

**FINAL  
ALTERNATIVE ASSESSMENT**

(COVER PAGE)

Session : APRIL 2021

Programme : Diploma In Information Technology (DITN)

Course : **ICT2101: Computer Organisation**

Date of Examination : 26 July, 2021 (Monday)

Time Start : 4:00pm – 6:30pm

Duration : 2 Hours 30 Minutes

**Special Instructions :**

This paper consists of **FOUR (4)** questions. Answer **ALL** questions in your own paper.

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

Materials permitted : Nil

Materials provided : Nil

Examiner(s) : **Ryan Tee Ah Ann** and Steven

Chief Moderator : Ms Kavitha Thamadharan

*This paper consists of 5 printed pages, including the cover page*

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)  
 ICT2101: COMPUTER ORGANISATION  
 FINAL ALTERNATIVE ASSESSMENT: APRIL 2021 SESSION

**Instructions:** This paper consists of **FOUR (4)** questions. Answer **ALL** questions in your own paper. Scan and convert your answers to pdf in **ONE (1)** file, and upload to **BLACKBOARD**. You should clearly number all your responses to the questions. **ALL** questions carry equal marks.

**Question 1**

- (a) Describe the function of the **THREE (3)** types of system bus in computer system. Illustrate your explanation using appropriate diagram. (7 marks)
- (b) Show the 16-bit 2's complement binary representation of the following decimals:
- i. 128 (2 marks)
- ii. - 4096 (2 marks)
- (c) Show all workings clearly for the following:
- i. Convert  $59.9375_{10}$  to binary (2 marks)
- ii. Convert  $1080.75_{10}$  to hexadecimal (2 marks)
- (d) The following is the output from -r **DEBUG** commands after a certain 8086 program has run with a breakpoint set. All values are in hexadecimal.

```
-r
AX=C145 BX=E03F CX=0050 DX=0102 SP=0215 BP=0403 SI=7000 DI=8000
DS=2617 ES=12E4 SS=5487 CS=5B4A IP=010D NV UP EI PL NZ NA PO NC
5B4A:010D 29C3 AND BX,AX
```

Answer the following questions:

- i. The logical address of the next instruction to be executed. (1 mark)
- ii. The physical address of the next instruction to be executed. (3 marks)

- iii. Identify the next instruction. Find the value of register BX and IP after the next instruction has been executed.

(6 marks)

**[Total:25 Marks]****Question 2**

Study and analyze the Assembly Language Codes given below and answer the following questions.

Table 1: Program Code

Line 1	TITLE SAMPLE PROGRAM
Line 2	.MODEL SMALL
Line 3	.STACK 64
Line 4	.CODE
Line 5	.DATA
Line 6	MYCODE PROC
Line 7	MOV AX, 04
Line 8	MOV BX, 0212
Line 9	CMP AX, BX
Line 10	JG action1
Line 11	JLE action2
Line 12	action1:
Line 13	ADD AL, 30
Line 14	JMP exit
Line 15	action2:
Line 16	ADD BL, 20
Line 17	JMP exitt
Line 18	exit:
Line 19	MOV AH, 4CL
Line 20	INT 21H
Line 21	MYCODE ENDP
Line 22	END MYCODE

- (a) i. Identify **THREE (3)** errors in the above instructions. (3 marks)
- ii. Briefly explain the reason if the code is incorrect and write the correct codes according to the Assembly Language. (6 marks)
- (b) Describe the meaning of the instruction at Line 10 and 11. Provide suggestion to further reduce these instructions. (6 marks)
- (c) Explain the outcome of combining instructions at lines 18, 19 and 20. (6 marks)

- (d) Based on the assumption that all lines of codes are corrected, describe the outcome of the above program.

(4 marks)

**[Total:25 Marks]****Question 3**

- (a) Comment on the error if any, in the following assembly language mnemonics. Otherwise explain the outcome of the operation.

i. SUB DL, [BX]

ii. OUT 4FH, BL

iii. IMUL BH

iv. MOV [95H], [7BH]

(8 marks)

- (b) 8086 microprocessor was designed to have two separate working unit: Execution Unit (EU) and Bus Interface Unit (BIU), so that both unit can work concurrently and increase the efficiency of the processor. Describe **THREE (3)** situations in which either of the unit is forced to be idle waiting for the other unit.

(12 marks)

- (c) i. Give **TWO (2)** advantages and **TWO (2)** disadvantages of having large register size in 8086 microprocessor.

(4 marks)

- ii. Give **ONE (1)** disadvantage of having a small register size.

(1 mark)

**[Total:25 Marks]****Question 4**

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

CS=1000H, DS=2000H, SS=3000H, SI=4000H, DI=5000H  
 BX=6080H, BP=7000H, AX=25FFH, CX=8791H, DX=1299H

Calculate the physical address of the memory where the operand is stored and the contents of the memory location(s).

MOV [SI+BX-8H], CX

(4 marks)

- (b) Explain the reason memory protection is needed. Also, describe the implementation of memory protection in memory paging system with the aid of diagram.

(8 marks)

(c) Explain the working principle of interrupt-driven I/O by providing step-by-step explanation.  
(8 marks)

(d) Explain the fetch-execute cycle of 8086 processor. Also, draw the pipeline process of 8086.  
(5 marks)

**[Total:25 Marks]**

**~~ The End ~**

*ICT2101 (Final)/April2021*