THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR BACHELOR OF TECHNOLOGY IN INFORMATION & COMMUNICATION TECHNOLOGY

EIT 4304: COMPUTER ARCHITECTURE & ORGANIZATION

END OF SEMESTER EXAMIANTION

SERIES: APRIL 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions in **TWO** sections **A & B**
Answer question **ONE (COMPULSORY)** plus any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question One (30 Marks)

a) Define the following terms and state their importance in computer design technology:
   (i) Computer architecture
   (ii) System architecture
   (iii) Instruction set (6 marks)

b) Differentiate between the following computer design concepts
   (i) Computer Architecture and Computer Organization
   (ii) Registers and Memory (4 marks)

c) "*Computer is a complex, contemporary system containing millions of elementary components. The designer need only deal with a particular level of the system at a time. At each level, the system consists of a set of components and their interrelationships. At each level, therefore, the designer is concerned with structure and function.*"

In the context of this statement:

(i) Differentiate between the following: Structure and Function (2 marks)
(ii) Briefly discuss the **FOUR** main structural components of a computer (4 marks)
(iii) Briefly discuss the **FOUR** basic functions that a computer can perform (4 marks)

b) Compare and contrast the following types of processor architectures:

(i) CISC (Complex Instruction Set Computer)
(ii) RISC (Reduced Instruction Set Computer)
(iii) EPIC (Explicitly Parallel Instruction Computing)
(iv) Multi-Core Processor (10 marks)

SECTION B (Attempt any TWO sections)

Question Two (20 marks)

a) What is a *system bus?* Briefly describe the **THREE** main classes of system buses (4 marks)

b) Give **TWO** reasons why the binary number system is utilized for modern electronic digital computers. (2 marks)

c) List the **SIX** important CPU registers and state their functions (6 marks)

d) With the block diagram of a DMA controller, explain how data is transferred between disk and memory. (8 marks)

Question Three (20 marks)

a) Give the full form and function of the following terms as applied to computer system architecture

(i) CMOS
(ii) BIOS
(iii) ISA
(iv) PCI
(v) DMA (10 marks)

b) Differentiate between instruction cycle and interrupt (4 marks)

c) Using a multi-layered computer architecture table, discuss the importance of Micro-programming level/layer (6 marks)

Question Four (20 marks)

a) Explain the single bus structure (4 marks)

b) Explain with block diagram single bus organization of the data path inside a processor (8 marks)

c) Write the control sequence for execution of the instruction **ADD**(R7)R8 (8 marks)

Question Five (20 marks)

a) Explain the basic operational concept of a digital computer (6 marks)

b) Briefly describe how Pipelined, Superscalar and Vector processing architectures provide performance enhancement to computer system internal architecture (6 marks)

c) Explain memory hierarchy in digital computer (8 marks)