B.Sc. Engg. / HD CSE 5th Semester — 16 March 2018 (Afternoon)

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

MID SEMESTER EXAMINATION — **WINTER SEMESTER, 2017-2018**

DURATION: 1 Hour 30 Minutes — **FULL MARKS: 75**

CSE 4503: Microprocessors and Assembly Language

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

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

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1. a) 'Assembly language is a low level language' - True/False? How do the `8085` and `8086` microprocessors differ with each other in terms of register sets? 9

   b) Derive the contents of the `Flag` (`CF, PF, ZF, SF`) register of `8086` microprocessor upon executing the following instructions: 8

      i. `CMP AL, ABh` ; Assume `AL` initially contains `FFh`.

      ii. `SUB AX, 1234h` ; Assume `AX` initially contains `8000h`.

   c) Write appropriate assembly language codes to accomplish the following tasks (use as many as possible arithmetic instructions with less number of registers): 8

      i. 0Bh × (200 - 225) + 127

      ii. FFFh × 10h + 1111b

2. a) What is Memory Segment? Write the concept of memory segmentation and addressing for 8086 processor. 9

   b) "*Number of address locations and memory size have a close relation with the Address Bus length*" – How? 8

   c) Suppose, while debugging an assembly language program the values of the registers are: `Flag=FEB9h, IP=0102h, CS=0500h, SP=FFFCh`. Now, if `INT 21h` is requested, derive the memory addresses from where the new `IP` and `CS` can be retrieved; Also show the new `SP` value and steps involved in handling the interrupt by the 8086 microprocessor. 8

3. a) Draw the schematic architecture of 8086 microprocessor. Write an example to explain the operation of *Instruction Pointer and Code Segment* register of 8086 microprocessor. 9

   b) Briefly explain the concept of Fetching and Execution cycles of an instruction. 8

   c) Write an assembly language program structure to allocate exactly 64 Kbytes of memory for *data segment*, 128 Bytes for *stack segment* and also consider that the size for *code segment* may exceed 64 Kbytes. 8

4. a) Write a short note on *interrupt* concepts and why it is so necessary? 9

   b) Explain the procedure to perform `MUL` and `DIV` operation in assembly language. 8

   c) To perform a `SWAP` operation amongst the contents of `CX` and `DX` registers, write two assembly language programs using: i. 8086 Stack Segment Operation ii. 8086 Instruction 8