R22

Code No: 185CQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January - 2025

HIGH VOLTAGE ENGINEERING

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) Part- A for 10 marks, ii) Part - B for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of ten questions (numbered from 2 to 11) carrying 10 marks each. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a)	State Paschen's law.	[1]
b)	What is 'TRACKING' and 'TREEING' is solid dielectric Break down.	[1]
c)	Define rise time and decay time of impulse voltage wave.	[1]
d)	What is the necessity for generating high voltages?	[1]
e)	What is the method available for measurement and High frequency AC voltages or Impulse voltages or other rapidly rising voltages?	[1]
f)	What are the different types of shunts used for impulse voltage measurement?	[1]
g)	What is the function of surge arrestor?	[1]
h)	How are switching over voltages originated in a power system?	[1]
i)	State the various safety precautions to be taken in H.V. Lab.	[1]
j)	What are the IEC standards?	[1]

PART – B

(50 Marks)

2.a)	Explain the breakdown mechanism in composite dielectrics due to aging and partial discharges.	
b)	Explain streamer theory breakdown in gases.	[5+5]
	OR	
3.a)	Explain clearly the electromechanical breakdown in solid dielectric.	
b)	Explain the phenomenon of corona discharges and breakdown mechanism in non-uniform field.	[5+5]
4.a)	Explain the different methods of producing switching impulses in test laboratories.	
b)	With a neat diagram, explain the three stage cascade transformer connection to produce high Voltage at 50 Hz.	[5+5]
	OR	
5.a)	With neat figure, explain the construction and working of Marx Generator.	
b)	With neat diagram, explain the working of generation of Impulse Currents.	[5+5]

6.a) Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement?

b) What are the qualities of a CRO used for measurement of impulse current measurements? [5+5]

OR

7.a) Explain the different methods of measuring high impulse currents with their relative merits and demerits.

b) What is an impulse generator? Why is controlled tripping necessary in impulse generators? [5+5]

8.a) What are the different methods employed for lightning protection of overhead lines?

b) Explain the working of surge arrester with neat diagram. [5+5]

OR

9.a) Explain the importance of switching over voltages in EHV power systems.

b) What is the difference between a stepped leader and a dart leader? [5+5]

10.a) What are the different type of test conducted on circuit breaker and explain.

b) Explain the different high voltage tests conducted on power transformers. [5+5]

OR

11.a) Explain the following terms used in HV testing as per the standards: (i) Disruptive discharge voltage (ii) Creepage distance (iii) Impulse voltage (iv) 100% flash over voltage.

b) Explain the different high voltage tests conducted on bushings. [5+5]

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