

PAPER 2



TECHNICAL

MOMBASA

UNIVERSITY OF

School of Engineering & Technology

Department of Electrical & Electronics

UNIVERSITY EXAMINATION FOR:

Certificate in Electrical and Electronics Engineering

EEE 1102 DIGITAL ELECTRONICS

END OF SEMESTER EXAMINATION

SERIES: july 2025

TIME: Two HOURS

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID, Scientific Calculator & No Mobile Phone.

This paper consists of five questions. Attempt any THREE questions.

Maximum marks for each part of a question are as shown.

This paper consists of **THREE** printed pages

Do not write on the question paper.

QUESTION ONE

- (a) (i) Draw a switching circuit that is expressed by the Logic notation $L = (A.B) + C$
- (ii) Represent the decimal number 7610
 - (i) In BCD

- (ii) In excess 3 code
- (iii) In 2421 code
- (iv) As a binary number (10 marks)

- (b) I. Simplify
- (i) A''
 - (ii) $A + A.B$

- II. Reduce the following Boolean expression to the required number of literals
- (i) (a) $ABC + A'B'C + A'BC + ABC' + A'B'C'$ to five literals
 - (ii) (o) $BC + AC' + AB + BCD$ to four literals
 - (iii) $(A+C+D)(A+C+D')(A+C'+D)(A+B')$ to four literals (10 marks)

uts each (12 marks)

QUESTION TWO

- (a) Simplify the following Doolean functions to a minimum number of literals
- (i) $x + x'y$
 - (ii) $x(x' + y)$
 - (iii) $x'y'z + x'yz + xy'$
 - (iv) $xy + x'z + yz$ (10 marks)

- (b) (i) Express the Borlean function $Z = A + B' C$ in a sum of minterms.
- (ii) Draw the circuit of the expression $Z = AB+C$ using NAND gates only
- (iii) Write the expression for the switching arrangement that will give the following truth table

A	B	C
0	0	0
0	1	1
1	0	1
1	1	0

- (v) What function is b(iii) above (10 marks)

QUESTION THREE

- (a) Perform the subtraction with the following binary numbers using
1. 2's compliment
 2. 1's compliment

- (i) $10010 - 10011$
 - (ii) $100 - 1000$ (10 marks)
- (c) Perform the subtraction with the following decimal numbers using
- (1) (o) 10's compliment
 - (2) (q) 9's compliment
 - (i) $753 - 864$
 - (ii) $20 - 1000$ (10 marks)

QUESTION FOUR

- (a) (i) Express the Boolean function $Z = AB + AC$ in a product of Maxterm form
- (ii) Using Karnaugh Mapp simplify $Z = AB + AB'$ (8 marks)
- (b) (i) Show the truth tables of AND, OR, and NOT gates for three variables
- (ii) Show the symbols of AND, OR and NOT gates with two inputs each (12 marks)

QUESTION FIVE

- (a) Convert the following numbers from the given base to the bases indicated
 - (i) Decimal 220.215 to binary, octal and hexadecimal
 - (ii) Binary 10010 101. 101 to decimal, octal and hexadecimal.
 - (iii) Octal 723.67 to decimal, binary and hexadecimal
 - (iv) Hexadecimal 2AC5.D to decimal, octal and binary (12 marks)
- (b) I. Obtain the 1's and 2's compliments of the following binary numbers
 - (i) 100100
 - (ii) 0101000
- II. Obtain the 9's and 10's compliment of the following decimal members
 - (i) 13681
 - (ii) 08800 (8 marks)