

2008

2008 PUNJAB TECHNICAL UNIVERSITY
B.E ELECTRICAL AND ELECTRONICS ENGINEERING
HIGH VOLTAGE PAPER

TIME: 3 HOUR
MARK: 1000

PART-A [10*2=20]

1. What are the techniques used to be adopted for controlling the switching overvoltages?
2. What is surge arrester?
3. State Paschen's law.
4. What are the different theories related with liquid dielectric breakdown?
5. How is the wave front and wave tail times controlled in impulse generator circuits?
6. What is tesla coil?
7. Why are the capacitive voltage divider preferred for high a.c. voltages measurement?
8. Calculate the correction factor for atmospheric conditions, if the laboratory temperature is 37 degree C, the atmospheric pressure is 750 mm Hg and wet bulb temperature is 27 degree C.
9. What is meant by insulation coordination?
10. What is the significance of impulse tests?

PART-B [5*16=80]

11

(a)(i) Derive the mathematical model for lightning discharges and explain them

(ii) Explain the causes for power frequency over voltage in power systems

(or)

(b) Explain the different methods employed for lightning protection of overhead lines.

12.

(a)(i) What are the factors that influence conduction in pure liquid dielectric and in commercial liquid dielectrics?

(ii) Discuss the various mechanisms of vacuum breakdown

(or)

(b)(i) Describe the mechanism of short term breakdown of composite insulation

(ii) Discuss the current growth phenomenon in a gas subjected to uniform and non-uniform electric fields.

13.

(a) Calculate the peak current and wave shape of the output current of the following generator. Total capacitance of the generator is 53 micro Farad. The charging voltage is 240 kv. The circuit inductance is 1.54 mH and the dynamic resistance of the test object is 0.05 ohms.

(or)

(b)(i) Describe with neat sketch, the working of Van de Graaff generator. what are the factors that limiting the maximum voltage obtained?

(ii) What is the principle of operation of resonant transformer? How is it advantageous over the cascade connected transformers?

14.

(a)(i) A coaxial shunt is to be designed to measure an impulse current of 50 kA. If the bandwidth of shunt is to be at least 10 MHz and if the voltage drop across the shunt should not exceed 50V find the ohmic value of the shunt and its dimensions.

(ii) What are the different types of resistive shunt used for impulse current measurements? Discuss their characteristic and limitations.

(or)

(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?

15.

(a)(i) How are the protective devices chosen for the optimal insulation level in a power system?

(ii) Explain the following terms:

1. with stand voltage

2. flashover voltage

3. 50% flash over voltage.

(or)

(b) Explain the impulse testing procedure for insulation.