

 **INTI** International
University & Colleges

FINAL
Examination Paper

(COVER PAGE)

Session : AUGUST 2018

Programme : Diploma In Information And Communication Technology (DICTN)

Course : ICT2101: Computer Organization

Date of Examination : 10 December 2018, (Monday)

Time : 5:00pm – 7:00pm Reading Time : Nil

Duration : 2 Hours

Special Instructions :

This paper consists of SIX (6) questions. Answer any FOUR (4) questions in the answer booklet provided.

Materials permitted : Nil

Materials provided : Nil

Examiner(s) : Tee Ah Ann and Vimala

Moderator : Mohd Faizal Bin Alias

This paper consists of 6 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME
(DICTN)
DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
ICT2101: COMPUTER ORGANISATION
FINAL EXAMINATION: AUGUST 2018 SESSION

Instructions: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. Each question carries equal marks.

Question 1

- (a) What is Moore's law? Describe the significance of this law. (5 marks)
- (b) List and briefly define the main structural components of a computer. (8 marks)
- (c) Discuss the benefits of using a multiple-bus architecture as compared to a single-bus architecture. (8 marks)
- (d) What is an Instruction Set Architecture (ISA) and why is it important in processor design? (4 marks)

Question 2

- (a) Convert the following to binary, decimal, and hexadecimal:

Decimal	Binary	Octal	Hexadecimal
50	101111011		
		723	
			E29
123			
			1FFF

(6 marks)

(b) Assume numbers are represented in 8-bit Two's Complement representation. Show the calculation of the following without using calculator:

- i. $6 + 13$
- ii. $-6 + 13$
- iii. $6 - 13$
- iv. $-6 - 13$

(7 marks)

(c) If an address field of an instruction contains a decimal value of 14, explain where the corresponding operand is located for following addressing:

- i. immediate addressing
- ii. direct addressing
- iii. indirect addressing
- iv. register addressing
- v. register indirect addressing

(5 marks)

(d) A computer has 16MB main memory and 64KB cache. The block size is 16 bytes. Assuming a direct mapping technique is used, calculate the following:

- i. How many cache lines does the computer have?
- ii. How many blocks does the main memory have?

(5 marks)

Question 3

(a) Identify the addressing mode used in each of the following instructions, and state the size of the operands:

- i. `MOV DX, [47H]`
- ii. `MOV [BP+0DH], DH`
- iii. `ADD AX, BP`
- iv. `MOV BX, 8H`
- v. `INC AX`

(5 marks)

- (b) Which of the following instructions cannot be coded in 8088/86 Assembly Language? Give the reason why not, if any. All numbers are in HEXADECIMAL.

- i. MOV AX, 27
- ii. MOV AL, 97F
- iii. MOV DS, 9BF2
- iv. MOV CX, 397
- v. MOV SI, 9516
- vi. MOV CS, 3490
- vii. MOV DS, AX
- viii. MOV BX, CS
- ix. MOV CH, AX
- x. MOV AX, 23FB9

(9 marks)

- (c) Assume that the registers have the following values in HEX and that CS=1000, DS=2000, SS=3000, SI=4000, DI=5000, BX=6080, BP=7000, AX=25FF, CX=8791 and DX=1299. Calculate the physical address of the memory where the operand is stored and the contents of the memory locations in each of the following addressing:

- i. MOV [DI][BX]+28, CX
- ii. MOV [SI+BX+8], AH
- iii. MOV [BX], AX
- iv. MOV [BP+SI+100], BX
- v. MOV [DI+BP+100], AX

(10 marks)

Question 4

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

$$(27_{10} + 15_{10}) * (625_{10} - 250_{10}) + 191_{10}$$

(10 marks)

- (b) What are the principle differences among sequential access, direct access, and random access.

(6 marks)

(c) Explain the function of each of segment register below:

- i. CS
- ii. DS
- iii. ES
- iv. SS

(4 marks)

(d) Explain the following addressing mode with suitable example:

- i. Immediate addressing
- ii. Indirect addressing

(5 marks)

Question 5

(a) Give **TWO (2)** advantages and **TWO (2)** disadvantages of Direct Memory Access (DMA).

(4 marks)

(b) When a device interrupt occurs, how does the processor determine which device issued the interrupt?

(5 marks)

(c) Explain any **TWO (2)** performance consideration for a Hard disk.

(4 marks)

(d) With the aid of a diagram, explain the concept of memory hierarchy.

(7 marks)

(e) Briefly explain the concept of virtual memory.

(5 marks)

Question 6

- (a) List the main characteristics of RISC computers and give one example of such processor. (6 marks)
- (b) Briefly explain the concept of pipelining. (4 marks)
- (c) Give **THREE (3)** disadvantages of a processor without pipelining. (6 marks)
- (d) Briefly describe the **THREE (3)** different types of CISC hazards. (9 marks)

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