

--	--	--	--	--	--	--	--	--	--

**Seventh Semester B.E. Degree Examination, June/July 2016**  
**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. Explain the need for generation of high voltage in the laboratory and what are the limitations of high voltage transmission? (10 Marks)
- b. Explain Townsend's theory of gas breakdown. Derive equation for current growth and the Townsend's criteria for breakdown. (10 Marks)
- 2 a. Discuss the 'Pachen's law' and explain its significance and limitations. (10 Marks)
- b. Explain streamer mechanism of breakdown dielectric in gases and obtain the expression for smallest value of  $\alpha$  to produce streamer breakdown. (10 Marks)
- 3 a. Briefly explain the electromechanical breakdown and thermal breakdown in solid dielectrics. (10 Marks)
- b. Explain the various theories that explain breakdown in commercial liquid dielectrics. (10 Marks)
- 4 a. Explain the principle of operation of resonant transformer. With the circuits, explain series and parallel a.c. test systems. What are the advantages and disadvantages of the above? (10 Marks)
- b. A ten stage Cockraft-Waltons circuit has all capacitors of  $0.06 \mu\text{F}$ . The secondary voltage of the supply transformer is 100 KV 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 output voltage, iv) The maximum output voltage. (10 Marks)

**PART – B**

- 5 a. Explain with a neat sketch the working of a Marx multistage impulse generator. (08 Marks)
- b. What is trigatron gap? Explain its function and operation. (06 Marks)
- c. A ten stage impulse generator has  $0.250 \mu\text{F}$  condensers. The wave front and wave tail resistances are  $75 \Omega$  and  $2600 \Omega$  respectively. If the load capacitance is  $2.5 \text{ nF}$ , determine the wave front and wave tail times of the impulse wave. (06 Marks)
- 6 a. Explain principle and operation of generating voltmeter used for measuring high D.C voltages. What are the advantages and limitations of the above? (10 Marks)
- b. Explain the principle and construction of an electrostatic voltmeter for very high voltages. (10 Marks)
- 7 a. Give the schematic arrangement of an impulse potential divider with an oscilloscope connected for impulse voltage measurements. Explain the arrangements to minimize the errors. (06 Marks)
- b. Explain the high voltage schering bridge for  $\tan \delta$  and capacitance measurement of insulators or bushings. (08 Marks)
- c. Discuss the method of straight detection for locating partial discharges in electrical equipment. (06 Marks)
- 8 a. Explain in brief the different tests that are conducted on bushings. (10 Marks)
- b. With a neat sketch, explain the procedure for impulse testing of transformers. (10 Marks)

\* \* \* \* \*