BIEE-018

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00293

June, 2018

BIEE-018 : HIGH VOLTAGE ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

*Note : Attempt any **seven** questions in all. Use of scientific calculator is allowed. Assume any suitable data, if missing.*

1. Explain how switching and power frequency over-voltages are controlled in power systems.   *10*

2. Describe the construction and principle of operation of an electrostatic voltmeter and give its applications.   *10*

3. List out the problems caused by corona discharges.   *10*

4. Design a peak reading voltmeter along with a suitable micro-ammeter, such that it will be able to read voltage up to 100 kV (peak). The capacitance potential divider available is of the ratio 1000 : 1.   *10*

5. Explain any *four* of the following : $4 \times 2\frac{1}{2} = 10$

    (a)   Withstand voltage

    (b)   Impulse voltage

    (c)   Creepage distance

    (d)   Partial discharge

    (e)   Intrinsic length

    (f)   BIL

6. Discuss and compare the performance of resistance capacitance and mixed R-C potential dividers for the measurement of impulse voltages.   *10*

7. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages.   *10*

8. Describe a method of recording the occurrence of lightning in an overhead transmission line.   *10*

9. Explain thermal breakdown mechanism in solid dielectrics. Derive an expression for critical thermal breakdown voltage (V_c) and critical electric field (E_c) for the same. State clearly the assumptions made.   *10*

10. Detail the various methods used to measure the RMS and peak values of high AC voltages, with the help of a neat sketch.   *10*