



**FINAL**  
Examination Paper

(COVER PAGE)

Session : April 2014

Programme : Diploma In Information And Communication Technology (DICTN)

Course : ICT2101 : Computer Organisation

Date of Examination : July 25, 2014

Time : 8:00am – 10:00am Reading Time: Nil

Duration : 2 Hours

Special Instructions :

Answer any **FOUR (4)** questions.

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Materials permitted : Nil

Materials provided : Nil

Examiner (s) : Mr. Ang Chee Huei, Steven Khoo.

Moderator : Mr. Mohammad Faizal Bin Alias

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

## INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY  
 PROGRAMME (DICTN)  
 ICT2101: COMPUTER ORGANISATION  
 FINAL EXAMINATION: APRIL 2014 SESSION

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

**QUESTION 1**

(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. JCXZ LOOP

(10 marks)

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

(5 marks)

(c) The following is output from the -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
```

Answers 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)

## QUESTION 2

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

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 AX, 4CH
Line 20	INT 21H
Line 21	MYCODE ENDP
Line 22	END MYCODE

- (a) Identify **THREE (3)** errors in the above instructions. Briefly explain why it is incorrect and write the correct codes according to the Assembly Language. (9 marks)
- (b) What is the meaning of the instruction at Line 10 and 11? Can these instructions be reduced? (6 marks)
- (c) What is the meaning of the combined instructions at lines 18, 19 and 20? (6 marks)
- (d) Based on the assumption that all lines of codes are corrected, what is the final outcome of the above program? (4 marks)

**QUESTION 3**

(a) The initial contents of the 8086 registers are as shown.

AX=56AB<sub>H</sub>, BX=24A8<sub>H</sub>, CX=A205<sub>H</sub>, DX=0100<sub>H</sub>, SI=8900<sub>H</sub>,  
DS=4000<sub>H</sub>, SS=5000<sub>H</sub>, BP=4567<sub>H</sub>, SP=0108<sub>H</sub>, DI=1234<sub>H</sub>

Perform the following operations and indicate the contents of the registers involved before and after the execution of the respective instructions. The operations are independent of each other. Assume CF = 1

- i. OR AX, BX (4 marks)
  - ii. SHL BX, CL (4 marks)
- (b) Briefly describe the function of each of the **THREE (3)** system bus. (6 marks)
- (c) Show the 16-bit 2's complement binary representation of the following decimals:
- i. 128 (3 marks)
  - ii. -4,096 (4 marks)
  - iii. 65,535 (4 marks)

**QUESTION 4**

- (a) Show all workings clearly for the following:
- (i) Convert 59<sub>10</sub> to binary (3 marks)
  - (ii) Convert 1080<sub>10</sub> to hexadecimal (3 marks)
  - (iii) Convert 95<sub>H</sub> to BCD (Binary Coded Decimal) (3 marks)
- (b) Explain the differences between a near procedure call and a far procedure call in the microprocessor's point of view. (8 marks)
- (c) Explain the working principle of interrupt-driven I/O. (8 marks)

## QUESTION 5

- (a) Discuss **THREE (3)** types of hazards that can happen in a pipelined processor. (12 marks)

- (b) Assume the following register conditions:  
 AX=AB00<sub>H</sub>      BX=200C<sub>H</sub>      CX=300F<sub>H</sub>      DX=DEFF<sub>H</sub>

Determine the status of the Carry flag, Parity flag, Auxiliary Carry flag, Sign flag and Overflow flag after the below instruction being executed.

```
MOV BX, 3FH
ADD BL, 45H
```

(5 marks)

- (c) What are the **advantages** and **disadvantages** of having

i. large register size

(4 marks)

ii. small register size

(4 marks)

## QUESTION 6

- (a) 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. (9 marks)

- (b) List out any **SEVEN** addressing modes with example used in 8086 microprocessor programming. (7 marks)

- (c) 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 locations in each of the addresses shown below. The operations are independent of each other.

(i) MOV [DI], AH

(4 marks)

(ii) MOV [SI+BX-8H], CX

(5 marks)

- The End -

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