

University of Mumbai

Examinations Commencing from 17th May 2022 to 4th June 2022

Program: BE Electrical Engineering

Curriculum Scheme: Rev2019(C- SCHEME)

Examination: Summer 2022/TE/Semester VI

Course Code: EEDO6013 and Course Name: High Voltage Engineering

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Most suitable numerical method to solve electrostatic field problems is
Option A:	Laplace equation method
Option B:	Charge simulation method
Option C:	Finite difference method
Option D:	Resistance analog method
2.	C- tan (delta) test on electric bushings is done using
Option A:	Impulse generators
Option B:	HV Schering bridge
Option C:	Power frequency cascaded transformer
Option D:	Resonant transformer
3.	Electrical conduction in gases was first studied in 1905 by
Option A:	Loeb
Option B:	Maxwell
Option C:	Townsend
Option D:	Hertz
4.	Generally _____ are avoided in construction of impulse measuring voltage dividers because they _____:
Option A:	Capacitors, might possess stray capacitance
Option B:	Inductors, can induce stray capacitance
Option C:	Capacitors, carry capacitive impedance
Option D:	Inductors, are very expensive
5.	Dielectric constant of mineral oils is about
Option A:	1.5 to 2.0
Option B:	2.2 to 2.4
Option C:	3.0 to 3.5
Option D:	1.008
6.	Tesla coil is used for
Option A:	generation of rectangular voltages
Option B:	generation of very high voltages
Option C:	generation of sinusoidal output voltages
Option D:	generation of high frequency ac voltages
7.	Thermal classification of insulating materials is done for
Option A:	Solids
Option B:	Liquids
Option C:	Gases

Option D:	Composite insulation
8.	The value of charging voltage used in a medium size impulse generator is
Option A:	10 to 50 kV
Option B:	50 to 100 kV
Option C:	500 kV
Option D:	1000 kV
9.	The spark over voltages of a spark gap depends on the air density which varies with the change in _____.
Option A:	Temperature only
Option B:	Temperature and pressure
Option C:	Pressure only
Option D:	Pressure and water vapour
10.	Which of the following type of high voltage testing laboratory, meant for engineering colleges and universities to open facilities of regular teaching and training and HV testing for the clients?
Option A:	Small size laboratory
Option B:	Medium size laboratory
Option C:	Large size laboratory
Option D:	UHV laboratory

Q2 (20 Marks Each)	Solve any Four out of Six	5 marks each
A	Describe, with a neat sketch, the working of a trigatron gap?	
B	What is "Cascaded Transformer"? Explain why Cascading is necessary?	
C	Why is grounding very important in a high voltage laboratory? Describe two typical grounding systems used.	
D	What is partial discharge? Differentiate between Internal and External Discharges?	
E	Discuss the various factors which affect the breakdown of gases.	
F	Explain Cavitation and Bubble theory of breakdown in liquid dielectrics.	

Q3 (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Explain the term "Ionization". With reference to breakdown in gases, discuss the following ionization processes. 1. Ionization by Collision. 2. Photo- Ionization. 3. Secondary Ionization.	
B	What is Paschen's Law? How to account for the minimum voltage for breakdown under a given "p x d" condition?	
C	Describe, with a neat sketch, the working of a Van-de-Graaff Generator. What are the factors that limit the maximum voltage obtained?	

Q4. (20 Marks Each)	
A	Solve any Two 5 marks each

i.	Discuss following terms with reference to multistage impulse generator: 1. Nominal Voltage 2. Stage Capacitance 3. Nominal Energy 4. Number of Stages
ii.	Write a short note on Intrinsic electromechanical and chemical breakdown in solid insulation system.
iii.	Explain principle of operation of capacitance divider for measurement of high AC voltages?
B	Solve any One 10 marks each
i.	Describe, with a neat sketch, the principle and construction of an Electrostatic Voltmeter for very high voltages? What are its merits and demerits for high voltage A.C. measurements?
ii.	What are the different power frequency tests done on Insulators? Mention the procedure for testing.