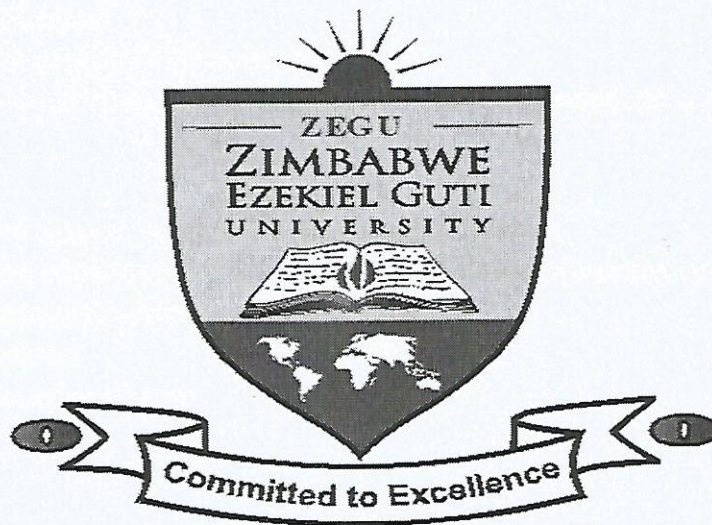


ZIMBABWE EZEKIEL GUTI UNIVERSITY



FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

Department of Digital Technology

MODULE: COMPUTER ORGANISATION AND ARCHITECTURE
(MAIN)

CODE: CDT 106

DATE: 28 May 2019

DURATION: 3 HOURS

INSTRUCTIONS AND INFORMATION TO CANDIDATES

1. ANSWER ANY **FOUR** QUESTIONS.
2. EACH FULL QUESTION CARRIES 25 MARKS.
3. NUMBER OF MARKS FOR EACH QUESTION IS GIVEN IN SQUARE BRACKETS
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Question 1

- a) Describe the primary functions of the following components found in the CPU
 - i. ALU [4]
 - ii. Program Counter [3]
 - iii. Instruction Register [3]
- b) Explain the basic principles of interrupt based I/O. [10]
- c) Explain why main memory (RAM) is smaller in size than external memory (HDD). [5]

Question 2

- a) Explain the three types of hazards in a pipelined architecture. [12]
- b) State the contents of each of the following registers during instruction cycle:
 - i) Memory Address Register [5]
 - ii) Program counter [4]
 - iii) Current instruction register [4]

Question 3

- a) Explain any five aspects you consider when designing an instruction set. [10]
- b) There are multiple locations for placing operands needed by the CPU. List four of these options. [4]
- c) Give a reason why variable length instructions are better than fixed length instructions? [1]
- d) Describe the main components in the structure of the von-Neumann architecture. [10]

Question 4

- a) Define the term *cache memory*. [2]
- b) Describe any three differences between third generation computers and fourth generation computers? [9]
- c) State the fundamental difference between a trap and an interrupt? Describe how each one is handled when it occurs? [6]
- d) "DRAMs are normally cheaper and larger in storage size than SRAMs. So SRAMs are not used in most computers." Is this statement correct? Justify your answer. [5]
- e) Use a stack machine concept to evaluate the expression $A * B + (C - D)/E$. [3]

Question 5

- a) In relation to communication between a microprocessor and peripherals explain the techniques of
- i. software polling [3]
 - ii. external interrupt [3]
 - iii. priority interrupts [3]
- b) Describe one possible application of any one of the techniques in a) [3]
- c) List the basic elements of a memory hierarchy. [3]
- d) Why is the memory system of a computer organized as a hierarchy? [8]
- e) Differentiate *computer organization* and *computer architecture*. [2]

*****End of Paper*****