



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION- JAN 2023

Course Code: ECE 1004

Course Name: Microprocessor Based Systems (open Elective)

Program : B.Tech - ECE

Date: 23-JAN-2023

Time: 9:30 AM-12:30 PM

Max Marks: 100

Weightage: 50%

Instructions:

Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO marks.

(10Qx 2M= 20M)

1. The various addressing modes that are defined in a given instruction set architecture define how machine language instructions in that architecture identify the operand (or operands) of each instruction. There are different types of addressing modes available in 8086. Identify the addressing mode for the following instruction MOV AH, [SI] (C.O.No.1)[Knowledge level]
2. The data transfer instructions are used to transfer data from one location to another. This transfer of data can be either from register to register, register to memory or memory to register. State one instruction that transfers the data from register to memory. (C.O.No.1)[Knowledge level]
3. A processor can be operated in two modes minimum and maximum modes. State the mode of the processor to be chosen in Multiprocessor configuration. (C.O.No.1) [Knowledge level]
4. Binary coded decimal (BCD) is a set of binary encodings of decimal numbers where each digit is represented by a fixed number of bits, usually four or eight. It helps to compute and analyze data easily for a human being. Write the BCD equivalent for the given Decimal Number: 255 (C.O.No.1) [Knowledge Level]
5. While executing call and return instructions, the CS value:2000 and IP value:0FFFh are pushed to the stack. Discuss the formation of Physical address and Logical address for the given CS and IP values. (C.O.No.4) [Knowledge level]
6. A student is working on a project assigned to him for writing and simulating an ALP using MASM. While executing the same he is not able to terminate the program even after writing .end at the end of the program. Suggest one of the Software interrupts to be used in the program to solve the issue faced by the student. (C.O.No.1) [Knowledge level]
7. If immediate data is present in the instruction it is immediate addressing mode. The instruction, MOV AX, 35 H is an example of _____addressing mode. (C.O.No.3) [Knowledge level]
8. The 8086 has four groups of the user accessible internal registers. Name the register which point to the top of the stack. (C.O.No.3) [Knowledge level]

9. Address bus is unidirectional because data flows in one direction whereas data Bus is bidirectional as data flow is possible in both the directions. State the number of unidirectional octal latches required for a processor with 26 address lines. (C.O.No.4) [Knowledge level]

10. DIV SOURCE is the syntax for division operation in 8086 give valid instruction for Multiplication operation. (C.O.No.4) [Knowledge level]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

11. During the decoration for a festival in December Madhav uses an algorithm to alternatively glow LEDs after a delay of 1msec each using I/O interfacing concepts. Consider a case where to help Madhav, you are assigned the task to generate the same using software delay, Write an assembly language program for generating 1msec software delay if the 8086 is operating at 5 MHz. Show your calculations.. (C.O.No.2) [Comprehension]

12. The T state is subset of machine cycle and machine cycle is a subset of instruction cycle. The time required to execute the given instruction can be termed as instruction cycle. The basic machine operation includes Read and Write operations further classified in I/O or Memory mode. Consider the scenario where an individual 8086 IC is interfaced with a memory to execute the following task: Read a data from location [2000H]. Explain the timing diagram for the above stated operation. E.g.: I/O read (C.O.No.4)[Comprehension]

13. In a Circuit design competition conducted for two consecutive working days. Team MBS1 and Team MBS2 are working together for a task assigned. If team MBS1 completes 4 parts of work in 2 days and Team MBS2 completes 6 parts of work in 2 days. Write an ALP to find the total parts of work done in two days and average work done in two days. (C.O.No.2) [Comprehension]

14. An interrupt is a condition that halts the microprocessor's current task temporarily to work on a different task and then return to its previous task. It is an event or signal that requests the attention of the CPU. Thus allowing, peripheral devices to access the microprocessor. What would be the sequence of events for the following situation considering the priority of the interrupts?

Situation: If 8086 receives NMI while executing DIV and DIV produces divide-by-zero error while processing the instructions in the program. (C.O.No.3) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TWENTY marks.

(2Qx20M=40M)

15. While dealing with the digital world, the most important part lies in converting real life signals which are analog into digital and convert them back to analog after processing. To achieve both the termed processes at an optimum level ADC's and DAC's are used. The processor can't handle it altogether hence a PPI device like 8255 can prove useful to interface with these devices. If 8255 is to be interfaced to 8086 to fulfill the above tasks, elaborate the following concepts in 8255. (C.O.No.4) [Application]

- Which port is used to SET/RESET each bit value?
- State the control register value to set bit PC05 in BSR mode.
- Draw the interfacing diagram with the processor.

16. Memories form an Integral part of the Microprocessor based systems as memories are essential element of a computing system. A system architect is assigned a task to Design and develop the Memory Map to interface a total of 64 KB memory EEPROM using 8Kx8 Memory Chips with the 8088/8086 microprocessor and the memory address decoding circuit for 8Kx8 memory chip. If you were the system Architect, Illustrate your approach to design the system with proper diagrams. (C.O.No.3) [Application]