

Code No: R41022

**R10****Set No. 1**

IV B.Tech I Semester Supplementary Examinations, October/November - 2017

**HIGH VOLTAGE ENGINEERING**

(Electrical and Electronics Engineering)

**Time: 3 hours****Max. Marks: 75**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) What is a surge voltage? What is the difference between a power frequency voltage and a surge voltage? What are the various sources that produce surge voltages? [7]  
b) Discuss briefly the Charge Simulation Method for solving the field problems and estimating the potential distribution. [8]
- 2 a) State Pachen's law and explain Pachen's curve. Derive an expression for minimum 'pd' value of Pachen's curve from first principles. [9]  
b) Explain suspended particle theory in commercial liquids. [6]
- 3 a) Explain the phenomena of thermal breakdown in solid dielectrics. [7]  
b) Discuss the applications of various solid insulating materials used in cables and capacitors. [8]
- 4 a) Draw a typical impulse current generator circuit and explain its operation and application. [8]  
b) Determine ripple voltage and regulation of a 10 stage Cockroft-Walton type DC voltage multiplier circuit having stage capacitance =  $0.01 \mu\text{F}$ , supply voltage = 100 kV at a frequency of 400 Hz and a load Current = 10 mA. [7]
- 5 a) What is a mixed potential divider? How is it used for impulse voltage measurements? [8]  
b) What are the requirements of a sphere gap for measurement of high voltages? Discuss the advantages of sphere gap for measurements. [7]
- 6 a) Explain how the volume resistivity of a solid dielectric is determined. [7]  
b) Explain the high voltage Schering Bridge for measurement of the  $\tan \delta$  and capacitance of high voltage equipment. [8]
- 7 a) Explain, with a schematic diagram, one method of measuring RIV of transmission line hardware. [7]  
b) Explain the method of impulse testing of high voltage transformers. What is the procedure adopted for locating the failure? [8]
- 8 Discuss the applications of the following in high voltage engineering:  
(i) Electro static coating (ii) Electro Static separator [15]