THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

HIGHER DIPLOMA IN COMPUTER STUDIES (HDIP 10A)
YR I SEM I

EIT 3108: COMPUTER ARCHITECTURE

END OF SEMESTER EXAMINATIONS

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

Answer question **ONE (COMPULSORY)** in section **A** and any other **TWO** questions from section **B**

This paper consists of **THREE** printed pages

SECTION A (30 marks)

Question 1 (Compulsory)

a) What is an Instruction set? State any **FOUR** elements of an instruction (5 marks)

b) List the disadvantages of using sign magnitude and 1's complement as ways of representing integers (3 marks)

c) Consider logic functions with three inpus: A, B and C with the following output

(i) Output D is true if at least one input is true
(ii) Output E is true if exactly two inputs are true
(iii) Output F is true only if all three inputs are true

Show the truth table for these three functions (3 marks)
Show the Boolen equations for these three functions (3 marks)

d) Using logic gates draw the circuit diagrams for the above logic functions (6 marks)

e) Perform the following logical operations
(i) 00100101
\+ 00010111

(ii) 00100101
\- 00010111

f) Perform the following conversions (2 marks)
(i) 10101010_2 to decimal
(ii) 99_{10} to binary

g) Explain the difference between implicit and explicit operands and state their effect on hardware design. (6 marks)

SECTION A (40 marks)

Question 2 (20 marks)

a) Relate the concepts of random and sequential access to data to access/cycle time (4 marks)

b) Describe the concept of virtual memory (6 marks)

c) Draw truth tables for the following logical operators (6 marks)
(i) AND
(ii) OR
(iii) XOR

d) Explain the functions of the Arithmetic and Logic Unit (ALU) (4 marks)

Question 3 (20 marks)

a) Describe any **FIVE** Operand addressing modes and state their effect on hardware requirements (11 marks)

b) Explain the following memory management mechanisms (9 marks)

(i) Paging
(ii) Partitioning
(iii) Segmentation

Question 4 (20 marks)

a) Describe the components of a computer system, their functions and how they are coupled to form an integrated whole, including the data flows through them. (10 marks)

b) Explain the process of execution of a program and how the main components are involved (10 marks)

Question 5 (20 marks)

a) What is an assembler? (2 marks)

b) Explain **FOUR** benefits of learning assembly language programming (8 marks)

c) State what the following program does (5 marks)

(i)
```
A 100
MOV AX, 0006
MOV BX, 0004
ADD AX, BX
NOP
```

d) State any **FIVE** CPU registers and their functions (5 marks)