

**FINAL**  
Examination Paper

(COVER PAGE)

Session : August 2015

Programme : Diploma In Information And Communication Technology (DICTN)

Course : ICT2101: Computer Organization

Date of Examination : December 6, 2015

Time : 11.00am – 1.00pm Reading Time : Nil

Duration : 2 Hours

**Special Instructions :**

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

Materials permitted : Nil

Materials provided : Nil

Examiner(s) : Mr. Yap Soo Har and Mr. Shahrman Mohd Said

Moderator : Mr. Mohd Faizal Bin Alias

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

DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY (DICTN)  
ICT2101: COMPUTER ORGANISATION  
FINAL EXAMINATION: AUGUST 2015 SESSION

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 and describe the significance of this law. (4 marks)
- (b) Describe the Von Neumann model in computer systems using the various components. (6 marks)
- (c) Convert the following:  
Decimal 1125.3125 to Binary  
Decimal 785.3125 to Hexadecimal  
Hexadecimal 1F6A to Binary  
Hexadecimal 6C9D to Octal (8 marks)
- (d) Explain the difference between the Assembler and a High Level Language. Write an example of an Assembler code for  $C = A + B$  Assuming A, B, C are values in registers A, B, C. (7 marks)

**Question 2**

- (a) Demonstrate using binary how an 8bit two's complement computer system will perform the following:  $92 - 41$  (5 marks)
- (b) Explain how the computer system execute an instruction from a high level language to its native machine language. (8 marks)
- (c) What are the **THREE (3)** buses that connects to the system bus. (6 marks)
- (d) Name **THREE (3)** types of internal registers. Which register would you use to indicate the position of a stack? (6 marks)

**Question 3**

- (a) If a computer system has 128MB of internal memory, how many bits are needed to address all the memory?  
(3 marks)
- (b) If a simple computer uses 16bit word and the RTL uses 5 bits for the Opcode and the rest for accessing memory address.  
(i) What is the maximum number of instructions this computer can have?  
(ii) How much internal memory can this computer support?  
(6 marks)
- (c) Explain the function of the CF, OF and ZF flags.  
(6 marks)
- (d) Describe how DEBUG assembler multiply two numbers using the registers AX, BX  
(6 marks)
- (e) Calculate the physical address corresponding to logical address D470 if the base address is 52B9.  
(4 marks)

**Question 4**

- (a) Describe the difference between a sequential Direct Memory Access controller and the simultaneous DMA.  
(5 marks)
- (b) Describe any **THREE (3)** ways I/O can be controlled.  
(6 marks)
- (c) Name **THREE (3)** types of addressing modes and give an example of one of them.  
(6 marks)
- (d) Describe what is the error in the following codes if any?  
(i) MOV A4H, AL  
(ii) MOV AL, 255  
(iii) MOV AX, AX  
(iv) MOV BX, CH  
(8 marks)

**Question 5**

- (a) List **TWO (2)** characteristics each of a RISC and a CISC computer. (8 marks)
- (b) The CISC system can execute the instruction 5 X 10 as follows:  
 MOV AX, 5  
 MOV BX, 10  
 MUL AX, BX  
 Show how a RISC system that do not include the complex instruction MUL will execute the same instruction using ADD and LOOP.  
 If all instructions require 1 clock cycle whereas the MUL instruction requires 30 cycles, demonstrate which one is a better option for this program (6 marks)
- (c) What is the value of register AX after the following program codes are executed?  
 MOV SI, 000E  
 MOV DI, 000D  
 MOV AX, [SI]  
 ADD AX, [DI] (6 marks)
- (d) Describe the concept of pipelining in the execution of a program. (5 marks)

**Question 6**

- (a) Describe the Little Endian technique of transferring data from register to memory. (4 marks)
- (b) The reason of having cache in a system is because a program tends to have Locality of Reference. Describe **TWO (2)** types of locality (8 marks)
- (c) Write a DEBUG assembler program to find the average of 3 numbers kept at memory address 200, 201 and 202 of 1 byte each.  
 Use the following instructions:  
 MOV  
 ADD  
 DIV (7 marks)
- (d) What are the advantages of using virtual memory? (6 marks)

~THE END~