Question Paper Code	11903

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Sixth Semester

Electrical and Electronics Engineering

20EEEL602 - HIGH VOLTAGE ENGINEERING

(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

Marks, K-Level, CO

1. Define isokeraunic level or thunderstorm days. — *2,K1,CO1*
2. Compare direct stroke and Indirect stroke. — *2,K2,CO1*
3. Compare statistical time lag with formative time lag. — *2,K2,CO2*
4. Define composite dielectric. — *2,K1,CO2*
5. Define tesla coil. — *2,K1,CO3*
6. Define deltatron circuit. — *2,K1,CO3*
7. List the advantages of using Faraday's generator. — *2,K1,CO4*
8. List the methods to measure DC voltages. — *2,K1,CO4*
9. Differentiate flashover and puncture. — *2,K2,CO5*
10. Define 50% flashover voltage. — *2,K1,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11. a) Outline the causes for switching surge and power frequency over voltages? Explain various methods of protecting the power system against it. — *13,K2,CO1*

OR

  b) (i) Explain in detail about Bewley's Lattice diagram. — *6,K2,CO1*

  (ii) A long transmission line is energized by a unit step voltage 1.0 V at sending end and is open circuited at receiving end. Infer the bewley lattice diagram and obtain the value of voltage at receiving end after a long time. Assume attenuation factor =0.8 — *7,K2,CO1*

12. a) Explain the streamer theory of breakdown in gases. — *13,K2,CO2*

OR

  b) Explain the various theories that are associated with breakdown in solid dielectrics. — *13,K2,CO2*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **11903**

13. a) Explain any one method of impulse voltage generation.   13,K2,CO3

OR

b) Explain Cockcroft Walton voltage multiplier circuit and derive the   13,K2,CO3
expression for optimum number of stages.

14. a) With a neat sketch explain the principle of operation of electrostatic   13,K2,CO4
voltmeter for HVAC measurement.

OR

b) With a neat sketch explain the sphere gap measurement for peak   13,K2,CO4
voltage measurement.

15. a) Explain the methods of testing circuit breakers.   13,K2,CO5

OR

b) Explain various methods of testing insulators.   13,K2,CO5

PART - C (1 × 15 = 15 Marks)

16. a) (i) An impulse generator has 10 stages with capacitors rated 0.15 µF   8,K2,CO3
and 150 KV per stage. The load capacitor is 1000 pF. Find the front
and tail resistances to produce an impulse of 1.2/50 µs.

(ii) Explain rogowski coil methods for measurement of high impulse   7,K2,CO4
current.

OR

b) (i) A Cockcroft Walton voltage multiplier has eight stages with   9,K2,CO3
capacitance equal to 0.05 micro farad. The supply transformer
secondary voltage is 125 kv at a frequency of 150 HZ. If the load
current is 5mA. Calculate (a) percentage ripple (b) regulation
(c) optimum no. of stage for minimum regulation of voltage drop.

(ii) A Rogowski coil is to be designed to measure the impulse current   6,K2,CO4
of 10 KA having a rate of change of current of 10^{11} A/sec .The current
is read by a TVM as a potential drop across the integrating circuit
connected to the secondary. Find the value of mutual inductance,
resistance and capacitance to be connected, if the meter reading is to be
10V for full scale deflection.