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**KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR**  
**FIRST YEAR, SECOND SEMESTER EXAMINATION**  
**FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE**  
**KCS 103 – INTRODUCTION TO COMPUTER ORGANIZATION**

Date: 09<sup>TH</sup> AUGUST 2023

Time: 8:30AM – 10:30AM

**INSTRUCTIONS TO CANDIDATES**

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

**QUESTION ONE (30 MARKS)**

- a) Convert the following storage size respectively:
- i) how many bytes are in 100GB (1 Mark)
  - ii) how many Kilobytes are in 10TB (1 Mark)
  - iii) how many Megabytes are in 50EB (1 Mark)
  - iv) how many Petabytes are in 10EB (1 Mark)
- b) Convert the following number system as follows:
- i)  $615306_8$  to a binary number. (2 Marks)
  - ii)  $F3E_{16}$  to octal number. (2 Marks)
  - iii)  $11101111_2$  to a hexadecimal number. (2 Marks)
  - iv)  $AD37_{16}$  to a binary number. (2 Marks)
- c) Briefly explain the differences between the following computer hardware:
- i) PROM and EPROM (2 Marks)
  - ii) SRAM and DRAM (2 Marks)
- d) Use a diagram to describe the Von Neumann architectural model and explain how it works. (6 Marks)
- e) Use a well labeled diagram to identify different components of a typical block of the CPU and explain how each component works (8 Marks)

**QUESTION TWO (20 MARKS)**

- a) Elaborate the differences between the microprocessors and microcontrollers in computer systems. (4 Marks)
- b) Binary number system is very important in system computing. Discuss reasons why system designers use such numbers in designing the microcomputers. (5 Marks)
- c) Use a well labeled diagram to describe how computer interaction unit diagram work. (5 Marks)
- d) Use a diagram to arrange the memory devices in ascending order based on the access time. (6 Marks)

**QUESTION THREE (20 MARKS)**

- a) Most computerized devices use controllers to perform their tasks. Using the relevant examples to discuss the applications of microcontrollers? (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 FOUR (20 MARKS)**

- a) Highlight and describe any six components of a microcontroller device. (6 Marks)
- b) Explain the characteristics of memory hierarchy design (6 Marks)
- c) Interface subsystem of a computer provides registers that the CPU can read from or write to during data and information transmission control. Identify four types of these registers and explain their roles respectively. (8 Marks)

**QUESTION FIVE (20 MARKS)**

- a) Identify four interfaces and ports that are available in a computer system. (2 Marks)
- b) Explain the advantages of using a higher-level language to implement an operating system? (6 Marks)
- c) Describe clearly on how data is stored in a computer system. (6 Marks)
- d) Explain what roles do device controllers and device drivers play in a computer system. (6 Marks)