ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2023-2024**

DURATION: 1 HOUR 30 MINUTES **FULL MARKS: 75**

CSE 4503: Microprocessor and Assembly Language

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions with corresponding COs and POs in parentheses.

---

1. a) Define and explain differences between the STACK memory operations of 8085 and 8086 microprocessors. — 10 (CO1) (PO1)

   b) Write detailed executions of any arithmetic instructions each for 8085 and 8086 microprocessors, respectively; where, use of *Accumulator* register is a must. — 10 (CO2) (PO2)

   c) Explain the concept of *Label* and *Loop* in assembly language programming. — 5 (CO1) (PO1)

2. a) Differentiate I/O operations for BIOS and DOS routines with proper explanation. — 10 (CO2) (PO1)

   b) Derive the corresponding machine codes for the following instructions using their respective instruction format and also show how the machine codes of the instructions are to be stored in memory: — 3 × 3 (CO1) (PO2)

      i. `IN DX, AB12H`
      ii. `MOV BX, 01010101B`
      iii. `MOV CS: [BP + F1E2H], DL`

   c) Using appropriate example codes, write the alternative details of the following assembly language instructions: — 2 × 3 (CO4) (PO2)

      i. `XCHG`
      ii. `RET.`

3. a) Suppose, Instruction Pointer (IP) of 8086 is moving in forward memory directions for executing following assembly language codes: — 10 (CO1) (PO1)

```
MOV AX, 1A2Bh;
NOT AX;
ADD AX, FFh;
```

   After the executions of all arithmetic and logical instructions in single-step debug mode with enabling interrupt option, what values would be there in AX and Flag (CF, PF, AF, ZF, SF, OF, IF, TF, and DF) registers?

b) Let, an assembly language program initiates with a memory segment registers as CS=1000h, DS=2000h, and SS=3000h. If the program starts with an origin of 0100h and both the data and stack segments are empty, then, derive the appropriate related register values (i.e., offset values) for each segments after cexecution of the assembly language codes given in Code Snippet 1. 12 (CO4) (PO2)

```
1  org 0100h
2  .DATA
3  A db 50
4  B dw 260
5  C db "IUT OIC$"
6
7  .CODE
8  MAIN PROC
9      mov al, A
10     mov bx, B
11     push al
12     push bx
13     pop dx
14     MAIN ENDP
15 END MAIN
16 ret
```

Code Snippet 1: An Assemble Language code for Question 3.b

c) Explain how to define a numeric constant value in an assembly language program. 3 (CO1) (PO1)