Total No. of Questions :8]

SEAT No. :

P3195

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B.E. (Electrical)

HIGH VOLTAGE ENGINEERING

(2012 Course) (Semester - II) (End Semester) (Elective - III) (403149)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Draw neat labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain Streamer mechanism of breakdown in gases with suitable diagram. **[6]**

b) Compare treeing and tracking phenomenon in solid dielectrics. **[7]**

c) Explain in detail Statistical method of insulation Coordination. **[7]**

OR

Q2) a) Describe breakdown in non-uniform fields and corona discharge. Explain concept of positive corona and negative corona. **[7]**

b) A solid dielectric material with dielectric constant of 5.2 has void of thickness 2mm. The dielectric material thickness is 9mm and voltage applied across it is 80kV (rms). If void is filled with air and has dielectric strength of 30kV/cm (peak). Find the voltage at which internal discharge can occur. **[7]**

c) With neat diagram explain mechanism of Lightning. **[6]**

Q3) a) Explain Tesla coil with neat diagram. Give its applications, advantages and disadvantages. **[9]**

b) Explain the Trigatron method of tripping control used in Impulse generators with suitable diagrams. **[9]**

OR

Q4) a) Explain the necessity of cascading of Transformer. Draw a 3 stage cascade transformer and mark its voltages at various levels. Also give its advantages and disadvantages. **[9]**

b) Define and draw an impulse current wave. Explain with suitable diagram Impulse Current Generator. Also give the function of different parts of an impulse current generator. **[9]**

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Q5) a) Describe the generating voltmeter used for measuring high dc voltages. How does it compare with a potential divider for measuring high dc voltages? **[8]**

b) An impulse generator has 8 stages with condenser rated for 0.16 μF and 125kV. The load capacitor available is 1000 pF. Find the series resistance and damping resistance needed to produce 1.2/50 μsec impulse wave. What is the maximum output voltage of generator, if the charging voltage is 120kV? **[8]**

OR

Q6) a) Give the basic circuit for measuring the peak voltage of (i) ac voltage and (ii) impulse voltage. What is the difference in measurement technique in the above two cases? **[8]**

b) Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters and factors that influence such voltage measurement? **[8]**

Q7) a) Why is grounding very important in an HV laboratory? Describe a typical grounding system used. **[8]**

b) What are the different power frequency tests done on insulators? Mention the procedure for testing. **[8]**

OR

Q8) a) Explain the following terms as referred to high voltage testing: **[8]**

i) withstand voltage

ii) flashover voltage

iii) 50% flashover voltage

iv) wet and dry power frequency tests

b) Classify the different High voltage laboratories and give salient features of each of them. **[8]**

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