

## 2005COCHIN UNIVERSITY OF SCIENCE & TECHNOLOGY

B.TECH ELECTRICAL AND ELECTRONICS ENGINEERING  
HIGH VOLTAGE ENGINEERING

NOVEMBER 2005

TIME: 3 HOUR  
MARK: 90

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ANSWER ANY SIX QUESTION  
ALL QUESTIONS CARRY EQUAL MARKS

MARK [6\*15]

- 1a. Explain and compare the performance of half wave rectifier and voltage doubler circuits for generation of high d.c voltages
- b. Describe with a neat sketch, the working of a Van de Graff generator. What are the factors that limit the maximum voltage obtained?
- 2a. Explain with neat diagram, the principle operation of (i) Series resonant circuit (ii) parallel resonant circuit, for generating high ac voltages. Compare their performance
- b. What is Tesla Coil? How are damped high frequency oscillations obtained from a Tesla coil?
- 3a. Give the Morx circuit arrangement for multistage impulse generators
- b. How is the basic arrangement modified to accommodate the wave line control resistance?
- 4a. Draw a typical impulse current generator circuit and explain its operation and application
- b. A 12 stage impulse generator has 0.126 microF condensers. The wave front and wave tail resistance connected are 800 ohm and 5000 ohm respectively. If the load condenser is 1000pF, find the front and tail times of the impulse wave produced
- 5a. What is meant by Basic Impulse Level? Discuss the principles involved in the insulation in the insulation co-ordination on EMV systems
- b. What are Volt time curves. Explain their significance in power system studies
- 6a. Explain the equipment insulation level and insulation co-ordination of substation
- b. Give definitions for the following terms:
  - i) Normal system voltage
  - ii) Highest system voltage
  - iii) Over voltage
- 7a. Describe the mechanisms by which lightning strokes induce over voltages on power transmission lines
- b. Discuss the various methods of controlling switching over voltages in power systems
- 8a. Describe the construction, principle of operation and application of
  - (i) Rod Gaps

(ii) Expulsion Gap

b. Explain the method of selection of surge diverters and the type of surge diverters used in EMV systems

9a. What are type, routine and acceptance tests? Discuss the various tests conducted on insulators

b. Explain how partial discharges in an insulation system or equipment can be detected and displayed

10a. Describe Mole's arrangement for measuring high dissipation factors in low frequency range

b. Explain the high voltage Schering bridge for the tan and capacitive measurement of insulators or bushings

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