Reg. No.																

Question Paper Code	14574

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Sixth Semester

Electrical and Electronics Engineering

20EEEL602 - HIGH VOLTAGE ENGINEERING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	------- is the primary cause of power system transients and surges. a) Earthquakes b) Switching and Lightning c) Solar flares d) Tornadoes	1	K1	CO1
2.	For distortion less transmission line a) RL = GC b) RG = LC c) RC = GL d) RLGC = 0	1	K2	CO1
3.	An overhead line with surge impedance of 50Ω is connected to a cable having a surge impedance of 600Ω. Determine the transmission coefficient into the cable. a) 0.92 b) 1.50 c) 1.85 d) 2.40	1	K3	CO1
4.	……. is having higher breakdown strength a) Solid dielectrics b) Liquid dielectrics c) Gaseous dielectrics d) Equal in all	1	K1	CO2
5.	Long-term deterioration and breakdown occurs in solid dielectrics due to a) thermal phenomenon b) surface discharges c) internal discharges d) treeing phenomenon	1	K2	CO2
6.	At standard temperature and pressure the electric field at which breakdown occurs in air with a small gap d (cm) is given by a) 30 + 6.08/d b) 24.2 + 6.08/d c) 24.2 + 6.08/d 2 d) 30 + 6.08/d 2	1	K3	CO2
7.	The wave form of lightning is ------ a) Sine b) Cosine c) Impulse d) Square	1	K1	CO3
8.	----- is the rise time of 1 / 50 µsec transient voltage a) 50 µsec b) 25 µsec c) 10 µsec d) 1 µsec	1	K2	CO3
9.	Energy efficiency formula for Tesla coil is a) $\eta=C_2 V_2^{\ 2} / C_1 V_1^{\ 2}$ b) $\eta=4C_2 V_2^{\ 2} / C_1 V_1^{\ 2}$ c) $\eta=C_1 V_1^{\ 2} / C_2 V_2^{\ 2}$ d) $\eta=4 C_1 V_1^{\ 2} / C_2 V_2^{\ 2}$	1	K3	CO3
10.	Generating voltmeter is a) Variable resistance device b) Variable inductance devices c) Variable capacitor Electrostatic voltage Generator d) None of the above	1	K1	CO4

11.	Compensated capacitance divider for high voltages (1 MV) generally a) 10 MHz b) 1 MHz c) 100 MHz d) 1000 MHz	*1*	*K2*	*CO4*
12.	In a pure capacitive divider, the ground capacitance Cg is represented by adding additional Capacitance from central point of HV capacitor to the ground and is equal to a) Cg b) Cg/3 c) 2Cg/3 d) Cg/2.	*1*	*K3*	*CO4*
13.	----- tests comes under short circuit tests of a circuit breaker. a) Making capacity test b) Breaking capacity test c) Short time current test d) All of the mentioned	*1*	*K1*	*CO5*
14.	The salt-fog test done on insulators is a) Impulse test b) Power frequency pollution test c) Impulse current test d) Switching surge test	*1*	*K2*	*CO5*
15.	Identify the apparatus mainly subjected to impulse voltage testing a) Fuse b) Insulator c) Battery d) Relay	*1*	*K3*	*CO5*
16.	Standard atmospheric condition as per Indian Standard Specifications are a) T = 27°C, P = 1013 mbar ,H= 17 g/m^3 b) T = 20°C, P = 1013 mbar, H= 11 g/m^3 c) T = 27°C, P = 1013 mbar, H= 11 g/m^3 d) T = 27°C, P = 1000 mbar ,H= 17 g/m^3	*1*	*K3*	*CO5*

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Classify the protection methods used against lightning over voltages in transmission lines.	*3*	*K3*	*CO1*
18.	Compare lightning over voltage and switching over voltage.	*3*	*K4*	*CO1*
19.	Use suitable examples to explain uniform and non-uniform electric fields.	*3*	*K3*	*CO2*
20.	Compare treeing and tracking.	*3*	*K4*	*CO2*
21.	Demonstrate the operation of a simple voltage doubler circuit.	*3*	*K3*	*CO3*
22.	Demonstrate the principle of Hall effect with suitable representation.	*3*	*K3*	*CO4*
23.	Analyze the electro optic method used for HVAC measurement.	*3*	*K4*	*CO4*
24.	Illustrate the concept of BIL in insulation coordination.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Interpret the stages involved in the mechanism of lightning strokes.	*12*	*K3*	*CO1*
		OR			
	b)	Demonstrate in detail about the procedure of Bewley's Lattice diagram.	*12*	*K3*	*CO1*
26.	a)	Apply the breakdown theories of commercial liquid dielectrics to explain insulation failure.	*12*	*K3*	*CO2*
		OR			
	b)	Demonstrate the breakdown mechanisms in vacuum using suitable theories.	*12*	*K3*	*CO2*

27.	a)	Examine the construction and working operation of a Van de Graff generator with its applications and limitations.	*12*	*K4*	*CO3*
		OR			
	b)	Differentiate the types of resonant transformer circuits used in high voltage generation.	*12*	*K4*	*CO3*
28.	a)	Investigate the sphere gap arrangement for high voltage measurement and classify the factors affecting its accuracy.	*12*	*K4*	*CO4*
		OR			
	b)	A Rogowski coil is required to measure impulse current of 8 kA having rate of change of current of 10^{10} A/sec. The voltmeter is connected across the integrating circuit which reads 8 volts for full scale deflection. The input to the integrating circuit is from the Rogowski Coil. Determine the mutual inductance of coil, R and C of the integrating circuit.	*12*	*K4*	*CO4*
29.	a)	Demonstrate the arrangement and detailed procedure for impulse voltage testing of power transformer.	*12*	*K3*	*CO5*
		OR			
	b)	Apply suitable HV testing procedures for insulators with neat diagrams.	*12*	*K3*	*CO5*