method and charge simulation method. [5+5]
4. Explain the process of ionization by collision in gaseous discharge. [10]
- OR**
- 5.a) What is meant by intrinsic strength? Explain intrinsic breakdown mechanism in solid dielectrics?
 - b) Explain how treeing and tracking leads to breakdown in solid insulating materials. [5+5]

QA

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6. Write the short notes on:

a) Faradays Generator

b) Magnetic links.

c) Hall generator.

QA

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[10]

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7.a) Explain the principle operation of the resonant transformer.

b) What is a Telsa coil? How are damped high-frequency oscillations obtained from a telsa coil? [5+5]

8.a) What are the mechanisms by which lightning strokes develop and induce over voltages on Overhead power lines?

b) What are the causes for switching and power frequency over voltages? [5+5]

QA

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[5+5]

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9. Discuss the principle of operation of insulation coordination in EHV power systems.

[10]

10. What are the different power frequency tests done on insulators? Mention the procedure for testing? [10]

QA

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[10]

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QA

11.a) Explain the partial discharge tests on high voltage cables. How is a fault in the insulation located in this test?

b) Explain the importance of Radio interference voltage measurements for EHV power apparatus. [5+5]

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