



--	--	--	--	--	--	--	--	--	--

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; Dec. - 2014

High Voltage Engineering

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART - A

- | | | |
|----|--|----|
| 1. | a. Explain the need for generate high voltages in the laboratory. Mention important applications of high voltages and also advantages. | 10 |
| | b. Explain the breakdown in non uniform fields and Paschen's law. | 10 |
| 2. | a. Explain thermal breakdown in solids. | 7 |
| | b. Explain bubble's theory as applied to liquid dielectric breakdown. | 7 |
| | c. Discuss time lags of breakdown. | 6 |
| 3. | a. What are special features of high voltage testing transformer? | 4 |
| | b. Explain the working of cascade connection of transformers for HVAC generation. | 8 |
| | c. Explain the working of a Tesla coil with equivalent circuit and output waveform. | 8 |
| 4. | a. With a neat diagram describe the principle of operation of a Van de Graff generator | 8 |
| | b. Derive expressions for average ripple, voltage drop and regulation in a voltage multiplies circuit for HVDC generation. | 8 |
| | c. Why Tesla coils have poor energy efficiency. A Tesla coil has – primary side capacitance of 2 μ F. secondary side capacitance of 1nF and output voltage of 31.6 kV. Find the energy efficiency of the coil. | 4 |

PART - B

- | | | |
|----|---|----|
| 5. | a. Define lightning and switching impulse voltages. Draw the waveforms. | 4 |
| | b. What is the principle of impulse voltage generation? Explain the working of a multistage impulse voltage generator. | 10 |
| | c. A 12 stage impulse generator has 0.126 μ F capacitors. The wave front and wave tail resistors are 800 Ω and 5000 Ω respectively. Find the front and tail times of the impulse wave if load capacitor is 1000 pF. | 6 |
| 6. | a. Explain standard sphere gap measurements for HVAC and factors affecting the measurements. | 10 |
| | b. What is a potential divider? Explain capacitance divider for HVAC measurements. | 10 |

- 7. a. What is Corana? Explain dielectric loss and loss angle measurement using scheming bridge. 10
- b. Explain tests on Transformers and circuit breaker. 10
- 8. Write short notes on:
 - (i) Breakdown in electronegative gases
 - (ii) Trigation gap for impulse generator triggering. 20
 - (iii) Construction and working of electrostatic voltmeter.
 - (iv) Discharge detection methods.

* * * * *