FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**August 2020**
Programme	:	Diploma in Computer Science (DCS)
Course	:	**DCS1102: Computer Architecture**
Date of Examination	:	10 December 2020 (Thursday)
Time	:	4.00pm – 6.30pm Reading Time : Nil
Duration	:	2 Hours 30 Minutes

Special Instructions :

This paper consists of **FOUR (4)** structured questions. Answer ALL the questions. All questions carry equal marks.

Material permitted :

Non-Programmable Scientific Calculator

Materials provided :

Nil

Examiner(s)	:	**Asvhini Subramaniam,** Lusiana Syaiful
Chief Moderator	:	Kavitha Thamadharan

*This paper consists of **3** printed pages, including the cover page*

DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
DCS1102: COMPUTER ARCHITECTURE
FINAL ALTERNATIVE ASSESSMENT: AUGUST2020 SESSION

Instructions: This paper consists of **FOUR (4)** structured questions. Answer ALL the questions. All questions carry equal marks.

Question 1

a) Convert **-103_{10}** and **-69_{10}** to binary, and add them using the 2's complement form. (*keep your answer in the 2's complement form, and indicate if an overflow occurs; status of carry and sum*):

(5 marks)

b) Perform the following subtraction using 2's complement and state the answer in decimal value.
0011.1001 – 0001.1100

(5 marks)

c) State the condition in which overflow occurs in case of addition and subtraction of two signed 2's complement numbers. Explain how overflow occurs and detected with an appropriate example(s).

(10 marks)

d) State the purpose of flags register and list any **THREE (3)** flag registers.

(5 marks)

Question 2

a) Discuss briefly the listed **THREE (3)** types of data hazards with appropriate example(s).
   i) true dependency
   ii) anti-dependency
   iii) output dependency

(12 marks)

b) Explain the following typical assembly language statements:
   i) ADD CLASS, 20
   ii) MOV DATA, 89
   iii) ADD AX, BX
   iv) AND NUM1, 99

(8 marks)

c) List the need for memory protection and describe the implementation of memory protection in the memory paging system.

(5 marks)

Question 3

a) State and briefly explain **THREE (3)** different types of interrupts with appropriate examples.

(15 marks)

b) Differentiate **instruction-level parallelism** with **machine parallelism.**

(10 marks)

Question 4

a) The register content for an Intel 8086 microprocessor is as follows:

CS = 4000H, DS = 2000H, SS = 3000H, SI = 5000H, DI = 6000H
BX = 8090H, BP = 7000H, AX = 6134H, CX = 8623H, DX = 9009H

Calculate the physical address of the memory where the operand is stored and the contents of the memory locations in each of the addresses shown below:

i) MOV [SI], AH
ii) MOV [DI+6H], BX
iii) MOV [SI+BX–5H], AX
iv) MOV [DI][BX]+10H, CX
v) MOV [BP][SI]+10H, DX

(15 marks)

b) State and discuss briefly any **TWO (2)** techniques for I/O Operations.

(10 marks)

~THE END~