

**FINAL
ALTERNATIVE ASSESSMENT**

(COVER PAGE)

Session : April 2020

Programme : Diploma in Information Technology (DITN)
Diploma in Information and Communication Technology (DICTN)

Course : ICT2101: Computer Organization

Date of Examination : 5 August 2020 (Wednesday)

Time : 12.00noon – 2.15pm Reading Time : Nil

Duration : 2 Hours 15 Minutes

Special Instructions :

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

Material permitted : Non-Programmable Scientific Calculator

Materials provided : Nil

Examiner(s) : Ms Kavitha, Mr Tee Ah Ann

Chief Moderator : Mr Ang Chee Huei

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

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTN)
ICT2101: COMPUTER ORGANIZATION
FINAL ALTERNATIVE ASSESSMENT: APRIL 2020 SESSION

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

Question 1

(a) Convert the following with full working shown:

- i. Decimal 208 to Binary
- ii. Decimal 129 to Binary
- iii. Hexadecimal F89A to Binary
- iv. Hexadecimal E6A2 to Binary
- v. Binary 10111101 to Decimal

(10 Marks)

(b) Demonstrate using binary how an 8bit two's complement computer system will perform the following:

- i. $84 - 41$ (5 Marks)
- ii. $23 - 91$ (5 Marks)
- iii. $-66 - 18$ (5 Marks)

(Total: 25 marks)

Question 2

(a) Explain the direct addressing mode by giving appropriate example. (3 marks)

(b) Describe the function of the following flag registers.

- i. Carry flag
- ii. Overflow flag

(6 marks)

- (c) For the following fragment of 8086 program, show the content of register AX after each instruction is executed. All values are in hexadecimal.

```
MOV AX, 0008
ADD AL, 05
AAA
```

(5 marks)

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

CS = 4000h, DS = 5000h, SS = 3000h, SI = 5000h, DI = 6000h,
 BX = 5060h, BP = 7050h, AX = 5022h, CX = 3206h, DX = 7227h

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

- i. MOV [SI], AL
- ii. MOV [DI + 6h], BX
- iii. MOV [SI + BX - 5h], AX
- iv. MOV [DI][BX] + 10h, CX

(11 marks)

(Total: 25 marks)

Question 3

- (a) Explain the differences between a near procedure call and a far procedure call in the microprocessor's point of view.

(8 marks)

- (b) Explain the working principle of interrupt-driven I/O.

(11 marks)

- (c) Develop an assembly language program to perform the arithmetic operations below by only using registers AX and BX.

$$10_{10} * (215_{10} - 165_{10}) + 25$$

(6 marks)

(Total: 25 marks)

Question 4

- (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. MUL BH
- iv. MOV [95H], [7BH]
- v. IN 25_H, DL

(10 marks)

- (b) Why memory protection is needed? How memory protection is implemented in memory paging system? (6 marks)

- (c) Cache memory for the x86 family comes in two types. Briefly explain these **TWO (2)** cache memory. (4 marks)

- (d) Explain the reason why cache memory is faster than conventional RAM. (5 marks)

(Total: 25 marks)

~The End~