



ELIZADE UNIVERSITY ILARA MOKIN, ONDO STATE
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING

FIRST SEMESTER EXAMINATION, 2020/2021 ACADEMIC SESSION

COURSE TITLE: SWITCHGEAR AND HIGH VOLTAGE ENGINEERING

COURSE CODE: EEE 535 (2-units)

EXAMINATION DATE:

COURSE LECTURER: DR T. O. ALE

TIME ALLOWED: 2 HOURS

INSTRUCTIONS:

1. *ANSWER FOUR QUESTIONS IN ALL*
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE NOT ALLOWED TO BORROW ANY WRITING MATERIALS AND CALCULATORS DURING THE EXAMINATION.
4. SMART WATCHES ARE NOT ALLOWED IN THE EXAMINATION HALL

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HOD's Signature

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Question ONE

- (a) State two (2) applications of Gases in Power System. (5 marks)
- (b) List five (5) properties required of such gas in (a) (5 marks)
- (b) What types of attachments are possible for electronegative gases? (5 marks)

Question TWO

- (a) What is a switchgear? (5 marks)
- (b) List the three (3) categories of Switchgear based on voltage level. (3 marks)
- (c) In any Switchgear, a protective scheme is of a great importance. Explain briefly the basic components of this so call protective scheme. (7 marks)

Question THREE

- (a) What are the uses of Liquid dielectrics in high voltage cables and capacitors? (6 marks)
- (b) What are the three (3) most important properties of liquid dielectric? (4 marks)
- (c) State five (5) requirements of a good solid dielectric materials used as insulators in power apparatus. (5 marks)

Question FOUR

- (a) What is a corona? (5 marks)
- (b) Enumerate three (3) disadvantages of a corona. (3 marks)
- (c) A certain 3- ϕ equilateral transmission line has a total corona loss of 53kW at 106kV and a loss of 98kW at 110.9kV. (i) What is the disruptive critical voltage line?
(ii) Calculate is the corona loss at 113kV (7 marks)

Question FIVE

- (a) The two methods of generating high D.C voltages are through the process of rectification employing voltage multiplier circuits (*Half-wave Rectifier Circuit, Full-wave Rectifier Circuit, Voltage Doubler Circuit and Cockcroft-Walton Voltage Multiplier*) and through Electrostatic generators. State the advantages of the Full-wave Rectifier Circuit over Half-wave Rectifier Circuit. (6 marks)
- (b) A ten stages Cockraft-Walton circuit has all capacitors of 0.06 μ F. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1 mA, determine;
(i) the voltage ripple (ii) the voltage drop and regulation (iii) the max output voltage
(iv) the optimum number of stages (9 marks)