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Roll No. ....

Total Pages : 2

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**B.Tech. 8th Semester Examination**  
**HIGH VOLTAGE ENGINEERING**  
**(EL-414)**

Time : 3 Hours]

[Max. Marks : 60

**Notes:**

- (i) Question No.1 is compulsory from Part-I.
- (ii) Attempt any four questions from Part-II.

**PART-I**

1. (a) Enumerate the limitations of EHV ac transmission.
- (b) Define Townsend's first ionization coefficient.
- (c) Explain Treeing and Tracking in solid dielectrics.
- (d) Enumerate the advantages of bundle conductors in EHV ac transmission.
- (e) How does EHV lines generate audible noise? What are the limits of audible noise?
- (f) What is tower-footing resistance? What are the methods to reduce this resistance?
- (g) What is arcing ground? Explain its effect on the performance of a power system.
- (h) Explain the principle of operation of a parallel resonant circuit for generating ac high voltage.
- (i) Explain the principle of operation of an Electrostatic voltmeter for measurement of high voltage.
- (j) Enumerate the factors which affect breakdown of gases.

(2×10=20 Marks)

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## PART-II

2. (a) Explain suspended particle mechanism of liquid breakdown. (5)  
(b) Explain cavity breakdown mechanism in liquid dielectrics. (5)
3. (a) Explain the advantages of HVDC transmission over EHV ac transmission. (5)  
(b) State and explain Paschen's law. How do you account for minimum voltage for breakdown under a given pd condition. (5)
4. (a) Derive the expression for surface voltage gradient for a 2- conductor bundle. (6)  
(b) A charge of  $10 \mu\text{c}$  is placed at a distance of 2 metres from the centre of a sphere of radius 0.5 metre. Calculate the magnitude, polarity and location of a point charge  $Q_2$  which will make the sphere at zero potential. (4)
5. (a) Explain the generation and properties of corona pulses. (6)  
(b) Explain the various factors which affect corona loss. (4)
6. (a) Explain the construction and principle of operation of valve type lightning arrester. (5)  
(b) Explain the lightning-stroke mechanism. (5)
7. (a) Explain the operation and application of an impulse generator. (6)  
(b) Draw the general layout of H.V. Lab. Enumerate the various equipments required for H.V. Lab. (4)