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

Mid Semester Examination [TVE Student]   **Winter Semester: 2020-2021**

Course Number : CSE 4503   **Full Marks: 75**
Course Title   : Microprocessors and Assembly Language   **Time: 1.5 Hours**

There are **3 (three)** questions. Answer all of them. Figures in the right margin indicate marks. The examination is **Online** and **Open Book**. Marks of each question and corresponding **CO** and **PO** are written in the brackets.

Write **Student ID** and **Name** top of the **first page** and write **student ID** and **page no** in every page of the answer script. Submission pdf of the answer script should be named as **Full_Student_ID<space>Course Code.pdf**

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1. a) What is a Central Processing Unit (CPU)? Differentiate between Microprocessor and Microcontroller systems.   10

    b) Suppose, Instruction Pointer (IP) of 8086 is moving in forward memory locations for executing the following assembly language code: 10

    ```
    MOV AL, AEh
    NEG AL
    ADD AL, FBh
    ```

    Upon complete execution of the code, what values would be there in AL and Flag (CF, PF, AF, ZF, SF, OF and DF) registers?

    c) Briefly explain the operations of a Program Counter.   5

2. a) What do you mean by Assembly Language? How does it differ from Machine language? Briefly explain with an example.   10

    b) Write short notes on the *Data Bus* and *Control Bus*. "*Number of address locations and memory size have a close relation with the Address Bus length*" – How?   9

    c) Let, a memory location is given by the physical address 4A37Bh. Compute –   6
        i.   The *offset address* if the *segment number* is 40FFh.
        ii. The *segment number* if the *offset address* is 123Bh.

3. a) Draw the schematic architecture of 8086. Write short notes on *pointer* and *index registers* of Execution Unit (EU) of 8086 microprocessor.   10

    b) Draw the coding template of MOV instruction. Explain the significance of using 'MOD' and 'R/M' in MOV coding template.   10

    c) Derive the contents of the IN AX, 07h using the instruction template and also show how the contents of this instruction can be stored in memory.   5