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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKE-UP EXAMINATION, JULY 2024**

**Course Code**: ECE 3003

**Course Name**: Microprocessor Programming and Interfacing

**Program** : B. Tech

**Date**: 22-07- 2024

**Time**: 9:30 AM to 12:30 PM

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*

**Part A [Memory Recall Questions]**

**Answer all the Questions. Each question carries 2 marks. (15Qx2M= 30M)**

1. 8086 IC is 40 pin IC. The following pins (signals) are used for special purpose. Describe their functions. i) AD19-AD0 ii) ALE (C.O.No.1) [Knowledge]

2. The CMP instruction can be used to compare two 8-bit or two 16-bit numbers. Indicate the flags bits that are affected when CMP AL, BL instruction is executed, if AL = 12h and BL = 14h. (C.O.No.2) [Knowledge]

3. 8086 Instructions are used to perform arithmetic (like addition, subtraction, multiplication, division etc.) and logical operations (AND, OR, Shift, rotate etc.). What will be the value of BL register if the following instructions are executed. Comment on the result.

MOV BL, 07H

                                        MOV CL, 01H

                                        ROL BL, CL (C.O.No.2) [Comprehension]

4. Using the offset address, few registers are used to compute Absolute address. How does 8086 compute the absolute address. (C.O.No.1) [Knowledge]

5. 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] (C.O. No. 2) [Knowledge]

6. While working on the project, a memory design engineer needs to expand the memory access to 64KB using 8 KB chips. State the number of chips required. (C.O.No.3) [Comprehension]

7.Microprocessor doesnot have inbuilt ports to transfer and receive the data between microprocessor and other peripherals connected to it.Identify the components that are present in I/O ports which prevent the data loss while transmitting and receiving the data.

(C.O. No. 4) [Knowledge]

8. Advanced Microprocessors have high computational features with advanced technology. Mention any two new features that are included in the advanced processor for high performance.

(C.O. No. 4) [Knowledge]

9. The 8255 IC has three ports which acts as I/O ports. Each port operates in different mode. Mention the mode of operation of Port A which is capable of transferring the data in both the directions. (C.O.No.3) [Knowledge]

10. Shift and Rotate instructions help to divide and multiply data in the powers of 2. Identify the operation performed by the instruction"Right Shift". (C.O. No.2) [Knowledge]

11. There are many interfacing chips required by 8086. IC 8255 is one such IC. The IC 8255 is also called as \_\_\_\_\_\_\_\_\_\_. (C.O.No.3) [Knowledge]

12. To perform high computation, Intel introduce higher versions of microprocessor. Name an advance processor with 32 bits architecture and state whether the performance of this processor is increased or not compared to 8086. (C.O. No. 4) [Knowledge]

13. Larger number of address lines can access large amount of memory. Determine the number of address lines required to access a 256K memory chip. (C. O. No. 2)[Knowledge]

14. There are different types of instructions available in 8086. Mention the content of AX after execution of the instruction, XOR AX, AX . (C.O. No.2)[Knowledge]

15. The Instruction Pointer in 8086 is a 16-bit register. Descibe the function of the Instruction Pointer register. (C.O. No.1)[Knowledge]

**Part B [Thought Provoking Questions]**

**Answer all the Questions. Each question carries 15 marks. (2Qx15M=30M)**

7. 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​

Lower Range address in the Data Segment​

Upper Range address in the Data Segment​

Logical address

Physical address​ (C.O.No.3) [Comprehension]

8. Microprocessor will execute a program in sequential order (instruction by insteruction). In traditional method, the Microprocessor will execute the current instruction only when the previous instruction is executed completely. By this, Microprocessor consumes more time for the execution of the complete program. Suggest a suitable technique to increase the speed of execution with suitable example. (C. O. No. 5)[Comprehension]

**Part C [Problem Solving Questions]**

**Answer all the Questions. Each question carries 20 marks. (2Qx20M=40M)**

9. 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. (C.O.No. 3) [Application’s level]

10. During the decoration for a festival in December Madhav uses an algorithm to alternatively glow LEDs after a delay of 20msec 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 20msec software delay if 8086 is operating at 10 MHz. Show your calculations.

(C.O.No. 3, 5) [Application]