



AFRICA NAZARENE UNIVERSITY

CENTRE: NAIROBI
DEPARTMENT: COMPUTER SCIENCE
UNIT TITLE: FUNDAMENTALS OF COMPUTER SYSTEMS
UNIT CODE: BIT 101 / CSC 101
LECTURER: J. M. MAKASA
TRIMESTER: 3RD TRIMESTER 2012/2013
DATE: 14TH AUGUST, 2013
TIME: 5.30PM – 8.30PM

Instructions:

1. Answer any **FOUR** questions.
2. Write all your answers in the answer booklet provided.
3. Time allowed: Three hours

Question One (20 marks)

- a) Compare and contrast a tablet PC and a Notebook. [2 marks]
- b) Describe the following terms as applied in computing.
 - i. FLOPS
 - ii. EEPROM
 - iii. Punched paper tape
 - iv. Clock speed.
 - v. Nibble

[5 marks]

- c) A hard disk has memory capacity of 8 terabyte express this in bits.

[2 marks]

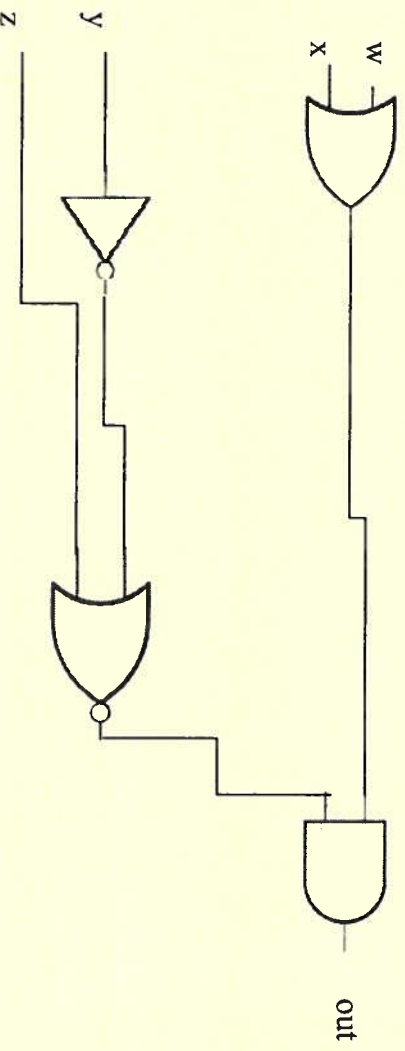
- d) Differentiate between SRAM and DRAM. [4 marks]
- e) Discuss briefly characteristics of DDR SDRAM. [2 marks]
- f) With the help of a well labeled diagram describe a hard disk. [4 marks]
- g) Perform the binary division and verify whether the product of the quotient and the divisor equals the dividend.

$$1011011_2 \div 111_2$$

[2 marks]

Question Two (20 marks)

- a) Discuss the characteristics of 2nd and 4th generation computers. [4 marks]
- b) Given the circuit below.
 - i. Generate a truth table. [5 marks]
 - ii. Come up with a logic equation for the output, OUT. [2 marks]



c) Given the logic equation:

$$Z = \bar{x}_1 x_2 (x_1 + x_3)$$

- i. Draw a circuit.
- ii. Generate a truth table.

[3 marks]

[3 marks]

d) Convert the following to the equivalent binary numbers.

- i. $40b.6_{16}$
- ii. 0.567_8

[3 marks]

Question Three (20 marks)

a) State the functions of the following registers in a computer system.

- i. Program counter
- ii. Instruction register
- iii. Accumulator
- iv. Memory address register
- v. Flag register.

[5 marks]

b) Describe the following:

- i. Opcode
- ii. Operand

[3 marks]

c) Define the term interrupt and further name two types of interrupts.

[3 marks]

d) Describe variable memory partitioning highlighting on the algorithms used in this method.

[5 marks]

e) Describe virtual memory.

[2 marks]

f) Define computer architecture.

[2 marks]

Question Four (20 marks)

a) Convert 677.5625_{10} to both octal and hexadecimal.

[4 marks]

b) Find the decimal equivalent of $ABC.DE_{16}$

[2 marks]

c) A hard disk has the following characteristics:

- Number of bytes per sector=512

- Number of sectors per track=40
- Number of tracks per cylinder=11
- Number of cylinders=1331

You would like to store a file of 20000 records.

- How many cylinders does the file require if each data record requires 256 bytes. [4 marks]
- Find the total disk capacity. [3 marks]

d) Calculate the following using two's and ones complement respectively.

- 110011₂-101100₂ [3 marks]
- 1111.11₂-0.01₂ [3 marks]

e) Define the term utility program. [1 mark]

Question Five (20 marks)

a) The area of a circle is given by the formula: $\pi \times r^2$. Draw a flowchart that computes the area of a circle if the radius is more than two inches. If the radius is less than two it should not be input more than three times. [5 marks]

b) Code a c++ program that implements the above flowchart for any radius input. [5 marks]

c) With the help of suitable sketches describe the following types of network topologies. [2 marks]

- Bus
- Ring
- Star

[6 marks]

d) Explain the meaning of a disk controller. [2 marks]

e) List at least four steps of program development cycle. [2 marks]