MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATICS

End of Semester One Examination for the Degree of Bachelor of Computer Science

Course Code:	CSC2215
Course Name:	Computer Organization and Architecture
Course Year:	Two
Academic Year	2020/2021
Date:	24th November 2021
Duration:	Three hours
Time:	2:00 AM – 5:00 PM

SECTION A: **COMPULSORY** **(40 MARKS)**

QUESTION ONE

a) In describing computers, a distinction is often made between computer architecture and computer organization. Briefly describe the difference between computer architecture and computer organization. **[2 marks]**

b) The behavior at each level of a system at design depends only on a *simplified, abstracted* characterization of the system at the next lower level. At each level, the designer is concerned with structure and function. Differentiate between structure and function. **[2 marks]**

c) When a device interrupt occurs, how does the processor determine which device issued the interrupt? **[2 marks]**

d) A computer is generally composed of four main structural components. Briefly describe these four structural components. **[8 marks]**

e) List and briefly define the main structural components of a processor. **[8 marks]**

f) Explain Moore's law? **[2 marks]**

g) What is the difference between a process and a program? **[3 marks]**

h) Represent the following numbers from 0 to 255 as 8-bit words: 0, 41, 255. **[3 marks]**

i) How does an 8-bit word can represent the number 179? **[1 mark]**

SECTION B: ANSWER ANY THREE QUESTIONS FROM THIS SECTION

QUESTION TWO

Both the structure and functioning of a computer are, in essence, simple. In general terms, there are only four basic functions that a computer can perform. Using a diagram describe the four basic operations of a computer. **[20 marks]**

QUESTION THREE

In 1946, von Neumann and his colleagues began the design of a new stored program computer, referred to as the IAS computer, at the Princeton Institute for Advanced Studies. The IAS computer, although not completed until 1952, is the prototype of all subsequent general-purpose computers.

Using a diagram, describe the general structure of the IAS computer. **[20 marks]**

QUESTION FOUR

Both the control unit and the ALU contain storage locations, called registers. Using a diagram and depicting an Expanded Structure of IAS Computer, describe six registers involved in repetitively performing an instruction cycle. **[20 marks]**

QUESTION FIVE

a) The complex subject of computer memory is made more manageable if we classify memory systems according to their key characteristics. Describe the eight Key Characteristics of Computer Memory Systems. **[16 marks]**

b) Another distinction among memory types is the method of accessing units of data. Differentiate between Sequential access, Direct access, Random access, and Associative access. **[4 marks]**

QUESTION SIX

Describe the following major types of semiconductor memory in term s of category, erasure, write mechanism and volatility:

a) Random-access memory (RAM)
b) Read-only memory (ROM)
c) Programmable ROM (PROM)
d) Erasable PROM (EPROM)
e) Electrically Erasable PROM (EEPROM)

. **[20 marks]**

QUESTION SEVEN

An OS is a program that controls the execution of application programs and acts as an interface between applications and the computer hardware.

a) List and briefly define the key services provided by an OS. **[14 marks]** 7

b) List and briefly define at least three major types of OS scheduling. **[6 marks]**

E N D and GOOD LUCK