

Total No. of printed pages = 2

EE 1817 PE 31

Roll No. of candidate

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2022

BINA CHOWDHURY CENTRAL LIBRARY  
(GMIT & GIPS)  
Azra, Hatkhawagaia,  
Guwahati - 781017

B.Tech. 7<sup>th</sup> Semester End-Term Examination

HIGH VOLTAGE ENGINEERING

New Regulation (w.e.f. 2017-2018) &

New Syllabus (w.e.f 2018-2019)

Full Marks – 70

Time – Three hours.

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

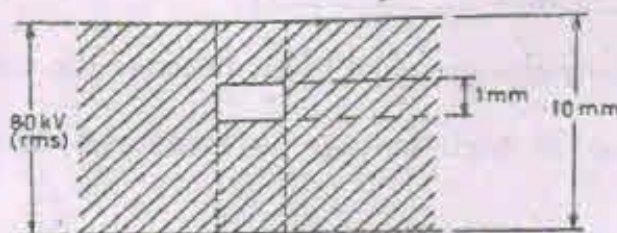
1. Fill up the blanks : (10 × 1 = 10)
- (i) \_\_\_\_\_ voltage leads to the Treeing effect in solid dielectrics.
- (ii) In solid dielectrics electrochemical deterioration and breakdown of areas are as a result of \_\_\_\_\_ and \_\_\_\_\_.
- (iii) \_\_\_\_\_ shaped electrodes are used in an electrostatic voltmeter.
- (iv) The \_\_\_\_\_ value of high voltage is measured in a Spark gaps arrangement.
- (v) The example of a high frequency resonant transformer is \_\_\_\_\_.
- (vi) The effect of \_\_\_\_\_ is avoided in generating voltmeters.
- (vii) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ is the full form of CVT.
2. (a) Briefly describe the different high voltage tests that are conducted on different electrical apparatus. (10)
- (b) How does a high voltage Schering bridge work? Illustrate and explain its working principle. (5)

[Turn over



3. (a) Explain the V-I characteristic curve that is generated while conducting the Townsend's experiment? (5)
- (b) Why a cascaded transformer circuit is preferred over a single unit of a very high-voltage transformer for testing purpose. (5)
- (c) What is the utility of a delay cable in a high voltage measurement circuit? (5)
4. (a) What are the different secondary mechanisms due to which electrons are generated during the ionization process? (5)
- (b) Explain the treeing and tracking mechanism with neat illustrations. (5)
- (c) Explain the working principle of a high frequency resonant transformer circuit. (5)
5. (a) Explain the working principle of a circuit that can be used as a voltage doubler. (5)
- (b) Mention the different mechanisms of breakdown in a liquid dielectric. Explain the suspended particle theory. (5)
- (c) Briefly explain the different materials that can be used as solid dielectric. (5)
6. (a) A 5KV (RMS) is applied across two electrodes which are placed at 3 mm apart in nitrogen gas. The steady current flowing was found to be 5  $\mu$ A. When the spacing was changed to 10 mm, the value of the current became 7  $\mu$ A. Find the value of the 1<sup>st</sup> Townsend coefficient. (8)
- (b) Write a note on the safety measures to be taken during the construction of a High Voltage laboratory. (7)

7. (a)



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As shown in the figure above a solid dielectric of dielectric constant 2 has an internal void of thickness 1mm. The specimen is 10 mm thick and is subjected to a voltage of 70KV (RMS). If the void is filled with air, find the voltage at which internal discharge will occur. (8)

- (b) Describe with a neat sketch an impulse generator and explain its working. (7)