

EE6701 HIGHVOLTAGE ENGINEERING QUESTION BANK

Unit III Generation of High Voltages and High Currents

1. What are the different forms of high voltages?
 - High DC voltages
 - High ac voltages of power frequency
 - High ac voltages of high frequency
 - High transient or impulse voltage of very short duration
 - Transient voltages of longer duration such as switching surges.
2. What are the applications of high voltages?
 - Electron microscopes and x-ray units in the order of 100KV or more.
 - Electrostatic precipitators
 - Testing purposes to simulate over voltages due to lightning and switching.
3. Name the methods used to generate High voltage DC.
 - Half and full wave rectifier
 - Voltage doubler circuit
 - Voltage multiplier circuit
 - Van de Graff generator
4. Write the equation for optimum number of stages in Cockcroft Walton Voltage multiplier circuit.

$$n_{um}^{optim} = \sqrt{\frac{V_{max} f C}{I}}$$

5. Write the basic principle of Electrostatic machines.

In electrostatic machines, current carrying conductors are moved in a magnetic field, so that the mechanical energy is converted into electrical energy.

6. What are the advantages of Van de graff generator?
 - Very high DC voltage
 - Ripple free output
 - Precision and flexible of control
7. What are the limitations of Van de graff generator?
 - Low current output.
 - Limitations on belt velocity due to vibration.
 - It is difficult to have an accurate grading of electric fields

8. What are the methods to generate High alternating voltages?
 - Cascaded Transformers
 - Resonant Transformers
9. What are the advantages of using cascade transformer with isolating transformer?
 - Natural cooling is sufficient.
 - Transformer are compact in size
 - Constructional is identical
 - Three phase connection in star or delta is possible
10. What are the advantages of resonant transformers?
 - It gives an output of pure sine wave.
 - Power requirement is less.
 - No high power arcing and heavy current surges occur.
 - Cascading is also possible for very high voltages.
 - Simple and compact test arrangement.
11. What are the advantages of High frequency ac transformers?
 - The absence of iron core in transformers and hence saving in cost and size.
 - Pure sine wave output.
 - Slow build up of voltage over a few cycles and hence no damage due to switching surge.
12. Define the standard impulse wave : $1.2/50\mu\text{s}$
13. Define front time.

It is the time required for the response to raise from 10% to 90% or 0 to 100% of the final value at the very first instant.
14. What is peak value?

The maximum positive deviation of the output with respect to its desired value is known as peak value.
15. What are the components of multi-stage impulse generator?
 - DC charging set
 - Charging resistor
 - Generator capacitor or spark gap
 - Wave shaping resistors and capacitors
 - Triggerring system
 - Voltage dividers
 - Gas insulated impulse generators