UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

PAPER CODE	PROGRAMME	DATE
TDIT 114	NATIONAL DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY YEAR I SEMESTER I	THURSDAY, 4TH MAY 2023
SERIES	**PAPER NAME**	**TIME ALLOWED**
APRIL/MAY 2023	COMPUTER ARCHITECTURE	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) Explain the following as used in circuit design of the circuit board;

(i) Half adder. (02 marks)

(ii) Full adder. (02 marks)

(b) Identify **five** reasons for using arithmetic circuits in designing combinational circuits. (10 marks)

(c) Determine the functions of the following registers;

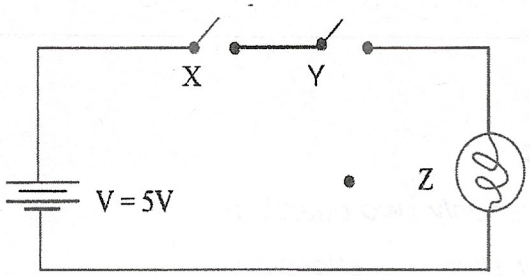
(i) Status register. (02 marks)

(ii) Control register. (02 marks)

(iii) Data register. (02 marks)

Question Two

A computer circuit that operates using an AND gate is fabricated using two switches X and Y. The computer is powered on only if both switches are closed. Using the illustration below;



(a) Show on a Truth table the output Z when these switches X and Y are **opened** and **closed.** (08 marks)

(b) Show on the Truth table the output using 1 and 0. (08 marks)

(c) Identify the Boolean output at Z. (04 marks)

Question Three

Minimize the following expression by use of Boolean rules.

(a) $X = ABC + \overline{A}B + AB\overline{C}$. (08 marks)

(b) $X = \overline{A}\ B\overline{C} + A\ \overline{BC} + \overline{ABC} + \overline{ABC}$. (12 marks)

SECTION B - (60 MARKS)

Answer only three questions from this section.

Question Four

A colleague has bought a brand new Dell desktop computer and has invited you to orient him on his newly bought device.

(a) State **five** internal components that his device possess. (05 marks)

(b) Give **four** ports that are found on his device. (05 marks)

(c) Explain **two** factors that will determine the speed of his machine's system bus while communicating with external peripheral devices. (04 marks)

(d) Determine **three** types of buses on his device's main board. (06 marks)

Question Five

Paul uses a Pentium four laptop computer in his computer center for doing secretarial and internet services. However, of recent, the performance of his computer is slowing down.

(a) State **six** components that Paul's laptop should have in order to meet his business needs. (06 marks)

(b) Explain **four** reasons that could have caused the slow performance of Paul's computer. (08 marks)

(c) Discuss **three** factors Paul would have considered before purchasing the laptop. (06 marks)

Question Six

Your institute uses computers at the computer lab which are IAS computers for teaching students and for student's research work.

(a) With illustration, discuss the general structure of an IAS computer. (12 marks)

(b) Explain **four** registers that the structure in 6 (a) possess. (08 marks)

Question Seven

(a) Explain **four** addressing modes a computer devise may perform. (08 marks)

(b) Show how a processor converts the followings to decimal.

(i) 101_2 (04 marks)

(ii) 1010_2 (04 marks)

(iii) 11.011_2 (04 marks)

END