KUMARAGURU
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Register Number: …….

B.E DEGREE EXAMINATIONS: APRIL/ MAY 2016

(Regulation 2013)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U13EETE44**:** High Voltage Engineering

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Over head Transmission lines are protected from lightning over voltages by
   a) Counter poise wires
   b) Protector tubes
   c) ground or shield wires above the main conductors
   d) Resistance
2. The maximum voltage gradient at the ground level due to a charged cloud before lightning strikes, can be as high as …….
3. The Paschen's law for breakdown in gases is given by
   a) f(v/pd) = 1
   b) f(v/pd) = -1
   c) V = f(pd)
   d) V = -f(pd)
4. An example for simple pure liquid is……
5. A Van De Graff generator has a belt speed of 2.5 m/s. charge density of 10 μc/m^2 and a beltwidth 2m. The maximum charging current is
   a) 50 μA
   b) 5 μA
   c) 2 μA
   d) 12.5 μA
6. The impulse ratio for any particular object ……
7. Non destructive testing methods require measurement of
   a) Dielectric strength
   b) Insulation resistance
   c) tanδ
   d) b and c
8. Hall generators are normally used to measure ……..
9. The distance between two metal fittings on the insulator is known as
   a) Loss tangent
   b) protect gap
   c) sphere gap
   d) creepage distance
10. In high current impulse testing of surge diverters, the duration of the current pulse 't' is given by ……

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. What is meant by Isokeraunic level?
12. What are the characteristics of switching surges?
13. What is meant by ionization by collision?
14. How is Intrinsic strength of solid dielectric defined?
15. What is Deltatron circuit?
16. What are the specifications of a standard impulse wave?
17. What are the methods used for measuring high frequency and impulse currents?
18. Enumerate the techniques available for measurement of high dc voltages.
19. Define disruptive discharge voltage.
20. List the tests carried out on surge diverters.

PART C (5 x 14 = 70 Marks)

(Answer not more than 400 words)

Q.No. 21 is Compulsory

21. What are the different methods employed for lightning protection of over head lines? Discuss in detail.

22. (a) Explain clearly the different mechanisms involved in Vacuum break down. (8)
Define Townsend's fist and secondary ionization coefficients and the criteria for breakdown. (6)

(OR)

(b) Explain in detail the properties of composite dielectrics and the mechanisms of breakdown in the same.

23. (a) (i) Discuss the principle of operation of a Van De Graff generator with neat sketches. (10)
(ii) Explain the operation of a simple voltage doubler circuit. (4)

(OR)

(b) (i) A ten stage Cockcroft-Walton circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1 mA, determine (i)voltage regulation (ii) the ripple (iii) the optimum number of stages for maximum output voltage (iv)the maximum output voltage (7)
(ii) Explain the Marx circuit arrangement and its components for multistage impulse generators. (7)

24. (a) Explain in detail about the sphere gap for measurement of high voltages complete with factors influencing the spark over voltage with neat sketches.

(OR)

(b) Write any two methods of measurement of high frequency and impulse currents.

25. (a) Explain the method of impulse testing of high voltage transformers. What is the procedure for detecting and locating the fault?

(OR)

(b) (i) What are the different power frequency and impulse tests conducted on insulators? (6)

(ii) Explain the short circuit tests conducted on circuit breakers with necessary schematic diagrams. (8)

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