ONE TIME EXIT SCHEME

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10EE73

Seventh Semester B.E. Degree Examination, April 2018
High Voltage Engineering

Time: 3 hrs.

Max. Marks:100

**Note: *Answer any FIVE full questions, selecting
atleast TWO questions from each part.***

PART – A

1 a. Explain the effect of high voltage used in transmission on :
   i) Volume of conductor required
   ii) Line efficiency
   iii) Line voltage drop. **(07 Marks)**
  b. Discuss the need of generating high voltage in the laboratory. **(06 Marks)**
  c. Mention the important applications of high voltage. **(07 Marks)**

2 a. Derive an expression for the growth of current in a gaseous dielectric under uniform filed condition assuming Townsed's first and second ionization co-efficient. **(08 Marks)**
  b. A steady current of $600\mu A$ flows through the plane eletcrodes separated by a distance of 0.5cm when a voltage of 10 KV is applied. Determine town sends first ionization co-efficient if a current of $60\mu A$ flows when the distance of separation is reduced to 0.1cm and the field is kept constant at the previous value. **(06 Marks)**
  c. Explain the suspended particle theory of breakdown in liquid. **(06 Marks)**

3 a. The following observation were made in an experiment for determination of dielectric strength of transformer oil. Determine the power law equation : **(06 Marks)**

Gap spacing	4	6	8	10
Bd. Voltage (KV)	88	135	165	212

  b. How does the 'Internal discharge' phenomena leads to breakdown in solid dielectric? **(07 Marks)**
  c. Explain electro thermal break down of solid dielectric. **(07 Marks)**

4 a. With the help of a neat sketch, explain how cascade transformer generate high AC voltages. **(06 Marks)**
  b. Describe with neat sketch the working of Cockcroft – Wotton voltage multiplier circuit. **(08 Marks)**
  c. Derive expressions for ripple in cascaded voltage multiplier circuits. **(06 Marks)**

PART – B

5 a. With the help of the neat diagram explain how lighting impulse voltage can be developed in the laboratory by marx circuit. **(08 Marks)**
  b. A 12 – stage impulse generator has $0.126~\mu F$ capacitors. The wave – fornt and wave –tail resistance connected are 800 ohms and 5000 ohms respectively. If the load capacitor is 1000 pF, find the fornt and tail times of the impulse wave produced. **(06 Marks)**
  c. Explain with a neat circuit diagram, the tripping of an impulse generator with a three electrode gap method. **(06 Marks)**

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6 a. Explain the principle and construction of an electrostatic voltmeter for the measurement of high voltages. **(08 Marks)**

b. Explain the working principle of series capacitor peak voltmeter based on Chubb – Frotscue method. **(06 Marks)**

c. A generating voltmeter has to be designed so that it can have a range from 20 to 200 KV DC, if indicating meter reads a minimum current of $2\mu A$ and maximum current of $25\mu A$, what should the capacitance of the generating voltmeter be? **(06 Marks)**

7 a. With the help of a diagram of Schering bridge explain how capacitance and tan δ can be measured. **(05 Marks)**

b. What is meant by partial discharge? Explain how it is measured using straight method and balance method. **(10 Marks)**

c. Discuss the factors affecting the discharge detection. **(05 Marks)**

8 Write a short note on :
a. Testing of circuit broker and isolators
b. Factors influencing the spark over voltages of sphere gaps
c. Trigatron gap
d. Paschen's law. **(20 Marks)**

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