



FINAL  
Examination Paper

(COVER PAGE)

Session : APRIL 2017

Programme : Diploma In Information And Communication Technology (DICTN)

Course : ICT2101: Computer Organization

Date of Examination : 05 August, 2017 (Saturday)

Time : 11:00a m – 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.

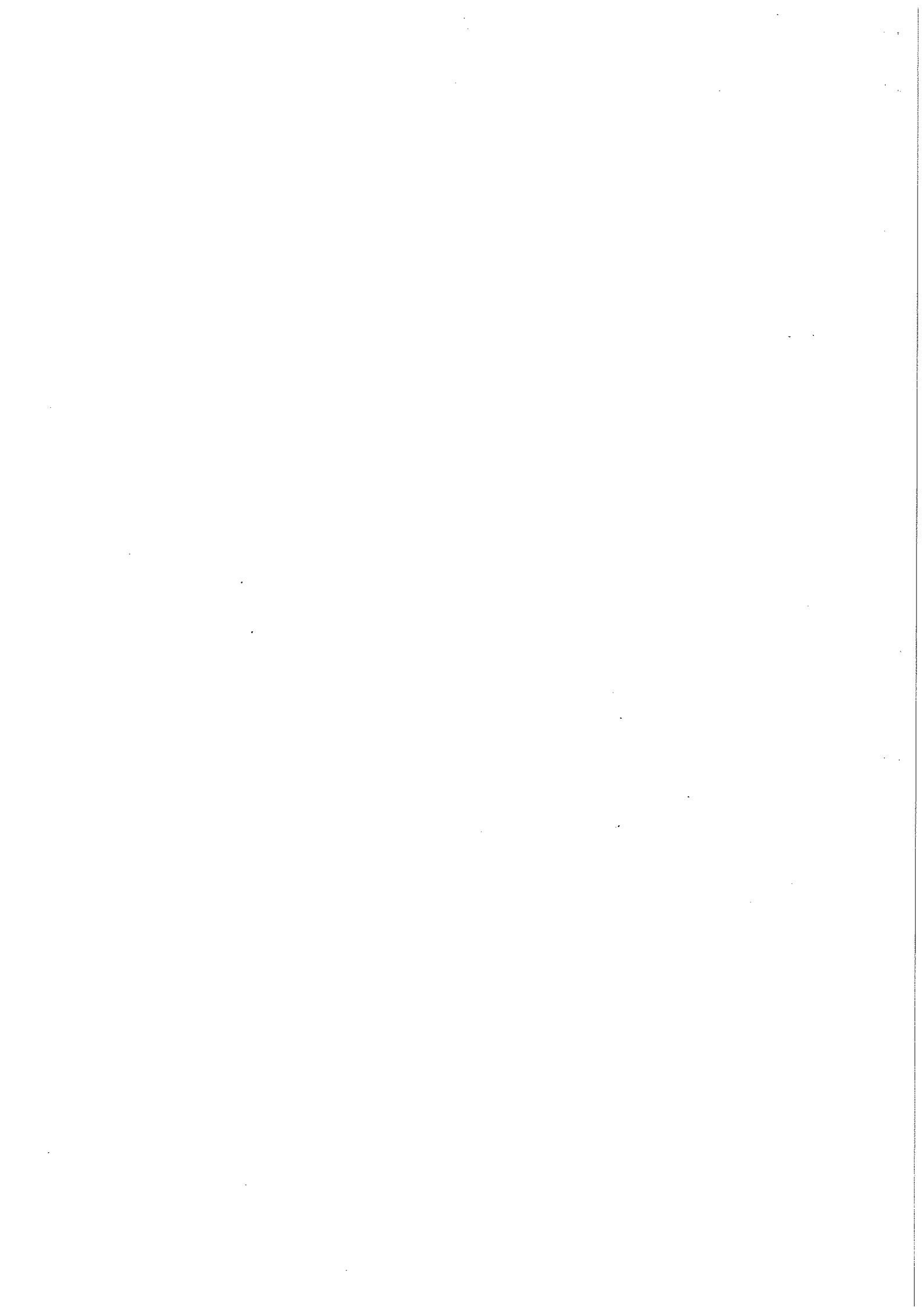
Materials permitted : Nil

Materials provided : Nil

Examiner(s) : Ang Chee Huei and Kavitha Thamadharan

Moderator : Mohd Faizal Bin Alias

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



DIPLOMA IN INFORMATION AND COMMUNICATIONS TECHNOLOGY  
PROGRAMME (DICTN)  
ICT2101: COMPUTER ORGANISATION  
FINAL EXAMINATION: APRIL 2017 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) For the following fragment of 8086 program, show the content of register AX after each instruction is executed. All values are in hexadecimal.

```
MOV AX, 0008
ADD AL, 05
AAA
```

(5 marks)

- (b) The stack pointer (SP) register of a 8086 microprocessor is currently pointing at memory address 1000<sub>H</sub>. A call to an Interrupt Service Routine (ISR) is then made,

i. Find the new value of SP

(2 marks)

ii. Depict the above situation in a diagram showing the memory location starting at address 1000<sub>H</sub> and ending at the address that you chose as the answer in Q1(b)i.

(8 marks)

- (c) Convert the following:

i. Decimal 208 to Binary

(2 Marks)

ii. Binary 10000001 to Decimal

(2 Marks)

iii. Hexadecimal F89A to Binary

(2 Marks)

iv. Binary 11001001001001 to Hexadecimal

(2 Marks)

v. Binary 10111101 to Octal

(2 Marks)

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**QUESTION 2**

- (a) Trace the 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 **binary** form. Use 'X' to represent undefined value.

(10 marks)

```
MOV AX, 5980H
MOV CL, 01H
SHR AX, CL
CMP AH, AL
MUL AL
```

- (b) Write an assembly routine to find the average of all 16-bit integers store in memory location from address 1000<sub>H</sub> to 2000<sub>H</sub>. Store the average into register DX.

(15 marks)

**QUESTION 3**

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

(8 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 calculation:

i.)  $84 - 41$

(6 Marks)

ii.)  $72 + 23$

(5 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) Explain the differences between a near procedure call and a far procedure call in the microprocessor's point of view.

(8 marks)

- (c) With the aid of a flowchart, explain the *single mode* DMA transfer.

(8 marks)

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**QUESTION 5**

- (a) Discuss **THREE (3)** types of hazards that can happen in a pipelined processor. (12 marks)
- (b) Why memory protection is needed ? How memory protection is implemented in memory paging system ? (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) Explain the direct addressing mode by giving appropriate example. (4 marks)
- (b) Describe the function of **ANY TWO** flag registers. (4 marks)
- (c) Calculate the sum of the following 2's complement binary and explain whether the sum causes an overflow.  
01100110 + 01110001 (6 marks)
- (d) Explain the working principle of interrupt-driven I/O. (11 marks)

10

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