THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
(BSC IT –Y3 SI)
BACHELOR OF TECHNOLOGY IN INFORMATION & COMMUNICATION TECHNOLOGY
(BTECH ICT Y3 SI)

EIT 4304: COMPUTER ARCHITECTURE & ORGANIZATION

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: MAY/JUNE 2012
TIME: 2 HOURS

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

This paper consist of **FIVE** questions
Answer any **THREE** questions. Question **ONE** is Compulsory
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (Compulsory - 20 marks)

Question One (20 Marks)

a) Define the following terms:
   i) Central Processing Unit (CPU)
   ii) Logic gate
   iii) Cache
   iv) Instruction set (4 marks)

b) Differentiate between:
   i) Computer architecture and computer organization
   ii) Registers and Memory (4 marks)

c) Discuss the **FOUR** major function of a computer processor (4 marks)

d) Using a block diagram, illustrate how the control unit (CU) instructs the other parts of the CPU through a set of FOUR basic operations (8 marks)

e) With the help of truth tables and symbols, discuss the basic combination of gates (10 marks)

SECTION B (Answer any TWO questions – 40 Marks)

Question Two (20 marks)

a) Differentiate between single-chip computers and single board computers (2 marks)
b) What is a system bus? Briefly describe the THREE main classes of system buses (4 marks)
c) Give **TWO** reasons why the binary number system is utilized for modern electronic digital computers (4 marks)
d) Perform the following conversions
   i) Convert binary 00011011 to decimal
   ii) Convert decimal 278 to binary
   iii) Convert decimal 0.625 to binary
   iv) Convert 19B116 to binary (4 marks)

e) List the **SIX** important CPU registers and state their functions (6 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) RAM
   iv) ROM
   v) SIMM
   vi) DIMM (6 marks)
b) Using a multi-layered computer architecture table discuss the importance of Digital Logic layer (4 marks)
c) Compare RISC and CISC architectures giving advantages and disadvantages of each. (10 marks)

Question Four (20 marks)

a) Briefly describe:
   i) Processor to Memory Communication (5 marks)

   ii) Processor to I/O Communication (5 marks)

b) Explain with block diagram single bus organization of the data inside a processor (10 marks)

Question Five (20 marks)

a) Why is the concept of Boolean algebra important to the digital computers and other digital systems? Give at least **TWO** reasons (4 marks)
b) With the help of Logic symbols and truth tables, describe the **THREE** basic logic gates (6 marks)
c) Give and Boolean expression and the truth table for the following logic operations
   i) 2 inputs AND gate
   ii) 2 inputs OR gate (4 marks)

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