Reg. No. : | | | | | | | | | | |

Question Paper Code: 46303

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Electrical and Electronics Engineering

14UEE603 – HIGH VOLTAGE ENGINEERING

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Corona effect can be identified by

   (a) bushy sparks (b) faint violet glow
   (c) red light (d) arcing between conductors and earth

2. A tesla coil is a

   (a) cascaded transformer (b) coreless transformer
   (c) high frequency resonant transformer (d) low impedance transformer

3. Which of the following liquids has highest breakdown strength?

   (a) Mineral oils (b) Silicone oils
   (c) Chlorinated hydrocarbon oils (d) Polyolefins or esters

4. Breakdown is permanent in

   (a) Gases (b) Liquids (c) Solids (d) All the three

5. A Van de Graaff generator has a belt speed of 2.5 m/s, charge density of 10 $\mu c/m^2$ and a belt width of 2 m. The maximum charging current is

   (a) 50 μA (b) 5 μA (c) 2 μA (d) 12.5 μA

6. According to the Paschen's Law, the breakdown voltage of a uniform field gap is
   (a) Directly proportional to the gas pressure and inversely proportional to the electrode gap
   (b) Inversely proportional to the gas pressure and directly proportional to the electrode gap
   (c) Directly proportional to the both electrode gap and gas pressure
   (d) Inversely proportional to the both electrode gap and gas pressure

7. In equipments filled with liquid dielectric, heat is transferred mainly by
   (a) Conduction (b) Convection
   (c) Radiation (d) No heat transfers takes place

8. The type of measuring device preferred for measurement of impulse currents of short duration is
   (a) Park's tubular shunt (b) current transformer
   (c) Hall generator (d) Faraday ammeter

9. In wet flashover tests, the conductivity of water used is
   (a) 10±1.5 μ Siemens (b) 100 ±15 μ Siemens at ambient temperature
   (c) 45±10 μ Siemens at room temperature (d) < 1.0 μ Siemens at 27° C

10. In EHV and UHV system, ratio of BIL to SIL will be usually
   (a) Less than unity (b) More than 1.5 (c) 1.5 to 2.0 (d) 1.2 to 1.5

PART - B (5 x 2 = 10 Marks)

11. What are switching over voltages?

12. What are commercial liquid dielectrics? How are they different from pure liquid dielectrics?

13. What are electrostatic generators?

14. List the factors that are influencing the peak voltage measurement using sphere gap?

15. Differentiate type test and routine test.

PART - C (5 x 16 = 80 Marks)

16. (a) Briefly explain about lightning phenomenon. (16)

Or

(b) Explain with suitable figures the principle and functioning of expulsion gaps and protector tubes. (16)

17. (a) Explain various theories of breakdown mechanism of the commercial liquid dielectrics. (16)

Or

(b) State the criteria for sparking potential and hence obtain the relation between sparking potential and (pd) values (Paschen's law). Discuss on the nature of variations of sparking potential with (pd) values. (16)

18. (a) Explain any two methods to generate high direct current (DC) voltages. (16)

Or

(b) What are the components of multistage impulse generator? Explain. (16)

19. (a) Explain how sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement? (16)

Or

(b) Describe the construction, principle of operation of a generating voltmeter and give its application. (16)

20. (a) Describe various tests carried out on the insulators. (16)

Or

(b) What is meant by insulation coordination? How are the protective devices chosen for optimal insulation level in a power system? (16)

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