USN | | | | | | | | | | |

10EE73

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 0.05μF. The supply transformer secondary voltge 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 0.3μF, 150kV. The capacitance of test specimen is 400pF. Determine the wave front and wave tail resistances to produces a 1.2/50μF. **(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 16kΩ 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 δ 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)**

* * * * *