



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023**

Semester : Semester III - 2021

Course Code : ECE3003

Course Name : Sem III - ECE3003 - Microprocessor Programming and Interfacing

Program : B.Tech. Electronics and Communication Engineering

Date : 11-JAN-2023

Time : 1.00PM -4.00PM

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 FIFTEEN QUESTIONS

15 X 2 = 30M

1. Microprocessor 8086 is a 40 pins IC. These pins are used for special purpose. Explain the functionality for each of the following pins a) $(BHE)^{-}$ b) $(DEN)^{-}$ (CO1) [Knowledge]
2. Different modes of addressing are used by 8086 Microprocessor. Identify the addressing modes for the following instructions. i) MOV DL, [BX+SI] ii) MOV AL, [BX+32H] (CO1) [Knowledge]
3. A memory design engineer, works on a memory chip with 32 KB of memory and interfaces the same with 8086/8088. While working on the project he/she gets a specification to expand the memory access to 64KB using 32 KB chips. State the number of chips required and number of address lines to be engaged for the given task respectively. (CO1) [Knowledge]
4. A microprocessor is interfaced with the memory depending on address lines that are present within the microprocessor. If a microprocessor has 16 bits address lines, identify the amount of memory that can be interfaced with the microprocessor. (CO1) [Knowledge]
5. Logical Instructions like Shift and Rotate instructions help to divide and multiply data in the powers of 2. Identify the operation performed by the instruction "Right Shift". (CO1) [Knowledge]
6. Mr. Marvel is working on a project assigned to him for writing and simulating an ALP using DOSBOX and MASM. While executing the same he is unable 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 Marvel. (CO2,CO3) [Knowledge]
7. The different versions of same processor may work on different frequencies due to the advancement and application based designs. A Microprocessor based system consists of a processor with frequency 10MHZ. Calculate the time period/one T state value for the given Processor. (CO3,CO2) [Knowledge]
8. Memory segmentation is an operating system memory management technique of division of a computer's primary memory into segments or sections. Name an assembler directives used to segments the primary memory of microprocessor. (CO2,CO3) [Knowledge]

9. The exchange instruction exchanges the content of one register with the content of another register. Write the syntax of the instruction that will exchange the contents of the AX and BX registers?
(CO3,CO2) [Knowledge]
10. The ROL instruction is used to rotate the bits of byte towards the left. Interpret the result of the following instruction: ROL BL, 04H.
(CO3,CO2) [Knowledge]
11. Universal Serial Bus (USB) is an industry standard that establishes specifications for cables, connectors and protocols for connection, communication and power supply (interfacing) between computers, peripherals and other computers. Mention any two advantages of USB.
(CO4,CO5) [Knowledge]
12. In 8255, ports are used as I/O and work in different modes. Mention the port that is used for the generation of handshake lines in mode 1 or mode 2.
(CO5,CO4) [Knowledge]
13. The 8255 IC has three ports which acts as I/O ports. Each ports operates in different mode. Mention the mode of operation of Port A which is capable of transferring the data in both the directions.
(CO4,CO5) [Knowledge]
14. Memories are used to store the data and code for the microprocessor. State the different types of volatile memories.
(CO4,CO5) [Knowledge]
15. Memory is the electronic holding place for the instructions and data a computer needs to reach quickly. Mention any two memories that can be used to store the data permanently and can be erased and reprogrammed.
(CO4,CO5) [Knowledge]

PART B

ANSWER ALL THE TWO QUESTIONS

2 X 15 = 30M

16. The 16-bit segment register values are combined with an offset to get the physical addresses in an 8086 processor. Given that the DS contains 14A2h and the offset address is 5584h, then calculate the following addresses
(i) Lower Range address in the Data Segment (ii) Upper Range address in the Data Segment
(iii) Logical address (iv) Physical address
(CO2,CO3) [Comprehension]
17. Microprocessor will execute the program in sequential order (instruction by instruction). In traditional method, the microprocessor will execute the present instruction only when the previous instruction is executed completely. By this microprocessor consumes more time for execution of complete program. Suggest a suitable technique in order to increase the speed of execution with suitable example.
(CO5) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS

2 X 20 = 40

18. Memory interfacing requires a memory map to be developed which helps in locating various memory locations uniquely in 8086/8088 addressable memory range. Some of the address lines are directly connected to memory chips and the unused lines are connected to a decoding circuit. Devise and develop the Memory Map and draw the Interfacing Diagram to interface a total of 24 KB memory using three 4Kx8 PROMs and three 4Kx8 SRAM Memory Chips with the 8088/8086 microprocessor by indicating the necessary signals. The Rom is having a starting address as F0000h. You may use a 74LS138 decoder and suitable number of gates for the address decoding circuit.
(CO4) [Application]
19. Programmable Peripheral Interface (PPI) is a general purpose I/O device, designed to interface the microprocessor with external device like Keyboard, LED, etc., Lower port of Port C is connected to 4 LED's. With an ALP, compute the values to be loaded in CR register of 8255 IC to blink one LED after another at a regular interval of 2msec. Use BSR mode of operation of Port C.
(CO4) [Application]
