



Shree Sathyam College of Engineering and Technology

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.
NH-544, Salem - Coimbatore Highways, Kuppanur, Sankari Taluk, Salem - 637301, TamilNadu, India.
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

EE3701-HIGH VOLTAGE ENGINEERING

IMPORTANT QUESTIONS BANK

UNIT -1					
PART A		CO	BL	PO	PI
1.	What are the basic requirements of lightning arresters?	CO1	L2	PO2	2.1.2
2.	What is the effects corona on a power system? (Or) Write the cause of corona.	CO1	L1	PO1	1.2.1
3.	Define isokeraunic level or thunderstorm days.	CO1	L1	PO1	1.2.1
4.	What are the causes of over voltages in electric power system?	CO1	L2	PO1	1.3.1
5	What is insulation co-ordination?	CO1	L2	PO1	1.3.1
6	What are ground rods?	CO1	L2	PO1	1.3.1
7	Define flashover.	CO1	L2	PO1	1.3.1
UNIT -II					
1	State paschen's law	CO2	L2	PO1	1.3.1
2	Name the different types of breakdown mechanisms in commercial liquid dielectrics.	CO2	L2	PO1	1.3.1
3	State the properties of composite dielectric.	CO2	L2	PO1	1.3.1
4	What is thermal breakdown in solid dielectrics?	CO2	L2	PO2	2.1.2
5	What are electro negative gases?	CO2	L1	PO1	1.2.1
6	What is mean by corona discharges?	CO2	L1	PO1	1.2.1
UNIT -III.					
1	What is trigatron gap? Mention the advantage of trigatron gap.	CO3	L2	PO2	2.1.2
2	What are the various methods available for generating High DC voltage?	CO3	L1	PO1	1.2.1
3	What are the advantages of Van de-Graff generator?	CO3	L1	PO1	1.2.1
4	Define rise time or front time fall time impulse wave.	CO3	L2	PO2	2.1.2



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5	What is the necessity for generating high voltages?	CO3	L2	PO2	2.1.2
6	Differentiate impulse voltage and switching surge.	CO3	L1	PO1	1.2.1
7	Why is controlled tripping is necessary for impulse generators?	CO3	L1	PO1	1.2.1
8	Capacitance Voltage dividers are used preferred High ac voltage measurements. Justify.	CO3	L2	PO2	2.1.2
9	What are the limitations of series resistance micro ammeter method for high voltage measurements?	CO3	L1	PO1	1.2.1
10	How is the resistance shunt designed?	CO3	L1	PO1	1.2.1
11	List the factors that are influencing the peak voltage measurement using sphere gap?	CO3	L2	PO2	2.1.2

UNIT IV

1	How rod gaps used as Protective devices?	CO4	L2	PO2	2.1.2
2	Define surge impedance of a line.	CO4	L1	PO1	1.2.1
3	What is insulation coordination?	CO4	L1	PO1	1.2.1
4	Compare type and routine tests.	CO4	L2	PO2	2.1.2
5	Define disruptive discharge voltage.	CO4	L1	PO1	1.2.1
6	Define creeping distance.	CO4	L1	PO1	1.2.1
7	Why is the impulse test important for power transformer?	CO4	L2	PO2	2.1.2
8	What is BIL?	CO4	L1	PO1	1.2.1
9	Why is insulation coordination needed?	CO4	L1	PO1	1.2.1

UNIT V

1	State any three Electrostatic applications in industries.	CO5	L2	PO2	2.1.2
2	What is electrostatic Precipitator?	CO5	L1	PO1	1.2.1
3	What is electrostatic Spinning?	CO5	L1	PO1	1.2.1
4	What is Ozone generation?	CO5	L2	PO2	2.1.2
5	State any three biomedical applications by using High voltage.	CO5	L1	PO1	1.2.1



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PART B					
UNIT –I					
1	Discuss briefly various causes of power frequency over voltage in a power system and methods to control them.	CO	BL	PO	PI
2	Explain the importance of switching over voltages in EHV line. How protection against is over voltage is achieved.	CO1	L2	PO1	1.3.1
3	Explain with neat sketch the mechanism of lightning discharge. How is the lightning modeled mathematically?	CO1	L1	PO2	2.1.2
4	Explain how over voltage in transmission line due to lightning can be minimized by ground rods and counter poises	CO1	L1	PO2	2.1.3
5	Show the charge distribution patterns in the cloud following Wilsons and Simpson theories.	CO1	L2	PO1	1.3.1
UNIT-II					
1	Explain the mechanism of development of anode and cathode streamers and explain how these lead to breakdown in gaseous dielectrics. (Or) Townsends theory first.	CO2	L2	PO1	1.3.1
2	Explain the breakdown due to internal discharges in solid dielectrics.	CO2	L1	PO2	2.1.2
3	Describe the various mechanisms of Vacuum breakdown.	CO2	L1	PO2	2.1.3
4	What is corona discharge? Explain clearly anode and cathode Coronas?	CO2	L2	PO1	1.3.1
UNIT-III					
1	Explain with diagrams different type of rectifier circuits for producing high DC voltages.	CO3	L2	PO1	1.3.1
2	Describe the construction and operation of vande Graff generator with neat sketch also states its limitations.	CO3	L2	PO2	2.1.2
3	Describe the generating voltmeter used for measuring high Dc voltages.	CO3	L1	PO1	1.2.1
4	Explain the principle and construction of electrostatic voltmeter for very high voltages.	CO3	L1	PO1	1.2.1
5	Explain the operation of digital peak voltmeter for measurement of high Dc voltages.	CO3	L2	PO2	2.1.2
6	Explain the Various dividers used for Measuring High Voltages.	CO3	L2	PO1	1.3.1
UNIT –IV					
1	Explain the Various High voltage tests being carried out in a power transformer.	CO4	L2	PO1	1.3.1
2	What are the different power frequency tests done on insulators? Mention the procedure for testing.	CO4	L2	PO2	2.1.2
3	Explain the various HV testing carried out insulators and Bushings.	CO4	L1	PO1	1.2.1
4	Describe the various tests conducted on circuit breaker.	CO4	L1	PO1	1.2.1



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5	What is mean by insulation coordination? Explain how the protective devices are chosen for optimum insulation level in a power system?	CO4	L2	PO1	1.3.1
UNIT V					
1	Explain the electrostatic precipitation with neat diagram.	CO5	L2	PO1	1.3.1
2	Explain the electrostatic painting and printing with neat diagram.	CO5	L2	PO1	1.3.1
3	Explain the electrostatic spinning and pumping with neat diagram.	CO5	L2	PO1	1.2.1
4	Explain the operation of ozone generation with neat diagram.	CO5	L2	PO1	1.2.1
5	Explain the various biomedical applications using high voltage technology.	CO5	L1	PO2	2.1.2

PART C

UNIT I					
1	A long transmission line is energized by a unit step voltage 1 V at the sending end and is open circuited at the receiving end. Construct the Bewley lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$.	CO1	L3	PO2	2.1.2
2	What are the requirements of a ground wire for protecting power conductors against direct lightning stroke? Explain how they are achieved in practice	CO1	L3	PO1	1.3.1
3	F/km is connected to an μ An underground cable of inductance 0.150 mH/km and of capacitance 0.2 F/km. Calculate the μ overhead line having an inductance of 1.2 mH/km and capacitance of 0.006 transmitted and reflected voltage and current waves at the junction, if a surge of 200 kV travels to the junction, (1) along the cable and (2) along the overhead line.	CO1	L3	PO2	2.1.2
UNIT II					
1	What are the preferred properties of gaseous dielectrics for high voltage applications? Draw the characteristics of D.C. breakdown strength of typical solid, liquid and gas and vacuum insulators in uniform fields.	CO2	L2	PO1	1.1.2
2	In an experiment of gas, it was found that at a steady current of 5.5×10^{-8} A with 0.4 cm separation between the plates. For constant field, if the separation reduces to 0.1 cm, results in a current of 5.5×10^{-9} A. Find Townsend's primary ionization coefficient.	CO2	L3	PO2	2.1.2
3	Explain thermal breakdown mechanism in solid dielectrics. Derive an expression for critical thermal breakdown voltage (V_c) and critical electric field (E_c) for the same. State clearly the assumption made.	CO2	L2		



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UNIT III					
1	A 100 KVA, 250 V/200 KV feed transformer has R and X of 1% and 5% respectively. This transformer is used to test a cable at 400 KV at 50 Hz. The cable takes a charging current of 0.5 A at 400 KV. Determine the series inductance required. Assume 1% resistance for inductor. Also determine the input voltage to the transformer. Neglect dielectric loss of a cable.	CO3	L3	PO2	2.1.2
2	Draw the circuit of an n-stage Cockcroft – Walton circuit for generating very high DC voltages and explain its operation. Also derive an expression for the ripple content in the output wave form	CO3	L2	PO1	1.1.2
3	An impulse generator has 8 stages with each condenser rated for 0.16 μ F and 125kV. The load 32 capacitor available is 1000pF. Find the series resistance and the damping resistance needed to produce 1.2/50 μ s impulse wave. What is the maximum output voltage of the generator, if the charging voltage is 120kV	CO3	L3	PO2	2.1.2
UNIT IV					
1	The effective diameter of the moving disc of an Electrostatic voltmeter is 15 cm with a separation of 1.5 cm. Find the weight in grams that is necessary to be added to balance the moving plate when measuring a voltage of 50 kV d.c. Derive any formula used. What is force of attraction between the plates when they are balanced?	CO4	L3	PO1	1.1.2
2	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.	CO4	L1	PO1	1.1.3
3	What is meant by Insulation Coordination? Explain how the protective devices are chosen for optimum insulation level in a power system.	CO4	L2	PO1	1.1.3
UNIT V					
1	Explain how high voltage engineering used in bio medical field.	CO5	L1	PO1	1.1.2
2	In thermal power station what type of electrostatic applications used explain its with neat diagram.	CO5	L2	PO1	1.1.2

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