PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester V - 2020
Course Code : ECE3111
Course Name : Sem V - ECE3111 - Microprocessor and Microcontroller
Program : B.Tech. CSE / ECM / ECI

Date : 11-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS   10 X 2 = 20M

1. Suggest the architectures used in the design of 8086 microprocessor and 8051 microcontrollers. Bring out the vital differences existing in these architectures.

(CO1) [Knowledge]

2. PUSH and POP instructions are associated with stack memory in 8051 microcontroller and 8086 microprocessor. However, there is a critical difference between addresing mode used in PUSH/POP operation between 8051 and 8086. Mention that difference.

(CO1) [Knowledge]

3. The addressing mode is way the operands are specified in the instruction. Using above defination mention the differences between following instructions.

   a. MOV A, #50H and MOV A, 50H.
   b. MOV A, R0 and MOV A, @R0.
   c. MOV BX, CL and MOV BX, [CL].
   d. MOV AX, [5000H] and MOV AX, 5000H.

(CO1) [Knowledge]

4. When microcontroller is powered up there are some default values which are loaded in the special function registers? What is the content of stack pointer (SP) and program counter (PC) register when 8051 microcontroller is powered up? Also, mention the default register bank of 8051 when it is powered up.

(CO1) [Knowledge]

5. Explain the instruction "*LOOP*" in 8086 microprocessor. How this instruction is related to the instruction "*DJNZ operand, label*" in 8051 microcontroller? What is the alternative of LOOP instruction in 8086?

(CO1) [Knowledge]

6. The microprocessor checks the status of the flag register after the execution of every instruction. Describe how the ZF and CF flag bits are updated in the instruction CMP operand1, operand2 of 8086.

(CO1) [Knowledge]

7. Every microprocessor has a different method of IO interfacing. There are two methods of IO interfacing in 8086 microprocessors. Mention the two methods. Also, explain the difference between them.

(CO1) [Knowledge]

8. Every microcontroller has some internal architecture that distinguishes it from the rest of the microcontrollers. Describe the architecture of the 8051 microcontrollers.

(CO1) [Knowledge]

9. The flag register is one of the special purpose registers. The flag bits are changed to 0 or 1 depending upon the value of result after arithmetic or logical operations. 8086 has 16-bit flag register, and there are 9 valid flag bits. Illustrate which all Flag bits will get affected when you perform 8EH+DCH?

(CO1) [Knowledge]

10. In an 8086 microprocessor, there are a few instructions that are used exclusively for logical operations. Among those are NEG instruction. Describe the function of the NEG instruction.

(CO1) [Knowledge]

PART B

ANSWER ALL THE FIVE QUESTIONS   **5 X 10 = 50M**

11. In each microprocessor there are certain interrupts. Explain the classifications of interrupt of 8086 microprocessor.

(CO3) [Comprehension]

12. A RAM chip of configuration 4k×8 is interfaced with the 8086 microprocessor for storing and restoring data. For the following decoded circuit, report the address space that will be accessed.
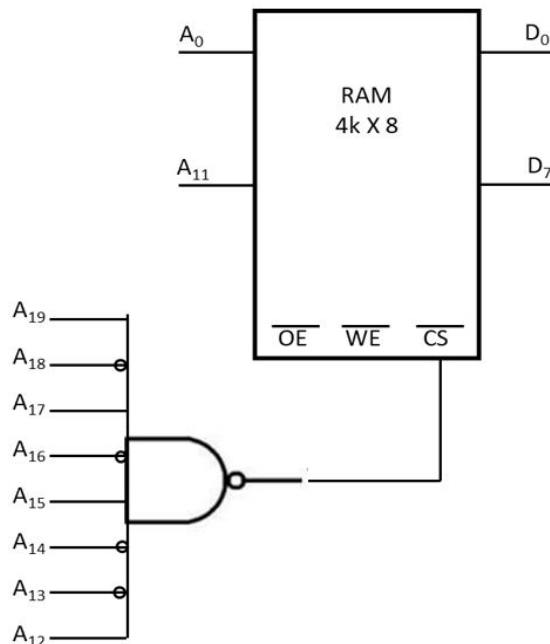
(CO2) [Comprehension]

13. A multi-function pinout is when two or more features are integrated into one pin. There are a few multifunctional pins in 8086 microprocessors, Explain the functions of the following pins in microprocessor.

    a. AD0-AD15
    b. M/IO
    c. INTR
    d. ALE
    e. MN/MX   (CO2) [Comprehension]

14. An interrupt is given to a microprocessor or a microcontroller in case of any issue. The interrupt pauses the main program, jumps to the ISR and returns back to the main program after executing the main program. In case of the 8086 microprocessor, explain all the sequences

    a. before jumping to ISR from main program
    b. before returning to main program from ISR.

Also, explain the differences between

    c. Near CALL and Far CALL.
    d. Calling a subroutine and Interrupts method.   (CO2) [Comprehension]

15. Describe all the addressing modes of 8051 microcontroller by giving example of each.
                                                        (CO2) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   **2 X 15 = 30M**

16. Write the output (AX) of the following programs.
    a) MOV AX, 1234H
       MOV BX, 5678H
       AND AX, BX
       HLT

    b) MOV AX, 1234H
       MOV BX, 5678H
       XOR AX, BX
       HLT

    c) MOV AX, 1234H
       MOV BX, 5678H
       OR AX, BX
       HLT

    d) MOV AX, 1234H
       NOT AX
       HLT
    Mention whether the following instructions are correct or wrong.
    MOV A, #FFH
    MOV R1, R2
    MOV A, @R2
    ADD A, B
    ANL R1, R2

                                                    (CO2) [Application]

17. a. A microprocessor-based sensor system can be used to count the number of people entering a security room. This can be correlated with counting the number of 1s in the content of Accumulator (AX) register of 8086. Assume that the content of AX register in 8086 microprocessor is 5225H. Write an ALP to count the number of 1s in AX.

b. Write a program to transfer a block of 4 bytes, starting address is 0500 and transfer the block at address 0600 by using string instructions. What is the difference between CLD and STD instruction?

c. Write an ALP in 8086 to find 01H+02H+03H+…… +FH.

(CO2) [Application]

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