

D 50535

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, NOVEMBER 2013

EE 09 L13—HIGH VOLTAGE ENGINEERING

Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer all questions.*

1. What is Townsend's first ionization coefficient ?
2. Explain the electrical properties of liquid dielectrics.
3. What are tesla coils and draw its equivalent circuit diagram ?
4. What are the different d.c. voltage measurements ?
5. How the protection against surges are takes place ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

6. Explain electromechanical breakdown in solid dielectric and derive the expression of highest electric stress before breakdown.
7. What is vacuum ? How is it characterized ? What is the usual voltage of vacuum used in high voltage apparatus ?
8. Explain Cockcroft Walton voltage multiplier circuit for generation of high D.C. voltages.
9. Explain about Resonant Transformers and what are its advantages.
10. What are magnetic links and where they are used ?
11. Explain how inductively coupled ratio arm bridge is used for capacitance and  $\tan \delta$  for the insulators.

(4 × 5 = 20 marks)

**Part C**

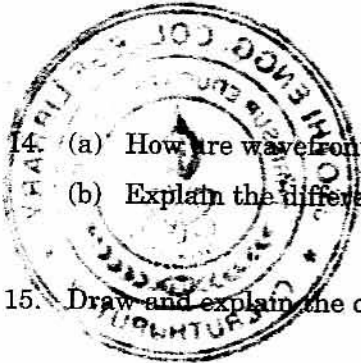
12. (a) Explain Paschen's law.  
(b) A solid specimen of dielectric constant of 4.2 and  $\tan \delta = 0.001$  at a frequency of 50 Hz. If it is subjected to an alternating field of 50 kV/cm. Calculate the heat generated in the specimen due to the dielectric loss.

*Or*

13. Explain (a) Short-term breakdown ; (b) Long-term breakdown in composite dielectrics.

(10 marks)

**Turn over**

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14. (a) How are waveshoot and wavetail times controlled in an impulse generator ?  
(b) Explain the difference between Impulse and Surges.

*Or*

15. Draw and explain the circuit for producing switching surges.

(10 marks)

16. Explain any two methods for the peak voltage measurement of high a.c. and impulse voltages and give its comparison.

*Or*

17. Explain with neat circuit diagram for the measurement of (a) High power frequency a.c. currents;  
(b) High impulse currents.
18. Explain about the power frequency over voltages in power systems and what are its causes, and how it can be controlled ?

*Or*

19. (a) Derive the expression for energy associated in a partial single discharge.  
(b) Explain the testing of circuit breaker.

[4 × 10 = 40 marks]