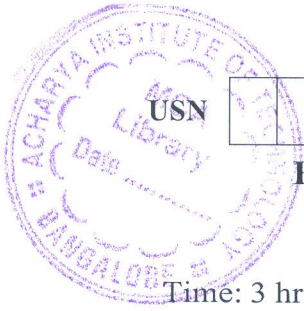# Fourth Semester B.E. Degree Examination, June/July 2023
Microprocessors and Microcontrollers

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1   a. Explain internal architecture of 8086/8088 with neat diagram with register details in brief.
                                                                            (10 Marks)
    b. Explain stack operations in brief and show the contents of the stack as each of the following instruction executed with relevant diagram.
        PUSH AX
        PUSH DI
        PUSH DX
        (Assume that SP = 1236, AX = 24B6, DI = 85C2 and DX = 5F93)   **(06 Marks)**
    c. Explain the bits of FLAG Register.   **(04 Marks)**

OR

2   a. Explain any four addressing modes with example.   **(08 Marks)**
    b. What are assembler directives? Explain the following assembler directives with an example:
        i) Model   ii) DB   iii) ORG   **(07 Marks)**
    c. Write an Assembly Language Program to show an addition, multiplication, subtraction and division of 16-bit numbers.   **(05 Marks)**

Module-2

3   a. Explain the following instructions with an example:
        i) ADC   ii) INC   iii) CMP   iv) AAM
        v) TEST   vi) SAR   vii) AAA   viii) SHL   **(12 Marks)**
    b. Explain Rotate instructions of all the four types.   **(06 Marks)**
    c. Explain AND and OR Logical instruction.   **(02 Marks)**

OR

4   a. What is an interrupt? Explain various types with an interrupt vector table.   **(10 Marks)**
    b. Write a program that (i) Clears the screen and (ii) sets the cursor at the center of the screen.
                                                                            (06 Marks)
    c. Explain the differences between INT and CALL instruction.   **(04 Marks)**

Module-3

5   a. Explain these instructions in brief:
        i) CBW   ii) CWD   iii) IMUL   iv) IDIV   **(08 Marks)**
    b. Explain these string instructions :
        i) MOVSB   ii) CMPSW   iii) SCAS   iv) LODSB   **(08 Marks)**
    c. With neat diagram, explain NAND gate address decoder.   **(04 Marks)**

OR

6   a. Explain these instructions:
        i) LEA   ii) XCHG   iii) SAHF   iv) XLAT   v) OUT   **(10 Marks)**
    b. Explain the differences between memory-mapped IO and IO mapped IO.   **(04 Marks)**
    c. Explain control word format of 8255.   **(06 Marks)**

Module-4

7   a.   Differentiate between CISC and RISC. Also explain 4 major rules of RISC design. (06 Marks)
      b.   Explain ARM core data flow model with neat diagram.   (08 Marks)
      c.   List and explain Registers of ARM processor.   (06 Marks)

OR

8   a.   Differentiate Microprocessor and Microcontroller.   (06 Marks)
      b.   Explain pipeline mechanism of ARM.   (06 Marks)
      c.   Explain ARM based embedded device, a microcontroller with neat diagram.   (08 Marks)

Module-5

9   a.   Mention and explain the salient features of ARM instruction set.   (06 Marks)
      b.   Explain instructions :
         i) MVN   ii) LSR   iii) ROR   iv) SUBS   v) ORR   (10 Marks)
      c.   Explain Barrel shifter with example.   (04 Marks)

OR

10   a.   Explain Instructions :
         i) SMULL   ii) BLX   iii) LDR   iv) LDM   (08 Marks)
      b.   Explain SWI Instructions.   (04 Marks)
      c.   Explain instructions :
         i) MRS   ii) ADR   iii) MRC   iv) SWP   (08 Marks)

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