

# CBCS SCHEME

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15EE73

## Seventh Semester B.E. Degree Examination, July/August 2021 High Voltage Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. Classify the breakdown mechanism in liquid and explain any one mechanism. (07 Marks)  
b. Explain current growth in presence of secondary ionization. (06 Marks)  
c. In an experimental in certain gas it was found that the steady state current is  $5.5 \times 10^{-8}$  A at a distance of 0.4cm between electrode keeping the field constant and reducing the distance of 0.1cm result in a current of  $5.5 \times 10^{-9}$  A. Calculate Townsend's primary ionization coefficient ' $\alpha$ '. (03 Marks)
- 2 a. Derive Paschen's Law and draw Paschen's curve in respect of a gas subjected to a uniform static electric field. (05 Marks)  
b. Explain Electromechanical breakdown and thermal breakdown in solid dielectric. (06 Marks)  
c. Derive the criterion for breakdown in electro negative gases. (05 Marks)
- 3 a. Explain the principle of operation of Resonant transformer with the circuit, explain series and parallel AC test system. What are the advantages and disadvantages of above? (08 Marks)  
b. A Cockcroft – Walton type voltage multiple has eight stages with capacitance all equal to  $0.05\mu\text{F}$ . The supply transformer secondary voltage is 125kV at a frequency of 150Hz if the load current to be supplied is 5mA. Find :  
i) The percentage ripple  
ii) The regulation  
iii) The optimum number of stages for minimum regulation or voltage drop. (08 Marks)
- 4 a. Explain construction and working of a three electrode gap tripping circuit used for impulse generator. (08 Marks)  
b. With a neat diagram, explain two stage cascade transformer connection for producing very high AC voltage. Mention its advantages and disadvantages. (08 Marks)
- 5 a. Describe Chubb and Fortescue method for measurement of peak value of an AC voltage. (07 Marks)  
b. Explain Cathode Ray oscilloscope for impulse voltage measurement with neat block diagram. (04 Marks)  
c. Explain clearly the factors influencing the spark over voltage of sphere gap. (05 Marks)
- 6 a. Write a brief note on capacitance voltage divider. (05 Marks)  
b. Explain principle of an electrostatic voltmeter. Show that it measure DC voltage. (05 Marks)  
c. What is Rogowski coil? Explain with neat diagram its principle of operation for measurement of high impulse current. (06 Marks)

- 7 a. Explain the defining theory of charge information in clouds. (08 Marks)  
b. What are different methods employed for lightning protection of overhead lines? Explain them. (08 Marks)
- 8 a. Explain the successive reflection and lattice diagram. (08 Marks)  
b. Explain the principle of insulation co-ordination in EHV and UHV system. (08 Marks)
- 9 a. With neat diagram describe a high voltage Schering bridge to measure the capacitance and dissipation factor of sample of dielectric. (08 Marks)  
b. Discuss the method of balanced detection for locating partial discharge in electrical equipment. (08 Marks)
- 10 a. Explain in brief the different tests that are conducted on bushing. (08 Marks)  
b. With neat sketch, explain the procedure for impulse testing of transformer. (08 Marks)

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