R09

Code No: C5604

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations, March/April 2011

HIGH VOLTAGE ENGINEERING

(POWER SYSTEM HIGH VOLTAGE)

Time: 3hours **Max. Marks: 60**

Answer any five questions

All questions carry equal marks

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1. a) What are the different dielectric materials according to their physical nature?
   b) What is "Finite Element Method"? Give the outline of this method for solving the field problems. [12]

2. a) Explain with diagrams, different types of rectifier circuits for producing high dc voltages.
   b) What is a Tesla coil? How are damped high-frequency oscillations obtained from a Tesla coil? [12]

3. a) Define the front and tail times of an impulse wave. What are the tolerances allowed as per the specifications?
   b) Give different circuits that produce impulse waves explaining clearly their relative merits and demerits. [12]

4. a) Explain the effect of series inductance on switching impulse wave shapes produced.
   b) A 6.6 kV/350 kV, 350 kVA, 50 Hz testing transformer when tested had the following observations: (i) no load voltage rise on HV side was 1% more than the rated value when 6.6 kV was applied on primary side.
   (ii) The rated short circuit current was obtained on HV side when shorted with 8% rated voltage on primary side. Calculate
   (a) self-capacitance of transformer along with its hv side bushing
   (b) leakage reactance neglecting resistance. [12]

5. a) Discuss the different methods of measuring high dc voltages. What are the limitations in each method?
   b) Compare the relative advantages and disadvantages of using a series resistance microammeter and a potential divider with an electrostatic voltmeter for measuring high dc voltages. [12]

6. a) Explain the principle and construction of an electrostatic voltmeter for very high voltages. What are its merits and demerits for high-voltage ac measurements?
   b) Why are capacitance voltage dividers preferred for high ac voltage measurements? [12]

7. a) Explain how a sphere-gap is used to measure the peak value of voltages. What Precautions need to be taken
   b) What is a mixed potential divider? How is it used for impulse voltage measurements? [12]

8. Write short notes on:
   a) Faraday generators. (b) Transfer characteristics of measuring circuits. [12]

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