

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
**ORGANISATION OF ISLAMIC COOPERATION (OIC)**  
**Department of Computer Science and Engineering (CSE)**

**MID SEMESTER EXAMINATION****WINTER SEMESTER, 2012-2013****DURATION: 1 Hour 30 Minutes****FULL MARKS: 75****CSE 4503: Microprocessors and Assembly Language****Programmable calculators are not allowed. Do not write anything on the question paper.**There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

1.
  - a) What is the purpose of cache memory? Discuss on various types of cache mapping techniques. 12
  - b) Define Programmed I/O and discuss on its various operations. 8
  - c) List the differences between Block transfer and Interleaved DMA. 5
2.
  - a) Describe the sequences of signals that occur in address bus, control bus and data bus when a simple microcomputer is executing the following three-instruction program: 12
    - i. Input a value from a keyboard connected to the port at address 02H
    - ii. Add 5 to the value.
    - iii. Output the result to a display connected to the port at address 07H
  - b) What are the differences between high-level language and assembly language? 5
  - c) List the special functions for each of the 8086 data registers AX, BX, CX, and DX 8
3.
  - a) Write a program to display a "?", then read two decimal digits whose sum is less than 10 and then display them and their sum on the next line with appropriate message. 10  
 Sample Execution:  
 ?27  
 The sum of 2 and 7 is 9. Your program should follow the structure given in the Appendix A.
  - b) . 3X4

	Registers	Data Segment	
ES	6000	5000CH	D7
CS	4000	5000BH	9A
SS	7000	5000AH	7C
DS	5000	50009H	DB
IP	43E8	50008H	C3
SP	0000	50007H	B2
BP	2468	50006H	49
SI	4C00	50005H	21
DI	7D00	50004H	89
AX	4235	50003H	71
BX	075A	50002H	22
CX	0004	50001H	4A
DX	3302	50000H	3B

Table 1: 8086 register and memory contents

Consider the contents of the registers and memory locations given in Table 1. Show the results that will be in the affected registers or memory locations after each of the following group of instructions is executed. Assume that each group of instructions starts with same values of registers and memory contents as shown in Table 1.

```

1. ADD BL, AL
   MOV [0004], BL
   ROR DI, CL
2. MOV BX, 000AH
   MOV AL, [BX]
   SUB AL, CL
   INC BX
   MOV [BX], AL
3. ADD AL, BH
   MOV DI, 0000H
   ADD AL, 0BH[DI]
   RCL AL, CL
   NEG AX

```

c) What is the difference between SUB and CMP instruction? 3

4. a) Define the followings with proper examples: 3X4
- Based- Indexed Addressing Mode
  - String Addressing Mode
  - Register Indirect Addressing Mode

You should explain your example using the values presented in Table 1.

b) What are the functionalities of the following 8086 pins? 4X2

HOLD, BHE, READY, INTA

c) What is the functionality of  $\overline{MN/MX}$  pin of 8086? Which pins function differently for different values on  $\overline{MN/MX}$ ? 5

#### Appendix A:

```

.MODEL SMALL
.STACK 100H
.DATA
    ; DEFINE VARIABLES HERE FOR YOUR PROGRAM IF ANY.
    ; OTHERWISE DELETE DATA SEGMENT

.CODE
MAIN PROC

    ; WRITE YOUR CODE HERE

MAIN ENDP
END MAIN

```