

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)****ORGANISATION OF ISLAMIC COOPERATION (OIC)****Department of Computer Science and Engineering (CSE)****MID SEMESTER EXAMINATION****WINTER SEMESTER, 2019-2020****DURATION: 1 Hour 30 Minutes****FULL MARKS: 75****CSE 4573: Microprocessors and Assembly Language Programming****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.

1. a) Derive the contents of the Flag (CF, PF, ZF, SF, AF) register of 8086 microprocessor upon executing the following instructions: 10
  - i. `CMP AL, ABh` ; Assume AL initially contains ABh.
  - ii. `ADD AX, 8000h` ; Assume AX initially contains 8000h.
- b) Write appropriate assembly language codes for 8086 to accomplish the following tasks: 8
  - i.  $0Fh \times (225 - 200) + 127$
  - ii.  $0FFFh \times 10h + 10101010b$
- c) What is an assembler? Using an appropriate example, briefly explain the concept for fetching of an instruction/data from the memory. 2+5
2. a) Considering following memory addresses and instructions, mention the output (i.e., values) of register A, B and Stack Pointer (SP) after execution of all the instructions. Assume, initially the stack is empty. 10

Memory Address	Assembly Language
0100h	<b>MVI</b> A, 250
0102h	<b>MVI</b> B, 10
0104h	<b>ADD</b> B
0106h	<b>PUSH</b> A
0108h	<b>POP</b> B

- b) Briefly explain about the stack operation of 8086 microprocessor. 8
- c) Write an assembly language code to take a single-character as an *input* and show the same character as an *output* with new line and carriage return. 7
3. a) Derive the machine codes of the following MOV instructions using its coding template and also show how the machine codes of the instructions are to be stored in memory: 10
  - i. `MOV AL, 255`
  - ii. `MOV SS:[SI], DH`
- b) How do 8085 and 8088 microprocessors differ with each other in terms of flag register? 8
- c) Write an assembly language program structure to allocate exactly 64 Kbytes of memory for *code segment* and *data segment*, and also 1024 Bytes for *stack segment*. 7



4. a) Write an assembly language program equivalent of *if-else* using conditional jump instructions for accessing following conditional levels L1, L2 and L3; where, take two values at AL and BL, respectively. 10

Condition	Operations for Levels
If AL>BL	L1: Add AL with BL
If AL<BL	L2: Subtract BL from AL
If AL=BL	L3: X-or between AL and BL

- b) Write short notes on Addressing Codes from memory 8
- c) Explain the procedure to perform SUB and CMP operation in assembly language. 7