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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2022-2023**

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

CSE 4503: Microprocessor and Assembly Language Programming

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 whereas corresponding CO and PO are written within parentheses.

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1. a) Differentiate between assembly language and machine language. How are these two related? — 10 (CO2) (PO1)

   b) Write appropriate assembly language codes to accomplish the following tasks: — 12 (CO4) (PO1)
      i. 0Fh×(225-200)+127
      ii. 0FFFh×10h+10101010b

   c) Wtite an elaborative assembly language code for RET. — 3 (CO4) (PO1)

2. a) Write an assembly language program to allocate exactly 64 Kbytes of memory for `code segment`, 512 Bytes for `stack segment` and also consider that the size for data segment may exceed 64 Kbytes. — 10 (CO1) (PO1)

   b) Suppose, Instruction Pointer (IP) of 8086 is moving in backward memory directions for executing the assembly language codes mentioned in Code Snippet 1: — 12 (CO1) (PO1)

```
1 MOV AX, FA1Ah
2 NEG AX
3 ADD AX, A1h
```

Code Snippet 1: Assembly Language Code for Question 2.b)

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

   c) Differentiate between `NEG` and `NOT` instructions with example. — 3 (CO1) (PO1)

3. a) Differentiate between the register sets of 8085 and 8086 microprocessors. — 10 (CO2) (PO1)

   b) Derive the machine codes of the following instructions using their respective instruction formats and also show how the machine codes of the instructions are to be stored in memory: — 3 × 4 (CO1) (PO1)
      i. `IN AX, ABH`
      ii. `MOV ES:[BX + A1B2H], DX`
      iii. `MOV BX, 01010101B`

   c) In case of fetching a BYTE and WORD from the ODD and EVEN memory banks, how are the fetching cycles adjusted? Explain. — 3 (CO2) (PO1)