Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 42507

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Sixth Semester

Electrical and Electronics Engineering

EE 2353 – HIGH VOLTAGE ENGINEERING

(Regulations 2008)

(Common to PTEE 2353 – High Voltage Engineering for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulations 2009)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. State the sources which determine the wave shape of switching surges.
2. Write down the causes of power frequency and its harmonic over voltages.
3. What is Town-sends condition for Breakdown ?
4. Define statistical time lag and formative time lag.
5. What is the need for HVDC generation ?
6. What is a 'Trigatron gap' ? What are its function ?
7. What is the principle behind the operation of generating voltmeter ?
8. Calculate the correction factors for atmospheric conditions, if the laboratory temperature is 37°C, the atmospheric pressure is 750 mmHg and the wet bulb temperature is 27°C.
9. Distinguish between flash over and puncture.
10. Define safety margin as applied to insulation co-ordination.

PART – B **(5×16=80 Marks)**

11. a) i) What are the mechanisms by which lightning strokes develop and induce over voltages on over head power lines ? **(8)**

ii) Write short notes on ground rods as protective devices. **(8)**

(OR)

b) What are the causes for switching and power frequency over voltages ? How are they controlled in power systems ? **(16)**

12. a) A certain dielectric can be considered to be represented by the equivalent circuit shown in figure 12 (a). What is the maximum voltage that can be applied across the dielectric, if partial discharges in air to be avoided ? State any assumptions made. **(16)**

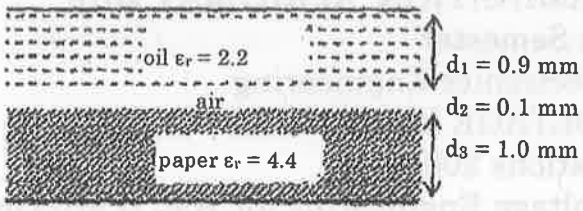

Figure. 12(a)

(OR)

b) From the fundamental principles, derive Townsend's criteria for the breakdown of gaseous dielectric medium. **(16)**

13. a) Describe, with a neat diagram, the working principle of the following high voltage producing apparatus : **(10+6)**

i) Van de Graaff generator

ii) Resonant transformer.

(OR)

b) i) An impulse generator has eight stages with each condenser rated for 0.16 μF and 125 kV. The load capacitor available is 1000 pF. Find the series resistance and the damping resistance needed to produce 1.2/50 μs impulse wave. What is the maximum output voltage of the generator, if the charging voltage is 120 kV ? **(12)**

ii) What are the essential parts of an impulse current generator ? **(4)**

14. a) Explain in detail the various techniques for the measurement of High DC voltages. **(16)**

(OR)

b) With neat sketch explain in detail the various methods used to measure the RMS and peak values of High AC voltages. **(16)**

15. a) i) Discuss with a circuit arrangements, the detailed procedure for conducting impulse voltage testing of HV power transformer. **(8)**

ii) Explain the procedure adopted for detection and location of fault during impulse voltage testing. **(8)**

(OR)

b) Explain the different aspects of insulation design and insulation coordination adopted for EHV systems. **(16)**