Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - NOV 2023

Semester : Semester V - 2021
Course Code : ECE3111
Course Name : Sem V - ECE3111 - Microprocessor and Microcontroller
Program : B. TECH

Date : 2-NOV-2023
Time : 2:00PM - 3:30PM
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.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. Flag register is a 16-bit register, of which 7 bits are unused. Out of the remaining bits, 6 bits are used as conditional flags. The others are controlled flags. Among the 6 flag bits, which one of the following is not a status flag?
   i)Zero flag
   ii)Direction flag
   iii)Sign flag
   iv)Auxiliary carry flag

   (CO2,CO1) [Knowledge]

2. Memory is organized as bytes, and the capacity of a memory chip is stated in terms of the number of bytes it can store. Suppose that a microprocessor has an n-bit address bus. How many memory locations can be accessed by the microprocessor? If each location can store 8-bit (1-byte) data then what is the memory capacity?

   (CO1,CO2) [Knowledge]

3. All the activities of the processor and buses are synchronized by a clock. What is the function of a 6-byte instruction queue in an 8086 microprocessor?

   (CO1,CO2) [Knowledge]

4. A Flag register in an 8086 processor is a 16-bit register that is used to reflect the status of the result after an arithmetic or logical operation. Explain why overflow occurs and how it contradicts the sign flag

   (CO1,CO2) [Knowledge]

5. The processor or the microprocessor as we might call it, is the component responsible for controlling all the activity in the system. What is the difference between memory read and memory write operation?

   (CO1,CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(4 X 5 = 20M)**

6. Once the effective address is computed, the physical address is calculated as the sum of the segment base address and the effective address. Find the physical address of the memory locations referred to in the following instructions if DS = 0223H, DI = 0CCCH, SI = 1234H.
a) MOV [DI], AL
b) MOV [SI][56H], BL

(CO1,CO2) [Comprehension]

7. A status register is a 16-bit register which is also called a flag register or a program status word. In this register, there are seven bits which are undefined and are not used, while the rest nine bits are used to indicate the nature of the operation that occurred in the past. With a neat labelled diagram, describe the functions of each bit with their bit positions

(CO1,CO2) [Comprehension]

8. A conditional flag is a single bit flip flop which is set or reset according to the result of an arithmetic or logic operation. Find the status of the flags CF, SF, AF, ZF, PF, OF after the following instructions are executed.
MOV BX, 45ECH
ADD AL, 7723H

(CO2,CO1) [Comprehension]

9. A multiplexed pin is when two or more features are integrated into one pin. There are a few multifunctional pins in 8086 microprocessors, Explain the functions of the following pins in the microprocessor.
AD0-AD15
M/IO
INTR
ALE
MN/MX

(CO1,CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

10. (i) The way in which operands are specified in an assembly language instruction is called its addressing mode. Explain the addressing modes of the 8086 microprocessor with one example for each one. 10 M
(ii) In assembly language programming, coding is done in a symbolic language called mnemonics. Explain memory read and memory write machine cycle with timing diagram for 8086 microprocessor. 10M

(CO1,CO2) [Application]