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Total Number of Pages: 02

B.TECH  
FEEE6402

7<sup>th</sup> Semester Regular / Back Examination – 2017-18  
HIGH VOLTAGE ENGINEERING  
BRANCH(S): ELECTRICAL  
Time: 3 Hours  
Max Marks: 70  
Q.CODE: B144

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) Mention the various insulation levels in a substation.?
  - b) Mention the gases used as the insulating medium in electrical apparatus?
  - c) Mention the different mechanisms for the breakdown in vacuum.
  - d) Why is the cable meant for a.c system to be tested with dc supply?
  - e) Which insulation is used in high voltage circuit breakers of large power rating?
  - f) What are the techniques to be adopted for controlling the switching over voltages?
  - g) What are the atmosphere correction factor and mention their influence in high voltage testing.
  - h) State the factors influence the lightning induced voltages on transmission lines.
  - i) How is lossy dielectric represented? Draw its phasor diagram.
  - j) List the factors that are influencing the peak voltage measurement using sphere gap.
- Q2** a) Describe about various types of shunt protected devices used for overhead lines against lightning stroke (5)  
b) Explain the Townsends criterion for a spark. (5)
- Q3** a) Explain why transmitting of power at high voltage is economical? (5)  
b) What are the atmosphere correction factor and mention their influence in high voltage testing. (5)
- Q4** Explain the different aspects of insulation design and insulation co-ordination adopted for EHV systems. (10)
- Q5** a) A ten stage Cockraft-Walton circuit has all capacitors of  $0.04 \mu\text{F}$ . The secondary voltage of the supply transformer is 120 kV at a frequency of 150 Hz. If the load current is 1.2 mA, determine (i) voltage regulation (ii) the ripple (iii) the optimum number of stages for maximum output voltage (iv) the maximum output voltage. (7)

b) What are the different tests conducted on insulators? (3)

Q6 a) What are the significances of power factor tests? (5)

b) Discuss the method of balanced detection for locating partial discharges in electrical equipment. (5)

Q7 a) Explain breakdown mechanism on vacuum dielectric. (5)

b) A generating voltmeter has to be designed so that it can have a range from 20 to 200 kV DC. If the indicating meter reads a minimum current of  $2\mu\text{A}$  and maximum current of  $25\mu\text{A}$ , what should the capacitance of generating voltmeter. Assume driving motor has a syn. speed of 1500 rpm (5)

Q8 Write short notes on any two (5 x 2)

a) Paschen's Law

b) Corona Discharges

c) Surge Arresters

d) Tesla coil