



Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DIPLOMA IN INFORMATION TECHNOLOGY

DCIT0122

COMPUTER ELECTRONICS

END TERM EXAMINATION

DATE: TUESDAY 9TH DECEMBER, 2025 TIME: 11:00AM-1:00PM

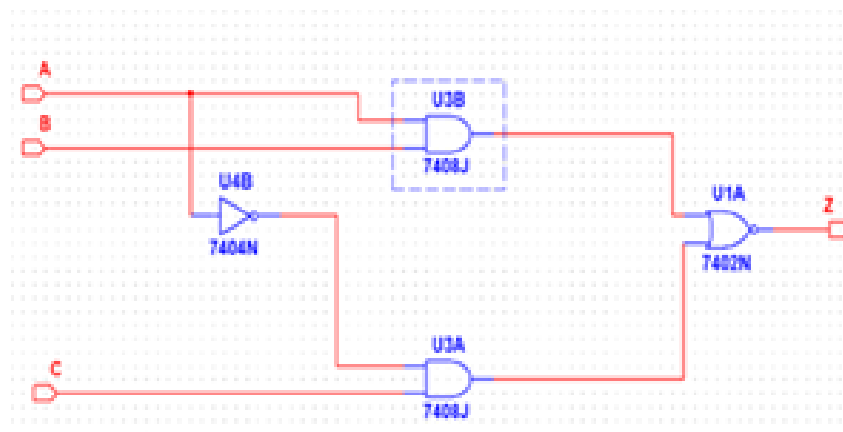
DURATION: 2 HOURS

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

SECTION A (COMPULSORY)

QUESTION ONE (15 MARKS) COMPULSORY

- Explain the working principle of a P-N junction diode. [2 Marks]
- Discuss two differences between Random Access Memory (RAM) and Read-Only Memory (ROM). [4 Marks]
- Explain how resistors are used in series and parallel configurations in electronic circuits. [2 Marks]
- Draw the truth table of the diagram below [2 Marks]



- Explain the difference between microcontrollers and microprocessors. [2 Marks]
- Simplify the Boolean expression $F(ABC) = AB' + AB'C + ABC'$ [3 Marks]

SECTION B: (ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (15 marks)

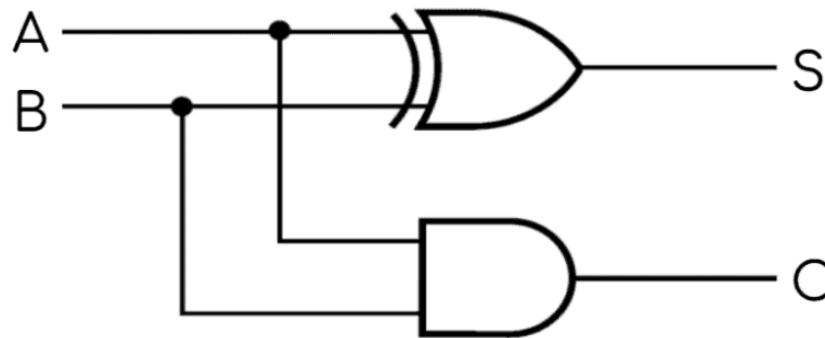
Given the Truth Table below.

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

- Write the Boolean expression of the above table. [2 Marks]
- Minimize the expression using the Boolean Algebraic Laws. [3 Marks]
- Design a circuit using AND, OR, and NOT gates to implement the Boolean expression $F(ABC)=A'B+AB'C$. [5 Marks]
- Explain the differences between half-wave and full-wave rectifiers. State why one is preferred over the other [5 Marks]

QUESTION THREE (15 marks)

- Using a Truth Table, identify the Logic Circuit below and explain its function [4 Marks]



- With the aid of a diagram and a truth table, explain how a full adder works. [5 Marks]
- Convert the following numbers [4 Marks]
 - 139_{10} to its Octal equivalent
 - 98798_{10} to Hexadecimal
 - 145_{10} to Binary
 - $FA29_{16}$ to decimal
- Calculate the sum of the following binary numbers [2 Marks]
 - $1111010 + 1001010$
 - $100100101 + 111100001$

QUESTION FOUR (15 marks)

- a. Define Resistance. [1 Marks]
- b. The following is an image of a resistor



- i. Explain the color codes [2 Marks]
 - ii. What is the value of the resistor [1 Mark]
- c. Discuss three uses of semiconductor materials in the field of electronics. [6 Marks]
- d. What is a voltage transformer? [1 Mark]
- e. Discuss two applications of transformers in electronic devices. [4 Marks]

QUESTION FIVE (15 marks)

- a. Design a D flip-flop circuit and explain its operation. [4 Marks]
- b. Use the above flip-flop to build a 2-bit binary counter. [5 Marks]
- c. Discuss three advantages of using JK flip-flop in sequential circuits. [6 Marks]

QUESTION SIX (15 marks)

- a. Illustrate what you understand by the term Electronics? [1 Mark]
- b. Investigate three applications of 5G technology in the transportation industry. [6 Marks]
- c. Discuss four roles that electronics plays in addressing challenges related to the integration of renewable energy into existing power grids. [8 Marks]