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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

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

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

UNIT - I

1 a) Discuss the significance of each flag in flag register of 8086. **6**

b) Analyze and identify the output after the execution of the following instructions **8**

i) INC AL if AL=FFH
ii) ADD AL, 01 if AL=09
DAA
iii) CBW if AL=FF

c) Write a program to exchange two blocks of data. **6**

UNIT - II

2 a) Calculate the operation code for the following instructions. Assume the opcode for MOV is 100010. **8**

i) MOV CX, [437AH]

ii) MOV CL, [BX]

b) Write a delay routine to generate the delay of 100 ms for 8086 microprocesso operates at 5 MHz frequency. **6**

c) Design an assembly language program to find number of vowels and consonants in a given string and display it on the terminal. **6**

UNIT - III

3 a) Compare and contrast the following pins based on the functionality of the Microprocessor operating in minimum mode. **10**

i) HOLD and HLDA
ii) INTR and INTA
iii) READY AND RESET
iv) DT/R and DEN
v) NMI and INTR

b) Design a timing diagram for Memory Read Cycle and Memory Write Cycle. Explain the same. **10**

OR

4 a) Design the control word for 8255 operating in I/O mode with Port A operating as an input port in Mode 1, Port B operating as an output port in Mode 1, Port C Upper operating as an output port and Port C Lower operating as an input port. **6**

b) Describe the following pins of Microprocessor operating in a maximum mode. **8**

i) LOCK

ii) S2, S1, S0

iii) QS1and QS0

iv) RQ0/GT0 and RQ1/GT1

c) With a neat diagram, explain the working functionality of 7-Segment display interface circuit containing four 7-Segment display units. **6**

UNIT - IV

5 a) On the basis of features supported, compare Microprocessor and Microcontroller. **6**

b) Design a code snippet for 8051 Microcontroller to swap the content of register R7 and R6 in register bank 0 using **6**

i) Register Addressing Mode

ii) Exchange instruction

c) Demonstrate the usefulness of following addressing modes of 8051 Microcontroller with an example. **8**

i. Immediate Addressing Mode

ii. Register Addressing Mode

iii. Direct Addressing Mode

iv. Indirect Addressing Mode

UNIT - V

6 a) Compare and Contrast the following instructions of 8051 Microcontroller with an example**.** **8**

(i) RR and RRC

(ii) RL and RLC

b) Design a program for 8051 Microcontroller to display FIRE and RUN on 7-Segment display board. 8

c) Write a program that OR the contents of ports 1 and 2 and put the result in external RAM location 0100H. 4

OR

7 a) Analyze the following code snippet and write the output. **6**

```
CLR C
MOV A,R2
RLC A
MOV R4,A
CLR A
RLC A
MOV R3, A
```

b) Write a stepper motor program to rotate motor in an anti-clock wise direction. **8**

c) Explain the operation performed by the following Bit level logical operatior **6**
8051 Microcontroller.

i) ANL C, b

ii) ANL C, /b

iii) ORL C, b

iv) ORL C, /b

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