TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN MATHEMATICS & COMPUTER SCIENCE

ICS 2101: COMPUTER ORGANIZATION

END OF SEMESTER EXAMINATION
SERIES: APRIL 2013
TIME: 2 HOURS

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

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **TWO** printed pages

Question One (Compulsory)

a) Explain the following terms: **(8 marks)**
- **(i)** Circuit
- **(ii)** Truth table
- **(iii)** Flip flop
- **(iv)** Sum of products expression

b) The following problem requires the design and implementation of a circuit for its solution. **(8 marks)**
- There are three buttons A, B, C
- The output is ON, if any TWO buttons are pushed
- If C is pressed, the output will always turn ON

Required:

Construct a truth tale for the above problem and develop a Boolean expression and construct a logic circuit for the above problem.

c) Explain the term register, citing any **FOUR** registers. **(6 marks)**

d) Distinguish between computer architecture and computer organization provide relevant examples. **(4 marks)**

e) Describe **FOUR** addressing modes. **(4 marks)**

Question Two

a) Outline the instruction cycle and use a flow chart to document the cycle without interruption. **(6 marks)**

b) What is a bus? Explain the three group of lines in the system bus. **(8 marks)**

c) Using an appropriate diagram, illustrate the classical organization of the CPU. **(6 marks)**

Question Three

a) Discuss the roles of the following computer memory. **(4 marks)**
- **(i)** RAM
- **(ii)** ROM

b) Distinguish between RISC and CISC **(4 marks)**

c) Give the Boolean expression and the truth table for the following logic gates. **(6 marks)**
- **(i)** 2 input OR
- **(ii)** 2 input NAND
- **(iii)** 2 input AND

d) Why is the concept of Boolean Algebra important in the digital computers and other digital systems? **(4 marks)**

e) Discuss the aim of minimization in the realization of logic circuits. **(2 marks)**

Question Four

a) Explain the following terms in the context of digital systems. **(4 marks)**
- **(i)** Internal memory
- **(ii)** Program counter
- **(iii)** Cache hit
- **(iv)** Split cache

b) Discuss the **THREE** basic characteristics influencing the choice of memory. **(6 marks)**

c) One of the cache design requirements is the cache size. Explain the impact of a larger cache on systems performance. **(4 marks)**

d) Compare and contrast SRAM and DRAM **(6 marks)**

Question Five

a) Explain the following terms as used in computer organization and architecture. **(8 marks)**
- **(i)** Instruction set
- **(ii)** Paging
- **(iii)** Pipelined processor
- **(iv)** Superscalar processor

b) Describe **THREE** basic input/output techniques. **(12 marks)**