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06EE73

Seventh Semester B.E. Degree Examination, June/July 2011
High Voltage Engineering

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. Assume suitable any missing data.

PART – A

1 a. What are the advantages of high voltage transmission? **(06 Marks)**

b. Derive the criterion for breakdown in electronegative gages. **(08 Marks)**

c. Mention the important applications of high voltages. **(06 Marks)**

2 a. Explain the various theories that explain break down in commercial liquid dielectrics. **(10 Marks)**

b. Explain the mechanism of electromechanical and thermal breakdown in solid dielectrics. **(10 Marks)**

3 a. Explain the scheme for cascade connection of transformer for producing very high voltages. **(10 Marks)**

b. What is a Tesla coil? How are the damped high frequency oscillations obtained from a tesla coil. **(10 Marks)**

4 a. Give the expression for ripple and regulation in voltage multiplier circuits. **(10 Marks)**

b. A ten stage Cockraft - Walton circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 10kV at a frequency of 150 Hz. If the load current is 1 mA, determine i) Voltage regulation ; ii) The ripple ; iii) The optimum number of stages for maximum o/p voltage ; iv) The maximum o/p voltage. **(10 Marks)**

PART – B

5 a. Describe the construction, principle of operation of a multistage mark impulse generator. **(10 Marks)**

b. What is trigatron gap? Explain its function and operation. **(06 Marks)**

c. A 10 stage impulse generator has 0.250 μF condenser. The wave front and wave tail resistance are 75 Ω and 2600 Ω respectively with the load capacitance 2.5 nF. Determine the wave front and wave tail time of the impulse wave. **(04 Marks)**

6 a. Explain the principle and construction of an electrostatic voltmeter for very high voltages. **(10 Marks)**

b. Explain how a sphere gap can be used to measure the peak value of voltages. What are the factors and parameters that influence such voltage measurement? **(10 Marks)**

7 a. With a neat sketch, explain the function of klydonograph. **(08 Marks)**

b. What is mixed potential divider? How it is used for impulse voltage measurement. **(08 Marks)**

c. A generating voltmeter has to be designed so that it can have a range from 20 to 200 kv dc. If the indicating meter reads a minimum current of 2 μA and maximum current of 25 μA, what should the capacitance of generating voltmeter. Assume driving motor has a syn speed of 1500 rpm. **(04 Marks)**

8 a. Discuss the method of balanced detection for locating partial discharges in electrical equipment. **(08 Marks)**

b. A Schering bridge was used to measure the capacitance and loss angle of an H.V. bushing. At balance, the observations were : the value of standard condenser = loop F, $R_3 = 3180\ \Omega$, $C_3 = 0.00125\ \mu F$ and $R_4 = 636\ \Omega$. What are the values of capacitance and tan δ of the bushing? **(04 Marks)**

c. What are the different tests are conducted on bushings, explain briefly. **(08 Marks)**

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