



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2013/2014

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

SIT 105: INTRODUCTION TO COMPUTER HARDWARE

Date: 17/12/2014

Time: 8:30 – 10:30 am

INSTRUCTIONS

Answer all questions in section A and any two questions from section B

Section A (30 Marks)

Question 1

- a) Explain each of the following terms as used in a microprocessor system (3 Marks)
- i. Arithmetic Logic Unit (ALU)
 - ii. General Purpose Registers
 - iii. Control Unit
- b) Explain each of the following terms as used in a micro-controller system (7 Marks)
- i. Program Counter (PC)
 - ii. Instruction Register (IR)
 - iii. Conditions Code Register/ Flags Register
 - iv. Instruction Decoder Circuit
 - v. Memory Data Register
 - vi. Memory Address Register
 - vii. Stack Pointer (SP)
- c) Explain the term instruction as used in a computer system (4 Marks)

- d) Differentiate between CISC and RISC Instruction Set Architectures (4 Marks)
- e) Explain the Von-Newmann Fetch-Execute Cycle. (3 Marks)
- f) Explain how the Von-Newmann architecture machine handles an interrupt to the fetch-execute cycle. (4 Marks)
- g) With the aid of a diagram, list the major components of a computer system and explain the functions of each component listed. (5 Marks)

Section B (40 Marks)

QUESTION 2 (20 MARKS)

- α) with the aid of diagrams, explain the three basic elements that are used in algorithmic state machine (ASM) charts. (9 Marks)
- β) Differentiate between a conventional flowchart and an algorithmic state machine (ASM) chart (4 Marks)
- χ) Describe a 1-Bit full-adder using ASM Chart and its truth table (7 Marks)

QUESTION 3 (20 MARKS)

Answer the following questions concerning bus-organized computer systems.

- α) With the aid of a diagram, explain the computer bus structure or Architecture. (5 Marks)
- β) With the aid of a diagram, explain how a 4-bit controlled buffer register works with input control signal called LOAD, a CLR signal that reset's the register and an output control signal called ENABLE. (8 Marks)
- χ) With the aid of a diagram, explain how the 4-bit controlled buffer register in a) can be used to implement bus-organized computer architecture between 4 general-purpose registers called A, B, C and D. (7 Marks)

QUESTION 4 (20 MARKS)

- α) Explain any four different types of Read Only memory (ROM) (4 Marks)
- β) Differentiate between hardwired and micro-programed control in a microprocessor system. (4 Marks)
- χ) With the aid of a diagram, explain how an 32-bit diode ROM with on-chip decoding works (6 Marks)
- δ) Name and explain the three different classes of access methods that are used in a computer system to access external storage (6 Marks)

QUESTION 5 (20 MARKS)

- α) Explain the concept of addressing modes in computer systems (2 Marks)
- β) Explain the concept of paging as used in computer systems (2 Marks)
- χ) Explain **any five** types of addressing modes that are used in computer systems (10 Marks)
- δ) A microprocessor system has 16 Address lines and 8 data lines. It also has 16kB memory chips. Provide the memory organization of the system if all the 16 address lines are in use. (6 Marks)