ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

DEPARTMENT OF DIGITAL TECHNOLOGY

EXAMINATION PAPER

COURSE CODE		: CDT106
COURSE TITLE		:COMPUTER ORGANISATION AND ARCHITECTURE
SPECIAL REQUIREMENTS		**: None**
DURATION	:	3 Hours
LEVEL	:	1.2
DATE	:	Feb 2021

INSTRUCTIONS TO CANDIDATES:

1. No cell phones are allowed in the examination venue.
2. Answer any **FOUR (4)** questions.
3. Begin each question on a new page.
4. The number of marks for each question or part question is shown in brackets [ ]

QUESTION 1

a) Explain the need for having a hierarchical memory organization and explain the hierarchy in detail with a block diagram. [6]

b) Define cache memory and explain why it is important for the execution of the program [4]

c) Define instruction pipeline [2]

d) State and describe the main components of the Central Processing Unit (CPU) [8]

e) For the following Boolean expressions;

Draw the circuit diagram and truth table

F=ac + abc [5]

QUESTION 2

a) Compare and contrast the RISC architecture and CISC architecture. [10]

b) Explain the concept of pipe lining and how it improves performance. [10]

c) Explain what is meant by Von Neumann architecture. [5]

QUESTION 3

			2^4			2^1	
					4s	2s	
1	0	1	0	0	1	1	0

a) The last row in the above table shows a binary code. Fill in the top two rows of the table assuming that the code represents a binary number. [4]

b) If the binary code represents an unsigned integer is the denary equivalent an even or an odd number? Explain your reason. [4]

c) If the binary code represents an unsigned integer give the denary equivalent of the binary number in the last row.

[4]

d) If the last row is a two's complement representation of a signed integer does it represent a negative or positive number? Explain your reason. [4]

e) What is the denary equivalent of this two's complement representation? [4]

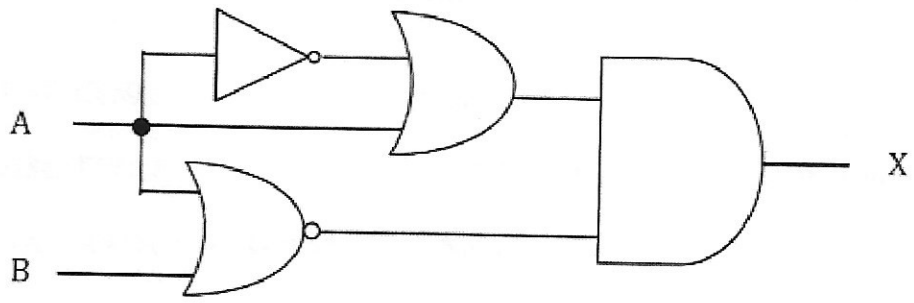
f) Write short notes about an 8086 processor. [5]

QUESTION 4

a) Define each of the following:

i. Accumulator. [2]
ii. Stack. [2]
iii. Registers. [2]
iv. System bus. [2]
v. Addressing modes [2]
vi. Instruction types [2]

b) Consider the following logic circuit:



Construct the corresponding truth table and the Boolean expression [10]

c) Explain why the CPU is often referred to as the brain of the computer. [3]

QUESTION 5

a) Explain the meaning of the following types of addressing

i. Direct,
ii. Indexed.

Give a reason why each may need to be used. [9]

b) Explain the fetch and the execute cycle in detail, giving an example. [8]

c) State what is stored in each of the following special purpose registers in a computer and explain how the contents are altered during the fetch/execute cycle.

i. MAR [3]
ii. MDR (or MBR) [3]
iii. CIR [2]

**********ENDOF PAPER**********