Unit III

5. (a) Describe the construction of a uniform field spark gap and discuss its advantages and disavantages for high voltage measurements. **8**

(b) Determine the breakdown voltage for air gaps of 2 mm and 15 mm lengths under uniform field and standard atmospheric conditions. Also, determine the voltage if the atmospheric pressure is 750 mm Hg and temperature 35ºC. **7**

6. (a) Explain briefly various tests to be carried out on a bushing. **8**

(b) Describe various tests to be carried out on a circuit breaker. **7**

Unit IV

7. (a) Derive an expression for charge potential relation for multiconductor lines. **8**

(b) Describe the phenomenon of corona. Discuss the factors affecting corona. **7**

CC-45

M. Tech. EXAMINATION, May 2017

(Third Semester)

(Re-appear Only)

EE(PS)

MPS-631-B

HIGH VOLTAGE ENGG.

Time : 3 *Hours*]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) State and explain Paschen's law. How do you account for the minimum voltage for breakdown under given Pd conditions ? **8**

(b) Explain the mechanism of development of anode and cathode streamers and explain how these lead to breakdown. **7**

2. (a) Derive an expression for critical electrical field and show that the field is independent of the critical temperature of the dielectric. State the assumptions made. **8**

(b) What is Electroconvection ? Explain liquid breakdown based on electroconvection. **7**

Unit II

3. (a) Explain working principle of Cockroft-Walton voltage multiplier circuit. Explain clearly its operation when the circuit is unloaded and loaded. **8**

(b) A 100kVA, 250V/200kV feed transformer has resistance and reactance of 1% and 5% respectively. This transformer is used to test a cable at 400 kV at 50Hz. The cable takes a charging current of 0.5 A at 400 kV. Determine the series inductance required. Assume 1% resistance of the inductor. Also determine input voltage to the transformer. Neglect dielectric loss of the cable. **7**

4. (a) Draw a neat exact equivalent circuit of an impulse generator. Indicate the significance of each parameter being used. **7**

(b) Explain the goodlet circuit of impulse voltage generation and compare its performance with that of Marx's circuit. **8**

8. (a) What is tower footing resistance ? What are the methods to reduce this resistance ? Why is it required to have this resistance as low as economically feasible ? **8**

(b) Explain the principle of operation of Ferranti surge absorber. **7**