Register Number: ……..

B.E DEGREE EXAMINATIONS: JUNE/JULY 2013

Fifth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE 110: High Voltage Engineering

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The peak value of _____ currents are of the order 10 to 100 kA
   a) Open/closing of circuit breaker
   b) Lightening Stroke
   c) Interruption of Fault Current
   d) Series Capacitance inserted in transmission for compensation.
2. 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
3. Long term deterioration and breakdown occurs in solid dielectrics due to
   a) Thermal phenomenon
   b) surface discharges
   c) Internal Discharges
   d) treeing phenomenon
4. The parameters that affect the breakdown strength of liquids is
   a) Hydrostatic pressure and temperature
   b) dissolved impurities
   c) dielectric constants
   d) Pressure, temperature, dissolved impurities and suspended particles.
5. High impulse voltage required for
   a) x ray units
   b) Electrostatic precipitators
   c) particle accelerators in nuclear physics
   d) Testing purposes of power system components.
6. Tesla coil is used for
   a) generation of sinusoidal output voltages
   b) generation of high voltages
   c) generation of rectangular voltages
   d) generation of high frequency a.c voltages
7. A generating voltmeter is used to measure
   a) impulse voltages
   b) AC voltages
   c) DC voltages
   d) High frequency AC voltages

8. The main factors that affect the sparkover voltage of sphere gap are

a) humidity and waveform
b) nearby earthed objects and atmospheric conditions
c) diameter of the sphere
d) gap spacing, diameter and waveform

9. The salt – fog test done on insulators is

a) impulse test
b) power frequency pollution test
c) impulse current test
d) switching surge test

10. Most important tests conducted on isolators and circuit breakers are

a) voltage withstand tests
b) short circuit tests
c) high current tests
d) temperature rise tests

PART B (10 x 2 = 20 Marks)

11. Why Switching over voltages are generated when energizing the EHV Systems? Compare it's over voltage magnitude with lightning over voltage magnitude.
12. How shielded wire/ Ground wire protect the transmission line from Lightning. What is preferred tower height and shielding angle to install this wire?
13. Why Breakdown is Permanent in solid dielectrics?
14. Why transformer oils are used most commonly used as a dielectric?
15. List the different form of high a.c voltages. What is the necessity to generate such high ac voltages?
16. Why is it preferable to use isolating transformers for excitation with cascade transformer units, if the power requirement is large?
17. What are the problems arises in measuring of very high voltage measurement?
18. What are the different methods of measuring high d.c voltages and a.c voltages (power frequency)?
19. Mention the different electrical tests done on insulators.
20. What is the purpose of impulse test?

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the Lightning Phenomenon. (7)

(ii) Give mathematical model of Lightning of discharges. Explain it. (7)

(OR)

b) Explain the different methods employed for protection of transmission line against Lightning Over voltages and Switching Over voltages.

22. a) Explain townsend's theory of breakdown . How is the condition for Townsend's breakdown obtained in a Townsend discharge.

(OR)

b) Explain various theories which explain breakdown in commercial liquid Dielectric

23. a) Describe with neat diagram the principle of operation, advantages, limitations and applications of Van –de graff generator.

(OR)

b) Explain the Marx circuit arrangement for multistage impulse generators. How is the basic arrangement modified to accommodate the wave time control resistances.

24. a) Explain any two methods of measuring high d.c voltages with neat diagram.

(OR)

b) Explain how a sphere gap can be used to measure the peak value of voltages. what are the parameters and factors influence such voltage measurement.

25. a) (i) Explain the partial discharge tests on high voltage cables. (7)

(ii) Explain the method of impulse testing of high voltage transformers (7)

(OR)

b) Write short notes on

(i) Testing of surge arresters (7)

(ii) Testing of insulators (7)

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