INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2013**
Programme	:	Diploma In Information And Communication Technology (DICTN/DICTI)
Course	:	**ICT2101 / CSC2101: Computer Organisation**
Date of Examination	:	July 30, 2013
Time	:	2:00pm – 4:00pm Reading Time: Nil
Duration	:	2 Hours
Special Instructions	:	

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

Materials permitted : Nil

Materials provided : Nil

Examiner (s)	:	**Mr. Ang Chee Huei,** Steven Khoo.
Moderator	:	Ms. Deshinta Dewi

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY PROGRAMME (DICTN)
ICT2101/CSC 2101: COMPUTER ORGANISATION
FINAL EXAMINATION: APRIL 2013 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) The stack pointer (SP) register of a 8086 microprocessor is currently pointing at memory address $0FEE_H$ and the value of the code segment register (CS) and instruction pointer (IP) are 3005_H and 0010_H respectively. A *near* procedure call is then made,

i. Find the new value of SP

(3 marks)

ii. Depict the above situation in a diagram showing the memory location starting at address $0FEE_H$ and ending at the address that you chose as the answer in Q1(a)i.

(6 marks)

(b) Given 100 8-bit unsigned numbers stored in data segment starting from address 2000_H, write an assembly program to find the smallest number and store it in register DL.

(16 marks)

QUESTION 2

(a) Trace register AX, carry flag (CF) and overflow flag (OF) for the following sequence of instructions. You are required to show results for each step in *hexadecimal* form. Use 'X' to represent undefined value.

(12 marks)

	AX	CF	OF
MOV AX, $FFFE_H$			
ADD AX, 04_H			
MUL AL			
SHL AX, 1			
CMP AH, AL			
CLC			

(b) The following is output from the -r DEBUG commands after a certain 8086 program has run with a breakpoint set.

```
-r
AX=01FF  BX=1000  CX=0050  DX=0000  SP=0215  BP=0000  SI=0000  DI=0000
DS=059A  ES=12E4  SS=5487  CS=7E35  IP=0102   NV UP EI PL NZ NA PO NC
3B4A:0102 58          POP     AX
```

The answers of the following questions should be expressed in hexadecimal :

i. The logical address of the next instruction.

(1 mark)

ii. The physical address of the next instruction.

(3 marks)

iii. The last address of the data segment in physical addressing scheme.

(3 marks)

(c) "Whereas human beings use base 10 (decimal) arithmetic, computers use the base 2 (binary) system". Answer the following questions with reference to the above statement:

i. Can computers be designed to operate on decimal system? Explain your answer.

(3 marks)

ii. Why are computers designed to operate on a binary system?

(3 marks)

QUESTION 3

(a) What is the maximum memory size supported by 8086 microprocessor ? Prove you answer with appropriate calculations.

(3 marks)

(b) Show the 8-bit 2's complement binary representation of the following integers :

i. -33

(4 marks)

ii. 44

(3 marks)

iii. -155

(3 marks)

(c) By using an appropriate example, explain what is carry.

(4 marks)

(d) What are the differences between a near procedure call and a far procedure call from the microprocessor's point of view.

(8 marks)

QUESTION 4

(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) Modern CPUs have build-in cache to improve the performance of the computer system. Explain **TWO (2)** characteristics of computer programs that justified the inclusion of cache.

(8 marks)

(c) State the **advantage** and **disadvantage** of having

i. a large register size,

(4 marks)

ii. a small register size,

(4 marks)

QUESTION 5

(a) Identify and briefly explain any **THREE (3)** characteristics of RISC processor.

(6 marks)

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

(7 marks)

(c) Compare and contrast CPU polling, interrupt-driven I/O and direct memory access (DMA) in terms of processor involvement and efficiency.

(12 marks)

QUESTION 6

(a) Give **TWO (2)** advantages and disadvantage of low-level programming.

(8 marks)

(b) Briefly describe the function of each of the **THREE (3)** system bus.

(6 marks)

(c) Add the following two 8-bit binary numbers in 2's complement representation : 11011000_2 and 10110001_2 . Does the sum cause an overflow ? Shows the calculation and explain your answer.

(7 marks)

(d) Briefly explain the concept of stored program computer (von Neumann Machine) architecture.

(4 marks)

- The End -