U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Computer Science And Engineering **Duration: 3 hrs.**
Course Code: 19CS3ESMMC **Max Marks: 100**
Course: Microprocessors and Microcontrollers **Date: 17.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Explain Any 5 Addressing Modes of 8086 with example. **10**

b) Write an 8086 Recursive program to find the Factorial of a positive Number. **5**

c) (i) What is the contents of BP, DS:0F346,DX and flags after the execution of SUB DS: 0F246h [BP], DX If [BP]=0100,[DS:F346]=122F, DX=70F7? **5**

(ii) What are the contents of BX and CL after ROR BX, CL
Where BX=2360 CL=08?

UNIT - II

2 a) Calculate the delay produced for the microprocessor operating at 5 MHz for the given code. **6**

```
        MOV CX, 2E80h----------4
WAIT:   DEC CX ---------------------2
        NOP--------------------------3
        JNZ   WAIT-----------------16/4
        RET--------------------------8
```

b) Calculate the machine code for the following instructions assuming the opcode of MOV=100010 **10**

(i) MOV AX, BX

(ii) MOV DS: 0F246h [BP], DX

(iii) MOV AX,[SI]

(iv) MOV [BX][SI],CX

c) What is the RESULT & effect on FLAGS after the execution of **4**

(i) RCL CX,1 with CF=1 and CX=2360

(ii) XOR AX,BX with AX=122F and BX=70F7

UNIT - III

3 a) Interface an 8255 with 8086 to work as an I/O port. Initialize port A as output port, port B as an input port and port C as output port. Port A address should be 0740 H. Write a program to sense switch positions SW0 – SW7 connected at port B. The sensed pattern is to be displayed on port A, to which 8 LEDS are connected, while the Port C lower displays number of on switches out of the total 8 switches **10**

Addresses of Port A=0740, Port B=0742, Port C=0744, Control port=0746

b) Design a control word for Programmable peripheral interface 8255 for the following scenarios: **10**

i) The seven -segment display is interfaced to 8086 microprocessor using 8255 to display the message 'LEFT'. The data for the Seven Segment display is sent through the Port A and clock signal is sent through Port C

ii) Explain the Input control signals (handshaking signals) used when port B is used in Mode-1 as I/p port.

OR

4 a) With a neat diagram, explain the General Bus Operation Cycle of 8086. 10

b) Design the Timing Diagram for Read & Write cycle for minimum mode of operation. 10

UNIT - IV

5 a) Compare the features of Microprocessor & Microcontroller. **5**

b) Explain the Different Addressing modes of 8051 with an example. **10**

c) Write a program in 8051 microcontroller to add BCD numbers found in Internal RAM locations 25h,26h and 27h together and put the high order byte of the result in RAM locations 31h and low order byte of result in RAM location 30h. **5**

UNIT - V

6 a) Write a 8051 program to display BANGALORE in a rolling fashion on a 7-segment display. **8**

b) Write an 8051 program to place any number in Internal RAM location 3Ch and increment it until the number equals to 2Ah. **6**

c) Explain the following Bit-Level logical operations. **6**

(i) ANL C, B

(ii) SETB C

(iii) CLR C

(iv) CPL C

OR

7 a) Write a program for 8051 microcontroller to drive the stepper motor Interface to rotate in anti-clockwise direction by 60 steps. Introduce suitable delay between successive steps. **8**

b) Write 8051 instructions to find a number that when XORed, results in the number 3Fh in A. **4**

c) With a neat diagram, explain the working of a keyboard interface circuit. **8**

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