UGANDA MARTYRS UNIVERSITY

NKOZI

UNIVERSITY EXAMINATION

FEBUARY 2021

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS

FIRST YEAR, END OF SEMESTER ONE TAKE HOME FINAL ASSESSMENT

FOR

DIPLOMA IN COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

AND

BACHELORS IN EDUCATION

IN

COMPUTER ARCHITECURE AND ORGANISATION

Instructions

EXAMINATION INSTRUCTIONS AND GUIDELINES

All questions carry equal Marks.

i. Attempt all questions in this examination
ii. Your answers should be typed in digital word format and submitted in Portable Document Format (.pdf)
iii. Use the Trebuchet MS font type; size 12, Line spacing 1.5
iv. Submit your examination answers to the University through either e-learning platform (www.elearning.umu.ac.ug) Ensure that your file is in pdf format

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Question 1

a) Suppose you are working in your word processor and you press the letter "g" on the keyboard. Give a brief summary of what happens; from the time you press the key to the time you see it displayed on your display screen/monitor. **(6marks)**

b) Currently in computer world *dual core*, *i3* core , etc are the common multi processing systems. Using diagrammatic illustration and in terms of functionality, show the difference between the dual core and i3. **(5marks)**

c) Operating system is defined as software that manages computer hardware and provides an environment in which a user executes programs conveniently and efficiently.
   i. What computer hardware is managed by the operating system and how does it manage the hardware. **(3marks)**
   ii. Explain how the operating system provides a convenient environment for the computer users. **(3 marks)**
   iii. Within the main memory protection of processes from each other and from the operating system is key. How is protection achieved? **(3 marks)**

d) Give at least two major activities of an operating system in regards to; **(5 marks)**
   i. Process management?
   ii. Memory management?

Question 2

(a) All modern computers are based on the architecture developed by John Von Neumann at the Institute of Advanced Studies. Explain the concepts that are outlined by this architecture. **(3 Marks)**

(b) Explain what we refer to when we talk about Performance as a characteristic of memory. **(4 marks)**

(c) Differentiate between Hardwired programming and software programming. **(4 Marks)**

(d) Explain the importance of cache memory and show how its integrated into the computer system. **(4 Marks)**

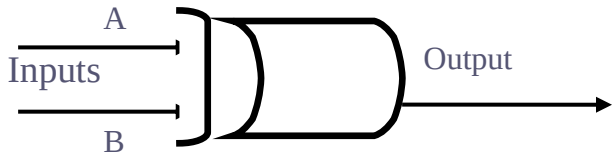
(e) With an example, briefly explain the involvement of the operating system in Memory management. **(4 Marks)**

(f) Briefly discuss the major security issues to consider while using a computer and how to deal with each**.** ***(6marks)***

Question 3

a) Why are logic gates important to modern day electronic computers? **(3 marks)**

b) Draw a truth table for the XOR logic gate below **(3marks)**



c). Given a Boolean SUM of PRODUCTS expression:

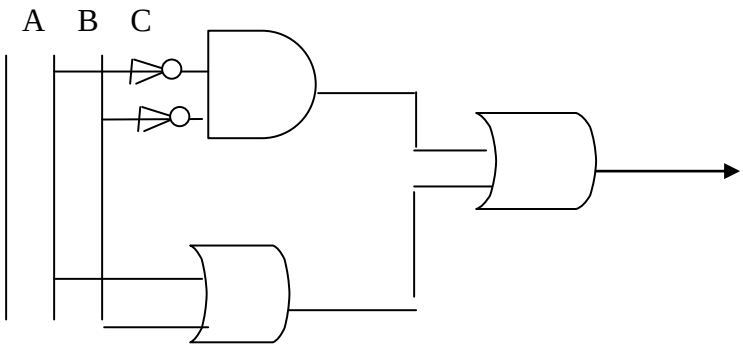
$$\overline{A}\ \overline{B}\ \overline{C} + \overline{A}\ B\ C + A\ B\ C + A\ \overline{B}\ C$$

Derive the corresponding

a) Logic circuit for this expression **(4 marks)**

b) A truth table **(4 marks)**

d). Refer to the circuit below



i).Write down the expression for the circuit. **(*3* Marks)**

e) Convert the following from one radix to another **(5 marks)**

i. $98DF_{16}$ to Binary

ii. 43.625_{10} to Binary

iii. Perform the addition of two numbers 4564 and 3445 in the Packed Binary Coded Decimal (BCD) format. ***(3* marks*)***

Question 4

a) "The width of the bus is a key determinant for performance" explain the statement.

(3 Marks)

b) By the nature of its function, the Control Unit is referred to as the heart of the CPU. Explain what makes up the control Unit**.** **(4 Marks)**

c) The control Unit and its logic can be hardwired or micro-programmed. Explain these two approached to Control unit implementation. **(5 Marks)**

d) Explain any two circumstances that favor CPU scheduling **(4 Marks)**

e) Define an 'Instruction' as used in the computer world, with an illustration of a simple instruction format, explain the fields of an instruction. **(5 marks)**

f) With an illustration explain the basic instruction cycle of a computer. Explain the alteration that is made on the instruction cycle in case of interrupt driven machines**.** **(4 Marks)**

END