



Register Number:.....

**B.E. DEGREE EXAMINATIONS: MAY 2015**

(Regulation 2009)

Fifth Semester

**ELECTRICAL AND ELECTRONICS ENGINEERING**

EEE110: High Voltage Engineering

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

- The tower footing resistance to limit the over voltages developed on ground wires due to lightning strokes should be below
  - 2500Ohm
  - 25 Ohm
  - 250 Ohm
  - 2 Ohm
- Which material is used in surge arresters for EHV and UHV systems?
  - Aluminium oxide
  - Metal oxides
  - Zinc oxide
  - Carbon dioxide
- SF<sub>6</sub> has the following property which is not favourable for use in electrical apparatus
  - High dielectric strength
  - It is not environmentally friendly and causes global warming
  - High arc quenching ability
  - None of the above
- Breakdown is permanent in
  - Gases
  - Liquids
  - Solids
  - In all the three
- Tesla coil is used for
  - Generation of sinusoidal output voltages
  - Generation of rectangular voltages
  - Generation of very high voltages
  - Generation of high frequency a.c. voltages
- In testing with a resonant transformer, the output voltage is
  - Rectangular wave
  - Trapezoidal wave
  - Pure sine wave
  - Triangular wave
- Rogowski coils and high frequency current transformers have bandwidth of about



- ii) A 3 phase single circuit transmission line is 400km long. If the line is rated for 110kV and has the parameters,  $R=0.2$  ohms/km,  $L=1.32$  mH/km,  $C=0.006$   $\mu\text{F}/\text{km}$ , find the surge impedance of the line. Neglect the susceptance of the line. (2)

22. a) i) Discuss the various mechanisms of vacuum breakdown. (9)  
ii) Derive the criterion for breakdown in electronegative gases. (5)

(OR)

- b) i) Derive Townsend's current growth equation at initial stage and as well as during secondary processes. (9)  
ii) Schematically represent the liquid purification system with test cell. (5)

23. a) i) Schematically discuss about cascade transformer connection adopted in producing high alternating voltages. (8)  
ii) A four stage Cockcroft-Walton type cascade circuit with capacitances all equal to  $0.05\mu\text{F}$  is fed from secondary voltage of 200 kV from the supply transformer. If 2mA of current is to be supplied to the load by this circuit then determine the percentage of ripple, voltage drop, regulation if the supply frequency is 50 Hz. (6)

(OR)

- b) i) Explain the construction and working of Van de Graff generator. (8)  
ii) A 8 stage impulse generator has  $0.132 \mu\text{F}$  capacitors. The wave front and the wave tail resistances connected are 600 ohms and 5000 ohms respectively. If the load capacitor is 500 pF, find the front and tail times of the impulse wave produced. (6)

24. a) i) Brief about principle and construction of an electrostatic voltmeter for very high voltages. List out its relative merits and demerits for high voltage ac measurements. (9)  
ii) What are the conditions to be satisfied by a potential divider to be used for impulse work? (5)

(OR)

- b) i) Explain the different methods of high current measurements with their relative merits and demerits. (9)  
ii) Explain the principle and construction of capacitance voltage transformer for measuring high ac voltages. (5)

25. a) i) Explain the various high voltage tests to be carried out on surge arresters. (10)  
ii) Mention different tests performed on cables. (4)

(OR)

- b) i) Explain the terms: withstand voltage, flashover voltage, 50% flashover voltage, wet and dry power frequency tests as referred to high voltage testing. (8)  
ii) Explain partial discharge measurement and mention different tests performed on transformers (6)

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