SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY

SCI 105: COMPUTER ARCHITECTURE

DATE:13TH APRIL, 2017 **TIME: 10.30 -12.30 PM**

INSTRUCTIONS TO CANDIDATES

a) **Answer ALL questions from section A(Compulsory)**

b) **Answer ANY TWO questions from section B**

SECTION A (30 Marks) - Compulsory

Question One

a) Define the following terms as used in computer systems: **[3 Marks]**

i) Computer architecture

ii) Computer organization

iii) Addressing mode

b) State three characteristics of Peripheral Component Interconnection (PCI) Bus. **[3 Marks]**

c) With the aid of a diagram, describe the general CPU instruction cycle with interrupts. **[5 Marks]**

d) Calculate in gigabytes the capacity of a hard disk which has 16384 cylinders, 16 heads and 63 sectors per track. **[3 Marks]**

e) Explain four elements of machines instruction. **[4 Marks]**

f) Describe the Von-Neumann computer architecture. **[5 Marks]**

g) Outline three types of instructions that must be provided in the instruction set. **[3 Marks]**

h) Explain four functions of the computer input/output module. **[4 Marks]**

SECTION B (40 Marks): ANSWER ANY TWO QUESTIONS

Question Two

a) Explain three types of addressing modes. **[6 Marks]**

b) A memory system has 16M bytes. The memory is organized into blocks of 64bit/8 bytes each, and the cache has total 512K bytes, organized into cache lines of 8 bytes each:

i) Determine the number of bits needed to address all bytes. **[2 Marks]**

ii) State the number of memory blocks, and determine the number of bits needed to address all memory blocks. **[3 Marks]**

iii) Give the number of cache lines, and determine the number of bits needed to address all cache lines. **[3 Marks]**

c) Discuss three types of interrupts. **[6 Marks]**

Question Three

a) Explain the structural components of each of the following:

i) CPU **[4 Marks]**

ii) Computer **[4 Marks]**

b) Discuss the following instruction format: **[4 Marks]**

i) 4-address instructions

ii) 3-address instructions

iii) 2-address instructions

iv) 0-address instructions

c) With the help of a well labeled diagram, describe the instruction cycle state diagram. **[8 Marks]**

Question Four

a i) Define the term bus arbitration. **[2 Marks]**

ii) Describe two types of arbitration techniques. **[4 Marks]**

b) Discuss two major components of a system bus. **[4 Marks]**

c) Let the decimal numbers A=54, B= -77 ;

i) Give their 8-bit 2's complement representation. **[2 Marks]**

ii) Compute A + B in 2's complement. **[2 Marks]**

d) Identifying the three RAID levels, explain how the technology is used to enhance reliability and performance in a computer system. **[6 Marks]**

END