Code No: 155BR

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2021
HIGH VOLTAGE ENGINEERING
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1.a) Explain the difference between photo ionization and photo-electric emission.
b) Define Townsend's first and second ionization coefficients. How is the condition for breakdown obtained in a Townsend discharge? [7+8]

2.a) Describe the various theories that explain breakdown in commercial liquid dielectrics.
b) A solid specimen of dielectric has a dielectric constant of 4.2, and δ=0.001 at a frequency of 50 Hz. If it is subjected to an alternating field of 50 kV/cm, calculate the heat generated in the specimen due to dielectric loss. [9+6]

3.a) Discuss one method of controlled tripping of impulse generators. Why is controlled tripping necessary?
b) Calculate the peak current and wave shape of the output of the following generator. Total capacitance of the generator is 53μF. The charging voltage is 200 kV. The circuit inductance is 1.47 mH and the dynamic resistance of the test object is 0.51 ohm. [9+6]

4.a) What are the different types of resistive shunts used for impulsive current measurements? Discuss their characteristics and limitations.
b) A resistance divider of 1400kV(impulse) has a high voltage arm of 16 kilo-ohm and a low voltage arm consisting 16 members of 250 ohms, 2-watt resistors in parallel. The divider is connected to a CRO through a cable of surge impedance 75 ohms and is terminated at the other end through a 75-ohm resistor. Calculate the exact divider ratio. [9+6]

5.a) Describe the importance of switching over voltages in EHV power systems. How is protected against over voltages achieved.
b) Give the mathematical models for lightning discharges and explain them. [8+7]

6.a) What are the various standards for HV Testing of electrical apparatus.
b) What are the different power frequency tests done on insulators? Mention the procedure for testing. [7+8]

7. Explain various methods to generate high A. C. voltages. [15]

8. Write short notes on the following:
a) Generation of impulse currents
b) Measurement of dielectric constant. [8+7]

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