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

SEMESTER FINAL EXAMINATION **WINTER SEMESTER, 2019-2020**

DURATION: 1.5 Hours **FULL MARKS: 80**

CSE 4503: Microprocessors and Assembly Language

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

There are **5 (five)** questions. Answer any **4 (four)** of them.

Figures in the right margin indicate marks.

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1. a) Distinguish between the followings: 10
   i. Polling and Interrupt.
   ii. Memory-mapped I/O and Isolated I/O.

   b) Let, in an assembly language code data segment is initialized at `7000h:0000h` memory location of 8086 and variables are declared as follows: 10

```
.DATA
A db 1, 2, 3, 4, 5
B db 'IUT'
C dw FFFFh
D db 'Exam Date is 24 August, 2020','$'
```

   Now, using appropriate instructions derive and store the initial offsets of A, B, C and D at SI, DI, BX, BP registers, respectively. Also, derive the DS register value.

2. a) You have to draw a detail WRITE bus timing diagram for 8086 microprocessor; where, consider that data is transmitted toward a memory location only. 10

   b) With an appropriate timing diagram clearly define the terms: *Clock cycle*, *Bus cycle* and *Instruction cycle*. Also, find out the T durations of the microprocessors having clock speeds of 40 MHz and 1 GHz, respectively. 10

3. a) Which memory locations are reserved for 8086 Interrupt Vector Table? Derive the specific memory locations where the CS and IP values of the following Interrupt Types can be found: 10
   i. `INT 21h`
   ii. `INT 3`

   b) Let, in 8086 based system current SP value is `FFF8h` and the CS, IP and FL values are `7000h`, `0100h` and `1101h`, respectively. Now, if at instance an interrupt occurs, then show the stack increase and decrease scenario along with changes in SP values and stack contents. 10

4. a) Derive the contents of the following `MOV` instructions using its coding template and also show how the contents of the instructions can be stored in memory: 10
   i. `MOV DL, 00000001B`
   ii. `MOV SS:[SI], BP`

   b) Write an assembly language program that will display "`Islamic University of Technology`" 10 (ten) times with new lines each starts at home position. 10

5. a) Differentiate between different `80x86` microprocessors. 10

   b) Write an assembly language program structure to clearly state the operational differentiation between `LABEL` and `LOOP`? 10