15

(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

SPECIAL EXAM

THIRD YEAR SECOND **SEMESTER EXAMINATIONS**

FOR THE DIPLOMA

IN

INFORMATION TECHNOLOGY

COURSE CODE: DIT 095

COURSE TITLE: PLATFORM TECHNOLOGY

DATE: 02/08/2022 **TIME:** 11:00AM - 1:00PM

INSTRUCTIONS TO CANDIDATES

Answer **Question ONE (1)** and any other **TWO**

TIME: 1 Hour 30 Mins

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION ONE (24 MARKS)

a. Define the term computing platform as used in platform technology **(2 marks)**
b. Discuss the types of pipelines available in platform technologies **(3 marks)**
c. Explain the 5 pipeline stages in processor pipelining **(5 marks)**
d. How does pipeline improve performance of computer system? **(3 marks)**
e. Explain how pipeline execution time is calculated. **(3 marks)**
f. Discus the reason(s) why you think pipelining increases latency **(4 marks)**
g. Explain 3 types of hazards in pipelines **(6 marks)**

QUESTION TWO (18 MARKS)

a. Using a simple digital circuit and its syntax, explain the structure of VHDL **(6 marks)**
b. Explain the most remarkable development of the English mathematician Charles Babbage (Father of Computer) in 1822 **(3 marks)**
c. Differentiate between systolic architecture and RISC architecture as used in computer organization and architecture **(4 marks)**
d. Memory management is one of the functions of the operating system. Briefly explain five memory management requirements **(5 marks)**

QUESTION THREE (18 MARKS)

a. Differentiate between arithmetic pipeline and instruction pipeline **(4 marks)**
b. Use radix representation to convert the binary number (101.01) into decimal. **(4 marks)**
c. Differentiate between Windows and Unix-like operating systems **(4 marks)**

d. Draw a general structure of a simple digital circuit of VHDL **(3 Marks)**

e. Write a simple program to show the input and output ports of the circuit above **(3 marks)**

QUESTION FOUR (18 MARKS)

a. Pipelining has been applied effectively in computer processors.
   i. Define the term pipelining **(2 marks)**
   ii. State its importance in computing **(2 marks)**
   iii. Differentiate between linear and synchronous pipelining **(4 marks)**

b. State the problems associated with pipelining **(3 marks)**
c. A task has four subtasks with time t_1=60, t_2=50, t_3=90 and t_4= 80 seconds. Calculate:
   i. Latch delay **(2 mark)**
   ii. Pipeline cycle time **(2 mark)**
   iii. Execution time for non-piped task **(2 mark)**
   iv. Speed **(1 mark)**