Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech**
FEEE6402

7th Semester Regular / Back Examination 2016-17
HIGH VOLTAGE ENGINEERING
BRANCH: EE
Time: 3 Hours
Max Marks: 70
Q.CODE: Y138

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Define Paschen's law in gaseous dielectrics break down.
b) What are the physical conditions governing ionization mechanism in gaseous dielectrics?
c) Explain why electronegative gas has high break down value.
d) What are the parameters that alter the breakdown strength of liquid dielectrics?
e) What are the factors that depends the break down value of pure liquids?
f) What are the characteristics of good solid dielectrics?
g) What are the factors influencing the spark over voltage of a sphere gap?
h) What are the various high voltage tests done on brushings?
i) What is the necessity for measurement of RIV?
j) What are the various high voltage tests done on insulators?

Q2 **a)** Explain the various theories of breakdown mechanism of commercial liquid dielectrics. **(5)**
b) Explain the various breakdown mechanisms involving in solid dielectric breakdown. **(5)**

Q3 State the criteria for sparking potential and hence the relation between sparking potential and (PD) values (Paschen's law). Discuss the nature of variations of sparking potentials with PD values. **(10)**

Q4 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 measurements? **(10)**

Q5 **a)** With a neat sketch explain the principle of operation of an electrostatic voltmeter for HVAC measurement. What are the merits and demerits? **(5)**

b) What is CVT? Explain through phasor diagram how a tuned CVT can be used for HVACmeasurement in substations & also explain series capacitor peak voltmeter. **(5)**

Q6 **a)** Derive the expression for ripple and voltage regulation in voltage multiplier Circuits. How are the ripple and regulation minimized? **(5)**

b) A Cockcroft –Walton type voltage multiplier has eight stages with capacitances equal to 0.05μF.The supply transformer secondary voltage is 125kV at a frequency of 150Hz. If the load current to be supplied is 5mA, find **(5)**

(i) the percentage ripple

(ii) the regulation and

(iii) the optimum number of stages for minimum regulation of Voltage drop.

Q7 **a)** With a neat sketch explain the impulse testing on the power transformer. **(5)**

b) What is meant by insulation coordination? How are the protective devices chosen for Optimal insulation level in a power system? **(5)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Breakdown mechanism in gases

b) Ground wires for protection of overhead lines

c) Tesla Coil equivalent circuit for generation of high frequency A.C high voltage.

d) Wet and dry power frequency tests as referred to HV testing