

GANPAT UNIVERSITY
B.TECH SEM-V ELECTRICAL ENGINEERING
REGULAR EXAMINATION NOV-DEC- 2013
2EE502: HIGH VOLTAGE ENGINEERING

TIME:-3 HOURS

TOTAL MARKS- 70

INSTRUCTION:-

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Section-I

- Que-1 (a) Explain working principle, construction, advantage and disadvantage of generating voltmeter. (06)
- (b) Design a peak reading voltmeter along with a suitable micro-ammeter such that it will be able to read voltages, up to 200 kV (peak). The capacitance potential divider available is of the ratio 1000:1. (05)

OR

- Que-1 (a) Explain Marx circuit arrangements for multistage impulse generators and also discuss all important components. (06)
- (b) A ten stage Cockcroft Walton circuit has all capacitors of $0.06 \mu\text{F}$. The secondary voltage of the supply transformer is 100kv 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. (05)
- Que-2 (a) What is capacitance voltage transformer? Explain with phasor diagram how a tuned capacitance voltage transformer can be used for voltage measurements in power systems. (06)
- (b) Explain Van de Graff generator. What are the factors that limit the maximum voltage obtained? (06)

OR

- Que-2 (a) Explain a sphere gap measurement used to measure the peak value of voltages. (06)
- (b) What do you mean by impulse wave? Discuss analysis of Circuit 'b' used for commercial impulse generator. (06)
- Que-3 Attempt any two (12)
- (a) Write a short note on Hall Generator.
- (b) Explain the different electrical tests done on isolators and circuit breakers.
- (c) Discuss the Cascade transformer used for HVAC generation.

SECTION-II

- Que:4 (A) What are the factors that influence the condition in the liquid dielectric? What are the commercial liquid dielectric and how they are different from pure dielectric liquids? (06)
- (B) Draw the layout of HV lab. And list the common testing facilities testing equipments available in high voltage laboratories with its layout. (06)

OR

- Que:4 (A) Discuss measurement of dielectric constant and loss tangent of capacitor. (06)
- (B) Explain cavitation & bubble theory and stressed oil volume theory of liquid dielectric (06)
- Que:5 (A) Explain the experimental set up for the measurement of pre-breakdown currents in gas. (06)
- (B) The following observations were made in an experiment for determination of dielectric strength of transformer oil. (05)

Gap spacing (mm)	3	6	9	10
Breakdown Voltage (kV)	86	148	169	219

Determine the power law equation. Also find the breakdown strength for a gap separation of 1 mm

OR

- Que:5 (A) Explain briefly the term 'Photo ionization' (04)
- (B) Explain the specimen and electrode arrangement used for measurement of Resistivity. (04)
- (C) Define Treeing and Tracking. (03)
- Que:6 **Attempt any two.** (12)
- (A) Explain breakdown and filtration tests for liquid dielectric.
- (B) Explain the classification of High Voltage Laboratories.
- (C) What is thermal breakdown in solid dielectric and how is it practically more significant than other mechanisms?

END OF PAPER

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