



FINAL
Examination Paper

(COVER PAGE)

Session : August 2016

Programme : Diploma In Information And Communication Technology (DICTN)

Course : **ICT2101: Computer Organization**

Date of Examination : 10 December, 2016 (Saturday)

Time : 11:00am – 1:00pm 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. All questions carry equal marks.

Materials permitted : Nil

Materials provided : Nil

Examiner(s) : Ang Chee Huei and Kavitha Thamadharan

Moderator : Mohd Faizal Bin Alias

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

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY
PROGRAMME (DICTN)
ICT2101: COMPUTER ORGANISATION
FINAL EXAMINATION: AUGUST 2016 SESSION

Instruction: 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 4F_H, BL
- iii. MUL BH
- iv. MOV [95_H], [7B_H]
- v. JCXZ LOOP

(10 marks)

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

(6 marks)

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

CS = 4000_H, DS = 2000_H, ES = 3000_H, SI = 5000_H,
DI = 6000_H, BX = 5060_H, BP = 7010_H, AX = 5022_H,
CX = 5653_H, DX = 8008_H

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 + 6_H], BX
- iii. MOV [SI + BX - 5_H], AX

(9 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 program above. Briefly explain why it is incorrect and write the correct codes according to the Assembly Language. (9 marks)
- (b) What is the purpose of the instruction at Line 10 and 11? Can these instructions be reduced? (6 marks)
- (c) What is the purpose 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 value store in register AX and BX ? (4 marks)

Question 3

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

AX=56AB_H, BX=24A8_H, CX=A205_H, DX=0100_H, SI=8900_H,
DS=4000_H, SS=5000_H, BP=4567_H, SP=0108_H, DI=1234_H

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) Demonstrate in binary how an 8-bit two's complement computer system will perform the following arithmetic:
- i. 125 - 51 (5 marks)
- ii. -76 - 58 (6 marks)

Question 4

- (a) Show all workings clearly for the following:
- (i) Convert 59₁₀ to binary (3 marks)
- (ii) Convert 1080₁₀ to hexadecimal (3 marks)
- (iii) Convert 95_H 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_H

BX=200C_H

CX=300F_H

DX=DEFF_H

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, 3F_H

ADD BL, 45_H

(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 **FOUR (4)** addressing modes with example used in 8086 microprocessor programming. (8 marks)

(c) Develop an assembly language program to perform the arithmetic operations below. Store the result in register AL.

$$(15 * (220 - 185) + 135) \% 10$$

All numbers above are in decimal form and % indicates modulus.

(8 marks)

~ The End ~

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