

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID :120666

Roll No.

**B. TECH.**

**Theory Examination (Semester-VI) 2015-16**

**HIGH VOLTAGE ENGINEERING**

*Time : 3 Hours*

*Max. Marks : 100*

**Section-A**

**Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)**

- (a) What is voltage surge? Draw the labelled diagram typical lightning voltage surge.
- (b) What is Back Flashover ?
- (c) What are the effects of switching surges on power system ?
- (d) Define “Creepage distance” in insulator.

- (e) Define uniform and non-uniform fields and give example for each.
- (f) What are electro negative gasses?
- (g) What is lattices diagram ?
- (h) What is the condition for using a generator volt meter to measure power frequency high voltage ?
- (i) What are the different type of shunts used for impulse voltage measurement ?
- (j) Compare the measurement of very high voltage using potential dividers and standard sphere gaps.

**Section-B**

**Q2. Attempt any five parts from this section. (5×10=50)**

- (a) Starting from the basic 'MARX' circuit, develop the circuit of a modern multistage impulse generator and explain its operation. Discuss the significance of various parameters.
- (b) Derive the condition for breakdown in gases.

- (c) Differentiate switching surge and lightning surges. How is switching surge generated in the laboratory? Discuss.
- (d) An impulse generator has eight stages with each condenser rated for  $0.16 \mu\text{f}$  and  $125 \text{ kv}$ . The load capacitor available is  $100 \text{ PF}$ . Find the series resistance and the damping resistance needed to produce  $1.2/50 \mu\text{s}$  impulse wave. What is the maximum output voltage of the generator, if the charging voltage is  $120 \text{ kv}$ ?
- (e) Draw the cross-sectional view of a non-linear resistor lightning arrester and explain its operation in detail including its V-I characteristics.
- (f) What are various controlling method of power frequency and switching over voltages ? Discuss in brief.
- (g) What are the requirements of a oscillograph for impulse and high frequency measurements in high voltage test circuits ?
- (h) A 12 stage impulse generator has  $0.126 \mu\text{f}$  capacitors. The wavfront and wavetail resistances connected are  $800\Omega$  and  $5000\Omega$  respectively.

## Section-C

**Attempt any two questions from this section. (15×2=30)**

Q3. Discuss the types of tests performed on insulators and bushings.

Q4. Explain the mechanisms of breakdown in vacuum.

Q5. (a) Why is grounding very important in high voltage laboratory ?

(b) Explain the importance of RIV measurements for EHV power apparatus.

