UGANDA MARTYRS UNIVERSITY

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS

END OF SEMESTER TWO EXAMINATION

ACADEMIC YEAR 2022/2023

COURSE	:	**BACHELOR OF SCIENCE IN COMPUTER SCIENCE & BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**
CLASS/YEAR	:	**THREE – FEB INTAKE**
EXAM	:	**COMPUTER ARCHITECTURE & ORGANIZATION**
CODE	:	**CSC 1103**
SEMESTER	:	**TWO**
DATE	:	**15TH MAY 2023**
TIME	:	**9:30 – 12:30 PM**
DURATION	:	**3 HOURS**

Instructions:

1. *Read carefully through ALL the questions before attempting*
2. ***ANSWER FOUR (4) Questions ONLY****. (Each question carries equal marks)*
3. *Ensure that your **registration number** is indicated on all pages of the examination answer booklet.*
4. *Ensure your work is **clear** and **readable**. Untidy work shall be penalized*
5. *Any type of examination malpractice will lead to automatic disqualification*

Question 1

a) In general terms, what is the distinction between Computer Organization and Computer architecture. State any two attributes of each term above. **(6 Marks)**

b) Give any three reasons why a Computer Science student needs to study computer organization and architecture. **(3 marks)**

c) Define computer Structure and Function and illustrate how these two are interrelated. **(5 Marks)**

d) All modern computers are based on the John Von Neumann architecture. Explain the concepts that are outlined by this architecture. **(3 Marks)**

e) The computer world has evolved over the years. What key features distinguish the first computer from the present? **(4 marks)**

f) You are a computing student and you have been tasked to go out in the market and buy a computer for a given organization like UMU. What will be the elements you will look out for, before buying this computer? **(4 marks)**

Question 2

a) Describe the four main functions of a computer? **(4 Marks)**

b) Explain the purpose of the Central Processing Unit. **(2 Marks)**

c) Elaborate on the structure of the Central processing unit. **(5 Marks)**

d) Explain how increasing the Cache size will help the CPU. **(3 marks)**

e) Explain what a program counter does. **(3 marks)**

f) What two activities must the CPU do and how are these activities achieved? **(4 Marks)**

g) Explain what you understand by registers. Briefly explain the various types of CPU registers. **(4 marks)**

Question 3

a) Define the term Interrupt? What advantages come with interrupt in the computer? **(3 Marks)**

b) With an illustration, explain the basic instruction cycle of a computer. Explain the alteration that is made on the instruction cycle in case of interrupt driven machines. **(4 Marks)**

c) Mention the classes of Interrupts. **(2 Marks)**

d) List the different methods used for handling the situation, when multiple interrupts occur. **(4 Marks)**

e) Define a bus and state the characteristics of a bus. **(3 Marks)**

architecture

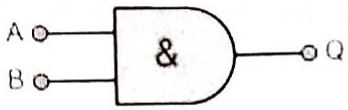
f) What types of transfers must a computer's interconnection structure (e.g., bus) support? **(4 marks)**

g) "The width of the bus is a key determinant for performance" explain the statement. **(2marks)**

h) Mention the three components of the system bus and explain their various functions. **(3 marks)**

Question 4

a) Draw a truth table for the AND logic gate below. **(3 marks)**



b) Give the name, symbol and Truth table for the gates with the following properties;

i. They output a 1's when all the inputs are 0's **(3 marks)**

ii. They reverse their inputs. **(3 marks)**

(c) Give the three main differences between Combinational circuits and sequential circuits. **(3 marks)**

(e) Explain why data is represented in Binary digits in the computer? **(3 marks)**

(f) Discuss the applicability of the Hexadecimal and Octal number systems in the computer world? **(2 marks)**

(e) Convert decimal number 8620 into **(8 marks)**

i. Binary
ii. Octal
iii. hexadecimal
iv. Packed Binary Coded Decimal (BCD) format

Question 5

a) What is the main purpose of the I/O module in the computer structure? **(2marks)**

b) Explain the major functions of the I/O module in the computer structure? **(2marks)**

c) Why are peripherals or external devices not connected directly to the system bus? **(3 marks)**

d) List three broad classifications of external or peripheral devices **(3 marks)**

e) How does the keyboard and monitor interact with the system? **(4 marks)**

f) Differentiate between cache and virtual memory. **(2marks)**

g) List and briefly define three techniques for performing I/O. **(6 marks)**

h) Explain DMA operation. State its advantages. **(3 marks)**

Question 6

a) With an illustration, explain the memory system of the computer. **(5 Marks)**

b) What characteristics of memory play a vital role in designing the memory system and why? **(3 Mar**

c) Explain why the memory system is organized in a hierarchy? **(2 Marks)**

d) Distinguish between DRAM and SRAM in terms of characteristics such as speed, size, and cost?

(4 marks)

e) Explain the importance of cache memory and show how it's integrated into the computer system.

(3 Marks)

f) How different is the cache memory from the registers? **(2 Marks)**

g) What are the differences among EPROM, EEPROM, and flash memory? **(6 marks)**

END