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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR**  
**FIRST YEAR, FIRST SEMESTER EXAMINATION**  
**FOR THE DEGREE OF BACHELOR OF SCIENCE**  
**(MATHEMATICS AND COMPUTER SCIENCE)**

Date: 25<sup>th</sup> July, 2022  
Time: 2.30pm – 4.30pm

**KCS 103 - INTRODUCTION TO COMPUTER ORGANIZATION**

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Briefly explain the differences between the following computer hardware:
- i) PATA and SATA.
  - ii) Magnetic disk and Optical disk drives
  - iii) Volatile memory and Non-volatile memory (6 marks)
- b) Describe how the Von Neumann Computer Model designed and how it works. Use a well labeled diagram to demonstrate. (6 marks)
- c) Explain what roles do device controllers and device drivers play in a computer system. (6 marks)
- d) Convert the following number system as follows:
- i)  $11101001_2$  to a hexadecimal number. (3 marks)
  - ii)  $E4F2_{16}$  to a binary number. (3 marks)
  - iii)  $416032_8$  to a binary number. (3 marks)
  - iv)  $C73_{16}$  to octal number. (3 marks)

**QUESTION TWO (20 MARKS)**

- a) Binary number system is very important in system computing. Discuss. (6 marks)
- b) Explain the three main functions played by the central processing unit of a computer system. (6 marks)
- c) Draw and explain the hierarchy of languages in the architecture of programmer's view of a computer system. (8 marks)

### **QUESTION THREE (20 MARKS)**

- a) Using relevant examples, identify and discuss the applications of microcontrollers?  
(6 marks)
- b) Explain what happens to a processor when an interruption of a signal is generated in any computer system.  
(6 marks)
- c) An interface subsystem of a computer provides registers that the CPU can read from or write to. Identify four types of these registers and explain their roles respectively.  
(8 marks)

### **QUESTION FOUR (20 MARKS)**

- a) Explain the advantages of using a higher-level language to implement an operating system?  
(5 marks)
- b) Describe clearly on how data is stored in a computer system.  
(5 marks)
- c) Use a well labeled diagram to identify different components of a typical block of the CPU and explain how each component works  
(10 marks)

### **QUESTION FIVE (20 MARKS)**

- a) Explain the characteristics of memory hierarchy design.  
(6 marks)
- b) Use a well labeled diagram to describe how computer interaction unit diagram work.  
(6 marks)
- c) Discuss the differences between the microprocessors and microcontrollers in computer systems.  
(8 marks)