PAN AFRICA CHRISTIAN UNIVERSITY
Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DIPLOMA IN INFORMATION TECHNOLOGY

DICT0122

COMPUTER ELECTRONICS

END TERM EXAMINATION

DATE: APRIL, 2026 **TIME: 3 HOURS**

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

SECTION A (COMPULSORY)

QUESTION ONE

a. Define computer electronics. [1 Mark]
b. Differentiate between conductors and insulators. [2 Marks]
c. i. State three passive components and one function of each. [3 Marks]
ii. Convert $(1011)_2$ to decimal. [3 Marks]
iii. Draw the AND gate truth table. [3 Marks]
d. Explain why the binary system is used in computers. [1 Mark]
e. Suggest one practical application of logic gates. [1 Mark]
f. Evaluate the importance of Boolean algebra in digital electronics. [1 Mark]

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

QUESTION TWO (15 marks)

a. State one semiconductor material. [1 Mark]
b. Explain how conductors differ from insulators. [2 Marks]
c. i. Identify two conductors and two insulators. [4 Marks]

ii. State three applications of conductors in computers. [3 Marks]
iii. Give two uses of insulators. [2 Marks]

d. Explain the effect of poor insulation on electronic circuits. [1 Mark]
e. Design a simple power cable layout for a computer. [1 Mark]
f. Why is insulation critical in electronics? [1 Mark]

QUESTION THREE (15 marks)

a. i. Define a half adder. [1 Mark]
ii. Draw a half adder. [3 Marks]
iii. Explain a full adder. [3 Marks]
iv. State one use of a decoder. [3 Marks
b. Explain a combinational circuit [2 Marks]
c. i. Explain the effect of poor circuit design. [1 Mark]
ii. Propose a simple alarm circuit logic. [1 Mark]
iii. Evaluate the importance of combinational circuits in CPUs. [1 Mark]

QUESTION FOUR (15 marks)

a. State the base of the binary number system. [1 Mark]
b. Explain the difference between decimal and binary systems. [2 Marks]
c. i. Convert 25_{10} to binary. [3 Marks]
ii. Add $101_2 + 011_2$. [3 Marks]
iii. Subtract $110_2 - 010_2$. [3 Marks]
d. Explain the effect of incorrect binary input on a digital circuit. [1 Mark]
e. Combine conversions to solve a small logic problem. [1 Mark]
f. Evaluate the importance of number systems in computing. [1 Mark]

QUESTION FIVE (15 marks)

a. Define a NOT gate. [1 Mark]
b. Explain the purpose of a truth table. [2 Marks]
c. i. Draw AND and OR gates. [4 Mark]
ii. Simplify A + A'B using Boolean laws. [5 Mark]
d. Explain why logic simplification is important. [1 Mark]
e. Create a logic expression for a simple light controller. [1 Mark].
f. Assess the role of Boolean algebra in electronics. [1 Mark]

QUESTION SIX (15 marks)

a. State one function of a transistor. [1 Mark]
b. Differentiate active and passive components. [2 Marks]
c. i. Identify three active components. [3 Marks]
ii. Identify three passive components. [3 Marks]
iii. Draw and label a simple LED circuit. [3 Marks]
d. Explain what happens if diode polarity is reversed. [1 Mark]
e. Design a basic LED indicator circuit. [1 Mark]
f. Evaluate the role of active components in electronic circuits. [1 Mark]