North East University Bangladesh
Department of Computer Science and Engineering
Mid Semester Examination Summer 2022
Program: B.Sc. (Eng.) in CSE
Course: CSE 321(Microprocessor and Interfacing)

Total Mark: 30   Total Time: 1 Hr 30 mins

Instructions: Answer all the parts in question no **1, 3** parts from question no 2, 3 parts from question no 3, and 2 parts from question 4.
Write your answers neatly with only adequate amount of explanations and diagrams where necessary. If not required avoid unnecessary explanation. Unnecessary materials will gain no marks but can lose marks if it contradicts with actual answers. In all mathematical questions you must show all the steps.
Try to answer parts of a question together.

1 a Identify if the following statements are true or false.   2
      i.   Intel is the only manufacturer producing X86 architecture-based microprocessor.
      ii. Intel 8086 microprocessor has 14 16-bit general purpose registers.
      iii. Cache memory is made with SRAM.
      iv. There are three types of interrupts available in 8086 microprocessor.

   b The contents of the following registers are:
        CS = 1111 H
        DS = 3333 H
        SS = 2526 H
        IP = 1232 H
        SP = 1100 H
        DI = 0020 H

      i.   Values of which registers will be necessary for finding the physical location of the top of the stack?   1
      ii. What is the physical location of the next instruction?   2

   c Suppose a memory with a 14-bit address and an 8-bit word size.
      i.   How many bytes can be stored in this memory?   1
      ii. If this memory were constructed from 1K x 1 RAMS, how many memory chips would be required?   1

   d Draw the internal block diagram of 8086.   3

(Total for Question 1 = 10 Marks)

2   Answer any **three (3)** of the following questions.
  a Given AX=0000H, BX-1234H, CX=6666H, DS=2000H, ES=3000H,   4
     2000:0020H=22H, and 3000:0020H=33H, indicate the changes in each of the following instructions.
```
MOV AX, 3000H
MOV DS, AX
MOV DL, [0020H]
MOV AX, 2000H
ADD AL, DL
```
  b Explain, with proper diagram, the DMA operation in an 8086 based computer system.   4
  c What are the conditional flags available in 8086? Explain the purpose of each.   4
  d Draw a fully buffered and demultiplexed 8086 bus. Why is bus buffering necessary?   3+1
  e Explain the necessity of generating and adding wait state in 8086 bus cycle. Draw the 4
     circuit diagram for the circuit of generating wait state.

(Total for Question 2 = 12 Marks)

3   Answer any **three (3)** of the following questions.
    a   Draw the block diagram of ALU in 8086.   2
    b   *Microprocessors and microcontrollers are same.* Do you agree with this statement?   2
        Explain your answer.
    c   An 8086 system is operating at 5 MHz.   2
        For the system what will be the time necessary for a mathematical operation to be
        done if it requires 750 instruction cycles.
    d   What will be the condition of the conditional flags in 8086 if the following instructions   2
        is executed, where AL contains 55h and BL contains 60h.
                                SUB AL, BL
    e   What is the function of ALE pin in 8086?   2
    f   What functionality does status pins S3 and S4 provides for 8086?   2

                                                    (Total for Question 3 = 6 Marks)

4   Answer any **two (2)** of the following questions.
    a   What is Moore's Law?   1
    b   Intel X86 is based on which microprocessor?   1
    c   How many address lines does 8086 has?   1
    d   What is the difference between NMI and INTR interrupt?   1
    e   What is the difference between minimum mode and maximum mode of operation?   1
    f   What is the total size of interrupt vector table in 8086?   1
    g   What are the bus systems necessary for a microcomputer system?   1

                                                    (Total for Question 4 = 2 Marks)