



UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

PAPER CODE TDIT 114	PROGRAMME NATIONAL DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY YEAR I, SEMESTER I	DATE WEDNESDAY, 14 TH DECEMBER 2022
SERIES NOV/DEC 2022	PAPER NAME COMPUTER ARCHITECTURE	TIME ALLOWED 3 HOURS
YOU SHOULD HAVE THE FOLLOWING FOR THIS EXAMINATION Answer booklet Ball point pen		

INSTRUCTIONS TO CANDIDATES

1. This paper consists of **two** sections **A** and **B**.
2. Section **A** consists of **three** questions. Answer only **two** questions
3. Section **B** consists of **four** questions. Answer **three** questions only
4. All answers to each question should begin on a fresh page.
5. **Do not** write anywhere on this question paper.
6. All rough work should be done in the official answer booklet provided.
7. Read other instructions on the answer booklet.

SECTION A- (40 MARKS)

Answer only two questions from this section.

Question One

A computer system has five core functions that it must perform for it to be fully appreciated as such a system.

- (a) Define the meaning of the system stated above. (02 marks)
- (b) Explain **five** core functions of the system stated above. (10 marks)
- (c) For each of the stated function in 1(b), mention an example of a component in the system that is responsible for that functionality. (04 marks)
- (d) Give the purpose of each of the component mentioned in 1(c) above to the system. (04 marks)

Question Two

- (a) Differentiate between **registers** and **system buses** as used in computing. (04 marks)
- (b) Using a well labeled illustration of the top-level computer components, explain the functionality of each of the sub-components that make-up the CPU. (16 marks)

Question Three

- (a) Distinguish between **binary-coded-decimal codes** and **alphanumeric codes** as used in computer architecture. (04 marks)
- (b) Construct a table showing the binary representation, hexadecimal representation, and the binary-coded-decimal representation of all decimal numbers from 0 to 15. (16 marks)

SECTION B - (60 MARKS)

Answer only three questions from this section.

Question Four

Analyze the table below and answer the questions that follow:

Table: 1 Truth Table on Four-Input Circuit

A	B	C	D	x
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

- (a) State the output of the input circuit above when all inputs except B are 1. (02 marks)
- (b) State the output for the input conditions: $A = 1$, $B = 0$, $C = 1$, $D = 0$.
(02 marks)
- (c) Write the Boolean expression that will be realized from the table above assuming all the inputs were added together to give the output (x). (06 marks)
- (d) Draw the circuit diagram representation for the Boolean expression in 4(c).
(10 marks)

Question Five

- (a) Distinguish between the terms **Flip-Flop** and **shift register** as used in computer architecture. (04 marks)
- (b) Draw the circuit diagram and the graphic symbol of the JK Flip-Flop. (10 marks)
- (c) In a tabular form, show the JK Flip-Flop characteristic table. (06 marks)

Question Six

- (a) Explain the functionality of each of the following in a computer system.
 - (i) Motherboard (02 marks)
 - (ii) Central processing unit (02 marks)
 - (iii) CMOS battery (02 marks)
 - (iv) North bridge (02 marks)
 - (v) Cache memory (02 marks)
- (b) Mention **five** ports that are found on a computer system, stating their purpose on the system. (10 marks)

Question Seven

- (a) Differentiate between a **read-only memory** (ROM) and a **programmable logic device** (PLD) as used in computer architecture. (04 marks)
- (b) Explain **three** types of programmable logic devices (PLD's) that are normally used when drawing the architecture of a computer. (06 marks)
- (c) Define the term **code converter** as used in computer architecture. (02 marks)
- (d) Design a code converter (use a tabular format) that converts a decimal digit from the 8, 4, -2, -1 code to BCD. (08 marks)

END