CBCS SCHEME

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15EE73

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
High Voltage Engineering

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Mention few preferred properties of gaseous dielectric for high voltage applications. Give any three example of gaseous dielectric. **(06 Marks)**

b. Explain the process of ionization by collision. Derive an expression for the current in the air gap considering Townsend's first ionization coefficient. **(10 Marks)**

OR

2 a. State and explain Paschen's Law. **(06 Marks)**

b. Briefly explain electro mechanical breakdown and thermal breakdown in solid dielectrics. **(10 Marks)**

Module-2

3 a. Explain the need of generating very high voltages in the laboratory. **(04 Marks)**

b. With a neat sketch, explain Cockcroft Walton principle for generating high dc voltages. **(06 Marks)**

c. Explain the working principle of a series resonant transformer. **(06 Marks)**

OR

4 a. Explain the Marx circuit arrangement for generation of high impulse voltages. **(08 Marks)**

b. A 12 stage impulse generator has 0.126μF capacitors. The wave front and wave tail resistance are 800Ω and 5000Ω respectively. If the load capacitor is 1000pF. Find the front time and tail time of the impulse wave produced. **(08 Marks)**

Module-3

5 a. Explain the Chubb and Fortescue method for measurement of pack value of an ac voltage waveform. **(08 Marks)**

b. Explain the principle of operation of an electrostatic voltmeter for measurement of high dc and ac voltages. **(08 Marks)**

OR

6 a. Discuss the factors influencing the spark over voltages of sphere gaps. **(08 Marks)**

b. Explain measurement of high impulse currents using Rogowski coil, with a neat figure. **(08 Marks)**

Module-4

7 a. Discuss the chief causes of over voltages in electric power systems. **(06 Marks)**
b. Explain charge formation in clouds using Simpson's cloud model. **(10 Marks)**

OR

8 a. With typical wave shapes, mention the characteristic of switching surge voltages. **(08 Marks)**
b. What is meant by insulation coordination? **(04 Marks)**
c. Discuss the ideal characteristics of protective devices connected in shunt for protection of electrical apparatus. **(04 Marks)**

Module-5

9 a. With the help of a diagram of a Schering bridge, explain how the capacitance and tan δ, can be measured. **(08 Marks)**
b. What is meant by partial discharge? Explain how it can be measured using balanced detection method. **(08 Marks)**

OR

10 a. Explain the testing of circuit breakers and insulators. **(08 Marks)**
b. What are the tests on transformers and explain the impulse testing of transformers. **(08 Marks)**

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