



MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

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**FINAL EXAMINATION  
JANUARY 2016 SEMESTER**

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**SUBJECT CODE** : IED23503  
**SUBJECT TITLE** : MICROPROCESSOR TECHNOLOGY  
**LEVEL** : DIPLOMA  
**TIME / DURATION** : 2:00PM – 4:00PM ( 2 HOURS )  
**DATE** : 24 MAY 2016

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consists of TWO (2) sections. SECTION A & SECTION B.
4. Answer ALL questions in SECTION A and THREE (3) questions in SECTION B.
5. Please write your answers on the OMR FORM and ANSWER BOOKLET given.

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THERE ARE 12 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

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## SECTION A (TOTAL: 25 MARKS)

**INSTRUCTION: Answer ALL questions.**

**Please use the OMR sheet provided.**

1. The bus that defines the “size” of the processor is \_\_\_\_\_.
  - A. The system bus
  - B. The data bus
  - C. The address bus
  - D. The control bus
  
2. What are the names of the **FOUR (4)** segment register?
  - A. Data, Index, Code, Stack
  - B. Stack, Data, Base, Counter
  - C. Stack, Extra, Code, Data
  - D. Stack, Index, Extra, Code
  
3. Which flag(s) does the 80x 86 uses to check for unsigned arithmetic overflow?
  - A. Overflow
  - B. Direction
  - C. Interrupt
  - D. Carry
  
4. Which register is used as an offset address for the string instruction destination in the microprocessor?
  - A. DI
  - B. SI
  - C. BP
  - D. DX

5. A 32-bit address register can access up to \_\_\_\_\_ of memory.
- A. 2KB
  - B. 2GB
  - C. 4GB
  - D. 6GB
6. The 8086/8088 uses two processing logical units which are known as \_\_\_\_\_.
- A. Segment & Offset Units
  - B. Bus Interface Unit & Execution Unit
  - C. Bus Unit & Execution Interface Unit
  - D. ALU & Control Unit
7. Actual execution of instructions in a computer takes place in \_\_\_\_\_.
- A. Control Unit
  - B. Storage Unit
  - C. ALU
  - D. None of the above
8. Which utility program reads an assembly language source file and produces an object file?
- A. Compiler
  - B. Linker
  - C. Assembler
  - D. Loader
9. The first processor that includes Virtual Memory in the Intel microprocessor family is \_\_\_\_\_.
- A. 4004
  - B. 80286
  - C. Pentium Pro
  - D. 80486

10. A 20-bit address bus can access to a memory of capacity \_\_\_\_\_.
- A. 1 MB
  - B. 2 MB
  - C. 4 MB
  - D. 8 MB
11. Pipelining improves CPU performance due to \_\_\_\_\_.
- A. Reduced memory access time
  - B. Increased clock speed
  - C. Additional functional units
  - D. The introduction of parallelism
12. Which of the following is an **INVALID** instruction?
- A. MOV AX, [BP]
  - B. MOV DS,CS
  - C. MOV AX,CS
  - D. None of the above
13. Which of the following is an **ILLEGAL** 8086 instruction?
- A. And bx,bx
  - B. Add ax,30
  - C. Inc AL
  - D. Mov 20,bx

14. What are the flags after `CMP AH, CL`?

<b>AX</b>	<b>6521H</b>
<b>BX</b>	<b>ABCDH</b>
<b>CX</b>	<b>0105H</b>

Figure 1

- A. C=1, Z=0, S=1  
B. C=0, Z=1, S=0  
C. C=0, Z=1, S=1  
D. C=0, Z=0, S=0
15. Which of the following is **NOT** a general purpose register?  
A. AX  
B. CX  
C. CS  
D. BX
16. The output of the MASM is stored in a file with the extension \_\_\_\_\_.  
A. .asm  
B. .lnk  
C. .obj  
D. .exe
17. What will be the contents of register AL after the following has been executed?
- ```
MOV BL, 8C
MOV AL, 7E
ADD AL, BL
```
- A. A and carry flag is set  
B. A and carry flag is reset  
C. 6A and carry flag is set  
D. 6A and carry flag is reset

18. Which of the following statement is true?
- A. The group of machine cycle is called a state.
  - B. A machine cycle consists of one or more instruction cycle.
  - C. An instruction cycle is made up of machine cycles and a machine cycle is made up of number of states.
  - D. None of the above
19. A Bus cycle is equal to \_\_\_\_ clocking periods.
- A. Two
  - B. Three
  - C. Four
  - D. Six
20. Which one of the following is a data transfer operation?
- A. ADD B
  - B. SUB B
  - C. CMA
  - D. MOV A,B
21. The 8085 microprocessor has \_\_\_\_ number of flag register .
- A. 4
  - B. 8
  - C. 16
  - D. 5
22. Processor gets the address of the next instruction to be processed from \_\_\_\_.
- A. Instruction register
  - B. Instruction counter
  - C. Program counter
  - D. Program register

23. In which microprocessor does the concept of pipeline first introduced?
- A. 8086
  - B. 80286
  - C. 80386
  - D. 80486
24. Out of the following which is not the flag in 8085 microprocessor
- A. Counter flag
  - B. Carry flag
  - C. Zero flag
  - D. Parity flag
25. The result of `mov al, 65` is to store \_\_\_\_\_.
- A. 0100 0010 in al
  - B. 42H in al
  - C. 40H in al
  - D. 0100 0001 in al

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**SECTION B (TOTAL: 75 MARKS)**

**INSTRUCTION: Answer THREE (3) questions ONLY.  
Please use the answer booklet provided.**

**QUESTION 1**

- a) Convert the binary number :
- i. 1001.0010 to decimal. (1 mark)
  - ii. 1011010 to hexadecimal. (1 mark)
  - iii. 1101101111110101 to hexadecimal. (1 mark)
- b) What is the decimal value of the hexadecimal number 777? (1 mark)
- c) Convert the decimal number 151.75 to binary. (1 mark)
- d) Calculate the following 151.75 to binary:
- i.  $2BFC + 54A7$  (1 mark)
  - ii.  $AC74 - B3F$  (1 mark)
- e) Write the following decimal numbers in eight bit two's complement, do the addition/subtraction, convert your answer back to decimal: (8 marks)
- i.  $-3 + +11$
  - ii.  $+125 + -40$
  - iii.  $+5 + -7$
  - iv.  $-23 - -18$ .



f) If DS is 7FA2H and the offset is 438EH. (10 marks)

- i. Calculate the physical address.
- ii. Calculate the lower range.
- iii. Calculate the upper range.
- iv. Show in logical address.
- v. Draw the address map.

[TOTAL: 25 marks]

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**QUESTION 2**

- a) Describe the operation performed by the instruction `OUT 47 h, AL`. (3 marks)
- b) What is the purpose of carry (c) flag and zero (z) flag? (2 marks)
- c) What is segmentation? What are its advantages? How is segmentation implemented in typical microprocessors? (8 marks)
- d) Differentiate between real and protected modes of an Intel microprocessor. (6 marks)
- e) Explain the functions of the following:
- i. Debugger
  - ii. Assembler
  - iii. Linker
- (6 marks)

**[TOTAL: 25 marks]**

**QUESTION 3**

- a) With the help of a schematic diagram, explain how a bus will function. (3 marks)
- b) List four types of registers used in Intel-based microprocessors. (4 marks)
- c) What do BIU and EU does, explain with schematic diagram. (6 marks)

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- d) For each part of this question, assume the "before" values when the given instruction is executed. Give the requested "after" values. (12 marks)

| <i>N</i> | <i>Before</i>                          | <i>Instruction executed</i> | <i>After</i>                         |
|----------|----------------------------------------|-----------------------------|--------------------------------------|
| 1        | EAX: 00 00 00 75h<br>ECX: 00 00 01 A2h | Sub ecx, eax;               | EAX =<br>ECX =<br>SF =<br>CF =       |
| 2        | AX: 77ACh<br>CX: 4B35h                 | add ax, cx                  | AX =<br>CX =<br>SF =<br>ZF =<br>CF = |
| 3        | EDX: 7F FF FF FF                       | inc edx                     | EDX =<br>SF =<br>ZF =                |

[Total: 25 marks]

QUESTION 4

Write a complete 8086 assembly language program that the seven segments will count from 1 to 9 and after finish counting at 9, the traffic light will appear. Show your calculation and provide the table to prove your calculation.

[TOTAL: 25 marks]

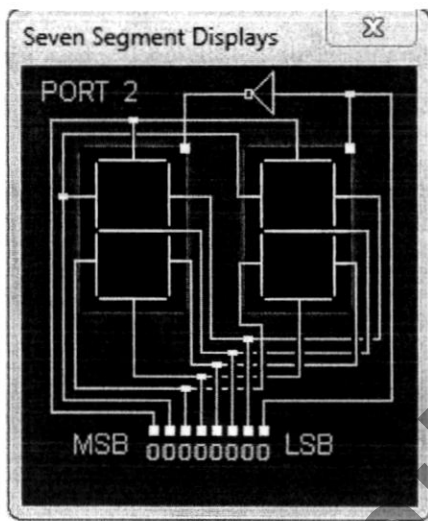


Figure 2

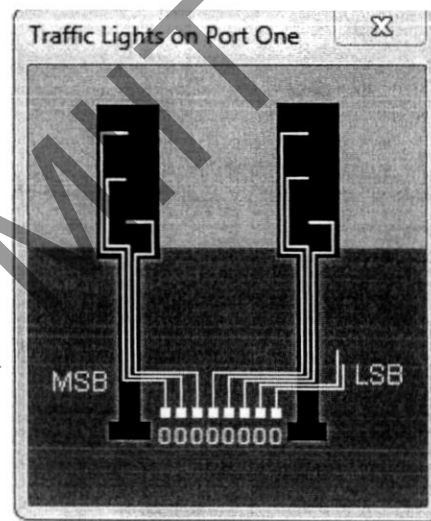


Figure 3

END OF EXAMINATION PAPERS