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

Term-End Examination

June, 2017

00997

BIEE-018 : HIGH VOLTAGE ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

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

1. Explain the different schemes for cascade connection of transformers for producing very high AC voltage.   *10*

2. Discuss the different methods of measuring high DC voltage. What are the limitations in each method ?   *10*

3. Design a peak reading voltmeter along with a suitable microammeter, 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*

4. Explain the phenomenon of electrical conduction in liquids. How does it differ from that in gases ?   *10*

5. What is "Thermal breakdown" in solid dielectrics ? How is it practically more significant than other mechanisms ? *10*

6. Explain the following terms : $4 \times 2\frac{1}{2}=10$

   (a) Withstand voltage

   (b) Flashover voltage

   (c) Hall effect

   (d) Surge voltage

7. In an experiment in a certain gas, it was found that the steady state current is $5 \cdot 5 \times 10^{-8}$ A at 8 kV at a distance of 0·4 cm between the plane electrodes. Keeping the field constant and reducing the distance to 0·1 cm results in a current of $5 \cdot 5 \times 10^{-9}$ A. Calculate Townsend's primary ionization coefficient α. *10*

8. Why are capacitance voltage dividers preferred for high AC voltage measurements ? *10*

9. Describe with a neat sketch, the working of a Van de Graaff generator. What are the factors that limit the maximum voltage obtained ? *10*

10. What is capacitance voltage transformer ? Explain with a phasor diagram how a tuned capacitance voltage transformer can be used for voltage measurement in power systems. *10*