FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2022**
Programme	:	Diploma In Information Technology (DITN/DICTN)
Course	:	**ICT2101: Computer Organization**
Date of Examination	:	August 4, 2022 (Thursday)
Time	:	8:00am – 10:30am Reading Time : Nil
Duration	:	2 Hours : 30 Minutes

Note: 30 minutes is added into the duration of the examination to factor in any connectivity matters and for you to scan and upload your scripts.

Special Instructions :

Section A: Answer **ALL** the questions.

Section B : Answer **ALL** the questions.

Materials permitted :

Nil

Materials provided :

Nil

Examiner(s)	:	**Mr Ryan Tee Ah Ann** and Nuur Shuhada Mohd Najib
Moderator	:	Mr. Victor Raj Kolintiar

*This paper consists of **4** printed pages, including the cover page*

DIPLOMA IN INFORMATION TECHNOLOGY (DITN/DICTN)
ICT2101: COMPUTER ORGANISATION
FINAL ALTERNATIVE ASSESSMENT: APRIL 2022 SESSION

Section A: (40 marks)

Instructions: This section consists of **THREE (3)** questions. Answer **ALL** questions.

Question 1

Perform the following conversion: (show all the working clearly)

(a) Decimal 99 to hexadecimal

(1 mark)

(b) Binary 110010 to decimal

(1 mark)

(c) Integer -78 to 8-bit two's complement binary

(2 marks)

(d) Demonstrate in binary how an 8-bit two's complement computer system will perform the following arithmetic and their status whether it is over flow:

i. 125 – 51

(2 marks)

ii. -76 - 58

(2 marks)

[Total: 8 marks]

Question 2

Suppose the contents of registers are as follow:

```
AX = 0008 BX = 0019 CS = 305E DS = 4FF9
IP = 0025 SI = 1005
```

Find out the following:

(a) The logical and physical address for the next instruction.

(2 marks)

(b) If the instruction (**`SUB AL,BL`**) is executed, what is the value of register **`AX`**, carry flag and overflow flag?

(3 marks)

(c) Give the instruction that store the result of subtraction (**`SUB AL, BL`**) in 2(b) in memory location `1000` of the data segment by using indexed addressing mode.

(2 marks)

[Total: 7 marks]

Question 3

(a) Trace the register AX, carry flag (CF) and overflow flag (OF) for the following sequence of instructions. You are required to show results for each step in binary form. Use 'X' to represent undefined value.

(10 marks)

```
MOV AX, 5980H
MOV CL, 01H
SHR AX, CL
CMP AH, AL
MUL AL
```

(b) Write an assembly routine to find the average of all 16-bit integers store in memory location from address 1000H to 2000H. Store the average into register DX.

(15 marks)

[Total: 25 marks]

SECTION B: (60 Marks)

Instruction: This section consists of **THREE (3)** questions. Answer **ALL** questions.

Question 4

(a) A low-level language is a programming language that provides little or no abstraction of programming concepts and is very close to writing actual machine instructions. Briefly explain **TWO (2)** advantages and **THREE (3)** disadvantages of low-level programming.

(10 marks)

(b) The I/O system is a major factor in overall system performance, and can place heavy loads on other major components of the system.

(i) Briefly explain **THREE (3)** basic types of interrupts.

(6 marks)

(ii) Explain why interrupt is better than polling in handling I/O for a computer system.

(4 marks)

[Total: 20 marks]

Question 5

The type of addressing mode and size of the operands are important features in ISA for computer to understand. Identify the type of addressing mode used in each of the following instructions, and state the size of the operands:

(a) MOV DX, [47H]

(b) MOV [BP+0DH], DH

(c) ADD AX, BP

(d) MOV BX, 8H

(e) INC AX

(10 marks)

[Total: 10 marks]

Question 6

The pipeline design of CPU allows storing and executing instructions in an orderly process. It is a technique used that allows multiple instructions to be overlapped during execution.

(a) With proper diagram(s), describe the working principles of pipelining, whichincludes the design of pipeline, the stages involved and the pipeline hazards.

(10 marks)

(b) Compare the efficiency of the following I/O handling mechanism:

CPU polling, interrupt-driven I/O and Direct Memory Access (DMA).

(12 marks)

(c) In your opinion, state and discuss **ONE (1)** technique/way to increase the CPU performance especially in multitasking and multiusers environment other than pipelining.

(8 marks)

[Total: 30 marks]

-THE END -