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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - MAY 2023**

Semester : Semester IV - 2021

Course Code : ECE3111

Course Name : Sem IV - ECE3111 - Microprocessors and Microcontrollers

Program : CSE

Date : 19-MAY-2023

Time : 10.30AM - 12.00PM

Max Marks : 50

Weightage : 25%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
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PART A

ANSWER ALL THE QUESTIONS

(5 X 2 = 10M)

1. The Flag register is a 16-bit register, of which 7 bits are unused. When will be the following flags set (OV AC & SF)?
(CO1,CO2) [Knowledge]
2. Each addressing mode of any processor is unique. Mentioned below are two instructions from two different addressing modes. Which one of the two instructions will be executed faster and why?
1. ADD AX, BX
2. ADD AX, 1234H
(CO2,CO1) [Knowledge]
3. The Flag register is a Special Purpose Register. Depending upon the value of result after any arithmetic and logical operation the flag bits will set or reset. What are the different flag available in status register of 8086?
(CO1,CO2) [Knowledge]
4. There are various classifications of instruction such as data transfer, arithmetic & logic, shift & rotate, etc. in 8086. Write a program to add two 8-bit numbers.
(CO1,CO2) [Knowledge]

5. The physical or effective address indicates the actual memory location in a segment where a data value could be either stored or read. Consider that the (DS) contains 6E29h, then
 (a) calculate the lower range and upper range of the Data Segment in hexadecimal.
 (b) in order to store 14 KBytes in the Data Segment, identify the offset in hexadecimal to be loaded in one of the compatible registers.

(CO1,CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(4 X 5 = 20M)

6. A program is a set of instructions that can be executed by a processor to do a specific task. Write an ALP to multiply the First five natural Numbers without using mul or Imul instruction.
 (CO1,CO2) [Comprehension]
7. In assembly language programs a person is supposed to know the architecture of the microprocessor in order to write a program. There are 10 numbers of each 8-bit stored from starting address A4000H to end address A400AH. Write an ALP to add these numbers and store the result in address A400CH.
 (CO1,CO2) [Comprehension]
8. The microprocessor is an important part of Computer Architecture. It is a programmable device that takes in input, and performs some arithmetic and logic operations over it to produce a desired output. The Intel 8086 is widely used in many applications. Sketch the internal architecture of 8086 Microprocessor and explain the role of all its parts.
 b) Buses in Microprocessors are sets of pins, wires or signals having common functions. Explain three types of buses and mention the differences between them.
 (CO2,CO1) [Comprehension]
9. The designer has done certain designing so that microprocessor performs a number of activities one after another. How to switch 8086 from minimum mode to maximum mode? Explain how 8086 in maximum mode generates all the control signals for operations using the 8288 bus controller.
 (CO2,CO1) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 10 = 20M)

10. Physical memory is the address in any one of the memory segments where either data or code is stored. Using the initial register values listed in the table, answer the following:
 1.If (IP) = 4578, what will be the physical address in this case?
 2.If a string of byte to be read from a memory location, what will be starting address from where the string will be read?
 3.If the string read in '2' must be stored in a memory location, what will be starting address from where the string will be stored?
 4.You need to store some data temporarily on stack, what will be the starting address in stack memory from where the data will be stored?

Register	Value	Register	Value	Register	Value
BX	2000	DI	4000	CS	3300
BP	AB00	SI	0006	DS	4400
ES	1000	SS	6500	SP	0555

(CO2,CO1) [Application]

11. Every microprocessor has a set of logical, branch, and call instructions. Five numbers, each of sixteen bit representing the age of a member of a team, it is stored in a memory named an array. Write an ALP program to find the average age of the team. The Numbers are 0016H,0022H,0058H,0045H and 0033H.

(CO1,CO2) [Application]