

Machakos University College
End of the semester Examination – 2014
Bachelor of Information Technology
Year 1 Semester 1

SIT 105: Introduction to Computer Hardware

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 (5 Marks)
 - i. Arithmetic Logic Unit (ALU)
 - ii. General Purpose Registers
 - iii. Control Unit
 - iv. Program Counter (PC)
 - v. Instruction Register (IR)
- b) Explain the term instruction as used in a computer system (4 Marks)
- c) Differentiate between CISC and RISC Instruction Set Architectures (4 Marks)
- d) Explain the Von-Newmann Fetch-Execute Cycle. (3 Marks)
- e) Explain how the Von-Newmann architecture machine handles an interrupt to the fetch-execute cycle. (4 Marks)
- f) With the aid of a diagram, list the major components of a computer system and explain the functions of each component listed. (5 Marks)
- g) With the aid of a diagram, explain the hierarchical relationship between computer hardware and software. (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

- χ) Describe a 1-Bit full-adder using ASM Chart and its truth table (4 Marks)
(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)

- a) Explain any four different types of Read Only memory (ROM) (4 Marks)
- b) Differentiate between hardwired and micro-programed control in a microprocessor system. (4 Marks)
- c) With the aid of a diagram, explain how an 32-bit diode ROM with on-chip decoding works (6 Marks)
- d) With the aid of a diagram, explain how an 8-bit address Erasable Programmable Read only Memory (EPROM) works (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)