

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017

High Voltage Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. What are the advantages and limitations of transmitting power at high voltages? Explain briefly. (10 Marks)
- b. With a neat sketch explain the principle and working of electrostatic painting and coating. (10 Marks)
- 2 a. Derive the criterion for breakdown in electronegative gases and discuss the importance of electro-negative gases. (10 Marks)
- b. Explain the streamer theory of breakdown in air at atmospheric pressure. (10 Marks)
- 3 a. Explain the various theories that explain the breakdown in commercial liquid dielectrics. (10 Marks)
- b. Briefly explain electromechanical break down and thermal breakdown in solid insulating materials. (10 Marks)
- 4 a. Explain the schemes for cascade connection of transformers for producing very high a.c voltages. (06 Marks)
- b. What is tesla coil? How are the damped high frequency oscillations obtained from of tesla coil? (06 Marks)
- c. A Cockraft-Waltons type voltage multiplier has eight stages with capacitance all are 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) Regulation. (08 Marks)

PART – B

- 5 a. With neat sketch explain the Marx circuit arrangement for multistage impulse generator. (10 Marks)
- b. What is trigatron gap? Explain its function and operation. (06 Marks)
- c. A 12 stage impulse generator has capacitor each rated at $0.3\mu\text{F}$, 150kV. The capacitance of test specimen is 400pF. Determine the wave front and wave tail resistances to produces a $1.2/50\mu\text{F}$. (04 Marks)
- 6 a. With neat sketch explain principle, working and construction of electrostatic voltmeter. (10 Marks)
- b. Briefly explain the factors affecting measurement of voltages using sphere gap. (06 Marks)
- c. A resistance divider of 1400kV (impulse) has a high voltage arm of $16\text{k}\Omega$ and L.V arm consisting of 16 members of 250Ω , 2 watt resistors in parallel. The divider is connected to a CRO through a cable of surge impedances 75Ω and is terminated at the other end though 75Ω resistor. Calculate the exact divider ratio. (04 Marks)
- 7 a. Explain method of measurement of capacitance and $\tan \delta$ using H.V Schering bridge. (08 Marks)
- b. Explain the transformer ratio arm bridge for audio frequency range measurements. (06 Marks)
- c. Discuss the method of discharge detection using straight detectors for locating partial discharges in electrical equipment. (06 Marks)
- 8 a. What are the different power frequencies and impulse tests done on insulators? Mention the procedure for testing. (10 Marks)
- b. Explain the method of impulse testing of high voltage, Transformers. What is the procedure adopted for locating the failure? (10 Marks)

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