Name of the Program: B.Sc. in Computer Science and Engineering **24 June 2021**
Semester: Winter 2020-2021 **Time: 2:30 pm – 4:00 pm**

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

Mid Semester Examination **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) Write an assembly language program structure to allocate exactly 64 Kbytes of memory for *code segment*, default memory bytes for *stack segment* and also consider that the size for *data segment* may exceed 64 Kbytes. 5 (CO4) (PO1)

   b) Suppose, Instruction Pointer (`IP`) of 8086 is moving in forward memory directions for executing following assembly language codes: 2+9=11 (CO1) (PO1)

Memory Address	Assembly Language
10001h	MOV AL, 1Ah
10003h	NOT AL
10004h	ADD AL, A1h

   After the executions of all arithmetic instructions, what values would be there in `AL` and `Flag` (`CF, PF, AF, ZF, SF and DF`) registers?

   c) With appropriate example, show the basic differences between the following instructions of 8086 microprocessor: 3×3 = 9 (CO1) (PO1)

   i. `AND` and `TEST`
   ii. `NOT` and `NEG`
   iii. `SUB` and `CMP`

2. a) Write an assembly language code to take a single-character as an *input* and display the next character (as in ASCII table) as an *output* in the new line with carriage return. 5 (CO4) (PO2)

   b) Derive the machine codes of the following instructions using their instruction/coding template/format and also show how the machine codes of the instructions are to be stored in memory: 3×4=12 (CO1) (PO1, PO2)

   i. `MOV BX, 10101010B`
   ii. `MOV CS:[BP+1234H], DX`
   iii. `IN AL, 192`

   c) Distinguish between the followings: 8 (CO1) (PO1)
   i. Odd Memory Bank and Even Memory Bank of 8086
   ii. 8085 Flag Register and 8086 Flag Register

3. a) Derive the mistakes of the following assembly language program and do the necessary corrections to re-write it: 5 (CO4) (PO2)

```
ORG 0100h
.DATA
P DB 10000001
Q DB 1A2BH
R DW 260
S DB ?

.CODE

MAIN PROC

    MOV AL, P
    MOV BL, 2
    MUL AL, BL
    MOV CL, R
    MOV S, Q

    MAIN ENDP
END MAIN
RET
```

b) Let, a memory location is given by the physical address `4A37Bh`. Compute – 2×5=10 (CO2) (PO1, PO2)

i. The *offset address* if the *segment number* is `40FFh`.

ii. The *segment number* if the *offset address* is `123Bh`.

c) With appropriate example differentiate between the operations of stack instructions and stack memory management for 8085 and 8086. (your answer should be written w.r.t. the use of SP). 10 (CO2) (PO2)