



Reg.No. \_\_\_\_\_

## End Semester Examination – Nov/Dec – 2016

**Code : 14EE2026**  
**Sub. Name : HIGH VOLTAGE ENGINEERING**

**Semester : 2016-17 ODD**  
**Duration : 3hrs**  
**Max. marks : 100**

### ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Marks
1.	a.	Give a scheme of protecting a rotating machine against overvoltages. Explain clearly how the scheme is different from protecting a power transformer	10
	b.	A travelling wave of 50 kV enters an overhead line of surge impedance 400 ohms and conductor resistance 6 ohm per km. Determine (i) the value of the voltage wave when it has travelled through a distance of 50 km, and (ii) the power loss and the heat loss of the wave during the time required to traverse this distance. Neglect the losses in the insulation and assume a wave velocity of $3 \times 10^5$ km per second. Determine the corresponding values for a cable having surge impedance of 40 ohms and relative permittivity 4.	10
(OR)			
2.	a.	Describe the construction, principle of operation and application of (i) Rod gaps; (ii) Expulsion gap; and (iii) Valve type lightning arrester.	10
	b.	What are volt-time curves? What is their significance in power system studies?	10
3.	a.	Explain the mechanism of development of anode and cathode streamers and explain how these lead to breakdown.	10
	b.	Describe briefly various mechanism of breakdown in solids.	10
(OR)			
4.	a.	Explain the process of breakdown in electronegative gases.	10
	b.	Explain clearly various processes which explain electric breakdown in vacuum	10
5.	a.	A 12-stage impulse generator has capacitors each rated at 0.3 $\mu$ F, 150 kV. The capacitance of the test specimen is 400 pF. Determine the wave front and wave tail resistance to produce at 1.2/50 $\mu$ sec. impulse wave. Also determine the maximum output voltage if the charging voltage is 125 kV.	10
	b.	Explain with neat diagram the principle of operation of (i) series (ii) parallel resonant circuits for generating high a.c. voltages. Compare their performance	10
(OR)			
6.	a.	Describe with neat diagram the principle of operation, application and limitations of Van de Graf generator.	10
	b.	Describe the construction, principle of operation and application of a multistage Marx's Surge Generator.	10
7.	a.	A Rogowski coil is required to measure impulse current of 8 kA having rate of change of current of 1010 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.	10
	b.	Discuss and compare the performance of (i) resistance (ii) capacitance potential dividers for measurement of impulse voltages	10
(OR)			
8.	a.	Draw a neat schematic diagram of a generating voltmeter and explain its principle of operation. Discuss its application and limitations.	10
	b.	Discuss and compare the performance of (i) resistance (ii) capacitance potential dividers for measurement of impulse voltages.	10

		<b><u>Compulsory:</u></b>	
9.	a.	List out various tests to be carried out on a cable and give a brief account of each test.	10
	b.	Explain briefly impulse testing of power transformer.	10

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