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Roll No

MEHP - 105**M.E./M.Tech., I Semester**

Examination, June 2014

Generation and Measurement of High Voltages*Time : Three Hours**Maximum Marks : 70***Note :** i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Write down the different theories of breakdown in solid dielectrics. 7
b) Derive the condition of self sustenance of discharge in a uniform field at low pressure. 7
2. a) Give the Marx circuit arrangement for multistage impulse Generators. How is the basic arrangement modified to accommodate the wave time control resistances? 7
b) An impulse generator has eight stages with two capacitors connected in series in each stage. Each condenser is rated for 0.33 μ F and 100kV. The load capacitor available is 1000 pF. Find the series resistance and the damping resistances needed to produce 1.2/50 μ s impulse voltage wave. What is the maximum output voltage of the generator, if the charging voltage is 200 kV? 7
3. a) Explain how a sphere gap can be used to measure the impulse voltage. What are the factors that influence voltage measurements by sphere gap? 7
b) What is the need of generation of high frequency high a.c. voltages? Explain the working of high frequency high voltage transformer. Also mention its advantages. 7
4. a) Draw the simple circuit of peak reading voltmeter and explain its working. 7
- b) What are the requirements of an oscillograph for impulse and high frequency measurements in high voltage test circuits? 7
5. a) With a neat sketch explain the impulse testing on the power transformer. 7
b) What are partial discharges and how are they detected under power frequency operation Conditions? 7
6. a) Explain the transformer ratio arm bridge for audio frequency range measurement. Discuss its merits and demerits over other methods. 7
b) A cable has to be tested at 500kV using a 100kVA, 400V/250kV testing transformer as a resonant transformer at 50Hz. The transformer has 2% resistance and 8% leakage reactance on 100 kVA base. If the charging current of the cable at 500kV is 0.4A, find the series inductance required. Assume 2% resistance for the inductor to be used and the connecting leads. Neglect dielectric loss of the cable. What will be the input voltage to the transformer? 7
7. a) Discuss the various techniques for the measurement of impulse voltage. 7
b) Explain the modifications to be made to the Schering bridge for the following: 7
i) High dissipation factor test object.
ii) High capacitance test objects, and
iii) One end of the test object to be grounded.
8. Write short notes on any three of the following: 14
a) Tests conducted on circuit breakers
b) Van de Graff generator
c) Insulation coordination
d) C.V.T
e) Streamer theory of breakdown in gaseous insulation.

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