

**BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2022**

(4th Year, 2nd Semester)

**HIGH VOLTAGE TECHNIQUE - II**

Time: Four Hours

Full Marks: 70

(35 marks for each part)

Use a separate Answer-script for each Part

**PART-II**

Answer *any two* questions

*One Mark* is reserved for neatness of the answer script

1. a) What are the classification of high voltage laboratories? Mention their utilities. 8  
b) With a neat drawing, show the layout of a typical high voltage laboratory with a 1 MV cascade transformer and a 3 MV impulse generator. 9
2. a) Write a brief note on Generating Voltmeter. 8  
b) What is a Rogowski Coil? For which type of high voltage measurement is it preferred? Give one practical application where it is used. 9
3. a) Why  $V-t$  curve and S-curve are required for high voltage lightning impulse voltage measurement? Explain with proper illustrations. 8  
b) Briefly describe the modern triggering circuit used in lightning impulse voltage generator. What are its advantages over conventional triggering arrangement? 9
4. a) Describe a technique of high voltage measurement where photographic method can be used. What is the significance of Lichtenberg figures in lightning impulse voltage measurement? 9  
b) With respect to lightning impulse test according to IS 2071, define (i) full lightning impulse, (ii) chopped lightning impulse, (iii) time to chopping, (iv) instant of chopping and (v) virtual origin. Draw the waveforms with proper markings wherever required. 8

[ Turn over

Reference No. Ex/EE/PE/B/T/421B/2022

**B.E. Electrical Engineering – 4<sup>th</sup> Year – Second Semester**

**High voltage Technique - II**

Full marks 70

Time : 3 hrs.

**Part-II**

**Answer Q.1 and any two from the rest of the questions.**

1. (a) Show in details how the transient response of a circuit is computed by EMTP with the formation of the [Y] matrix. 10  
(b) Show analytically how computation for a non-linear branch can be included in EMTP 05
2. Form the equivalent circuit for a scheme of charging a star-connected 3-ph transformer through transmission cables, when one pole of the circuit breaker fails to make simultaneously with the other two. Also, show how ferro-resonance can take place under such circumstances. 10
3. Show analytically with the help of an equivalent circuit, the role of the ratio of the series capacitance to the shunt capacitance per unit length in determining the nature of the voltage distribution along the winding when subjected to a step input. 10
4. Citing the recommendation of the International Electro-technical Commission in setting the Impulse Withstand Voltage, deduce a relationship between the Critical Flashover Voltage and the Withstand Voltage for a sample insulator. 10
5. Discuss the selection of number, locations and ratings of surge diverters in a substation. 10