PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

Test - 1

Sem & AY: Even Sem 2021-2022   **Date**: 09-05-2022

Course Code: ECE3003   **Time**: 11:00 A.M -12:00 P.M

Course Name: Microprocessor Programming and Interfacing   **Max Marks**: 30

Program & Sem: B. Tech. / Fourth   **Weightage**: 15%

Instructions:

   (i)   Read the question properly and answer accordingly.
   (ii)   Question paper consists of 3 parts.
   (iii)   Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries 3 marks.   (4Qx3M=12)

1. The 8086 Flag register reflects status and provides some control bits. Give the status of five flag bits (CF, PF, AF, ZF and SF) of 8086 microprocessor, if two 8-bit numbers EDh and FEh are added.   [3M]
   (C.O.NO - 01) [Bloom's level - Knowledge]

2. 8086 signals are assigned to a 40-pin DIP IC. Give a single sentence description for the following 8086 signals: $MN/\overline{MX}$, ALE, $M/\overline{IO}$ and $DT/\overline{R}$.   [3M]
   (C.O.NO - 01) [Bloom's level - Knowledge]

3. In real mode of operation the 8086 combines the values contained in the segment registers and using some registers (such as pointer, index and data). Identify which among the following logical combinations are the valid? Justify each case.
   (a) CS:SI (b) SS:BP (c) ES:BX (d) DS:CS   [3M]
   (C.O.NO - 01) [Bloom's level - Knowledge]

4. Given that the DS contains 7A27h and the offset address is 567Bh, then calculate the following addresses: (a) Physical address (b) Lower Range address in the Data Segment (c) Upper Range address in the Data Segment (d) Logical address.   [3M]
   (C.O.NO - 01) [Bloom's level - Knowledge]

Part B [Thought Provoking Questions]

Answer the following Question. The question carries 10 marks.   (1Qx10M=10)

5. In real mode of operation, the 8086 combines the values contained in the segment registers and using some registers (such as pointer, index and data). Using the initial register values listed in the table, answer the following:

a) If (IP) = 578Ah, what will be the physical address in this case?

b) If a string of byte to be read from a memory location, what will be starting address from where the string will be read?

c) If the string read in '2' has to be stored in a memory location, what will be starting address from where the string will be stored? Give alternate options if any.

d) 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? Give alternate options if any.

Register	Value	Register	Value	Register	Value
AX	2233	BX	3000	CX	0020
DX	3000	DI	5000	CS	2400
BP	BC00	SI	0007	DS	5500
ES	A000	SS	7200	SP	0567

[2+2+3+3 = 10M]
(C.O.NO - 02) [Bloom's level - Comprehension]

Part C [Problem Solving Questions]

Answer the following Question. The question carries 8 marks.   (1Qx8M=8)

6.
(a) The 8086 addressing modes provide flexible methods to access memory by means of specifying the operands (data) using various formats. Identify which among the following is a valid or invalid addressing mode of 8086. Justify each case.
(i) ADD 07,CL   (ii) MOV BX,AL   (iii) MOV BL,2000h   (iv) MOV [2000h],DX

(b) Write an 8086 assembly language program to find the value of F = 4Y = 8, without using multiplication instruction. Both Y and F are memory locations. Memory location F will store the result whereas Y will have the number to be multiplied. All the values of Y and F are part of data segment.   [2x4=8M]
(C.O.NO - 02) [Bloom's level - Comprehension]

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Winter Semester: 2021 - 22

Course Code: ECE 3003

Course Name: Microprocessor Programming & Interfacing

Program & Sem: B Tech - ECE & IV Semester

Date: 26th April 2022

Time: 11.30 AM to 12.30 PM

Max Marks: 30

Weightage: 15%

Instructions:
(iv) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries THREE marks. **(4Qx**
3M=12M)

1. Prefetching is possible using 8086 Microprocessor. How does this is achieved and give a note on the general purpose registers in 8086 Microprocessor. (C.O.1) [Knowledge]

2. 8086 IC is 40 pin IC. The following pins (signals) are used for special purpose. Describe their functions.
   i) AD19-AD0 ii) ALE iii) INTR   (C.O.1)
   [Knowledge]

3. Using the offset address, few registers are used to compute Absolute address. How does 8086 computes the absolute address.   (C.O.1)
   [Knowledge]

4. Different modes of addressing are used by 8086 Microprocessor. Identify the addressing modes for the following instructions.

5. i) MOV DL, [BX+SI]   ii) MOV AL, [BX+32H]   (C.O.1)
   [Knowledge]

Part B [Thought Provoking Questions]

Answer the Question. The question carries TEN marks.
(1Qx10M=10M)

5. 8086 uses segment register content and the effective address to compute the Physical address in the given segment. Given that DS contain 7FA1H and the

offset address is 4381H. The following addresses are computed by the Microprocessor. What will be the computed addresses?

i) Physical Address   ii) Lower range address in DS   iii) Upper range address in DS

iv) Logical address   (C.O.1)

[Comprehensive]

Part C [Problem Solving Questions]

Answer the Question. The question carries EIGHT marks.
(1Qx8M=8M)

6.   Assembly language program is used by the user to program 8086.
How does 8086 be programmed to swap the word at memory location 24000H with that of 25000H
(C.O.2) [Application]

PRESIDENCY UNIVERSITY
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SCHOOL OF ENGINEERING

TEST 2

Winter Semester: 2021 - 22

Course Code: ECE 3003

Course Name: Microprocessor Programming & Interfacing

Program & Sem: IV sem ECE

Date:1ˢᵗ June 2022

Time: 11.30 AM to 12.30 PM

Max Marks: 30

Weightage: 15%

Instructions:

(i)   *Read the all questions carefully and answer accordingly.*

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries FIVE marks.   (4Qx 3M= 12M)

Q.NO. 1. Register set in 8086 is used to hold data. Data can be manipulated by using Logical

Instructions. What will be the contents of register BL after the last instruction execution?

Let CY = 1 before execution

MOV DL, 14H

MOV CL, 03H

RCL BL, CL,

.   (C.O.No.2)

[Comprehension]

Q.NO. 2. AND, OR and XOR are some of the important logical instruction in 8086. IF AL = AAh

BL = 0Bh. What is the output for the logical instructions given?

AND AL, BL

OR AL, BL

XOR AL, BL   (C.O.No.2)

[Comprehension]

Q.NO. 3. In 8086 microprocessor Flag register indicate the status of the flag bits after

arithmetic operation. Indicate the value of the CF, PF, AF, OF flags after adding the

two unsigned numbers **0EFh** and **0F1h.**

(C.O.No.2)

[Knowledge]

Q.NO. 4. Logical instructions in 8086 is used to perform logical operations. Shift and rotate are some

important logical instructions in 8086. Differentiate between SHR and ROR instructions of

8086 With examples

(C.O.No.2)

[Knowledge]

Part B [Thought Provoking Questions]

Answer the Question. The question carries TEN marks.
(1Qx10M=10M)

Q.NO. 5 a. Assembly level programs are used in 8086 to perform different operations .Using

different instructions we can perform different operations. Identify output of this

program

```
. model small
.data
String1 db "assembly language program", $
. code
MOV AX, @data
MOV DS, AX
MOV SI, offset String1
MOV CX, Length
ADD SI, CX
Back: MOV DL, [SI]
MOV AH, 02H
INT 21H
DEC SI
LOOP Back
MOV AH, 4CH
INT 21H
End
```

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

[Comprehension]

b. Identify the errors in the program

LINE 1:   model small
LINE 2:   .data
LINE 3:   Multiplier dw 1234H
LINE 4:   Multiplicant dw 3456H

LINE 5:	Product dB 2 dup (0)
LINE 6	.code
LINE 7:	MOV AX, @data
LINE 8	MOV DS, BX
LINE 9:	MOV AX, Multiplicant
LINE 10:	MUL Multiplier, Multiplicant
LINE 11:	MOV Product, AX
LINE 12:	MOV Product, DX
LINE 13:	MOV AH, 4CH
LINE 14:	INT 20H
LINE 15:	End

[5] (C.O.No.3.5)

[Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The question carries EIGHT marks.
(1Qx8M=8M)

Q.NO.6.   Generating delays is an important concept in assembly level programming. Delays can

be generated by writing program. Write an assembly level program to generate a delay

of 5ms. The processor is having a clock frequency of 5Mhz. If the operating

frequency changes to 10Mhz, determine the total number of clock cycles needed to

generate the same delay of 5ms?   [8] (C.O.No. 3,5)

[Application]

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF MANAGEMENT

END TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: ECE 3003

Course Name: Microprocessor Programming and Interfacing

Program & Sem: B. Tech – IV Sem

Date: 29th June 2022

Time: 9:30 AM to 12:30 PM

Max Marks: 60

Weightage: 30%

Instructions:

(v) Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries THREE marks.
(6Qx3M= 18M)

1. The Flag register is a Special Purpose Register. Depending upon the value of result after any arithmetic and logical operation the flag bits become set or reset. If two numbers 47h and 73h are added, indicate the bit values affected for the six status flags of 8086.
(C.O.No.2) [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 & CMP BL, AL 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, 04H
> ROL BL, CL,   (C.O.No.2)

[Comprehension]

4. The 'INT' instruction of 8086 is a software instruction which is considered as equivalent to 'CALL' instruction and is always associated with an interrupt number. Indicate the sequence of events in the form of a table for 8086 an interrupt INT 07 will be invoked. Given Flag Register contents as 0087h, the CS: IP as 0200:0500.
(C.O.No.3) [Comprehension]

5. Pipelining increases the overall instruction throughput of any processor. Pipelining makes it possible to start an instruction before completing the execution of previous one. Assume that there are 6 stages and 3 instructions are to be executed, what will be the

number of clock cycles needed to complete the execution for a pipelined machine.

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

6. In memory interfacing the required number of address lines are directly connected to memory chips whereas some lines are unused and used for design the decoding circuit. Differentiate between the absolute and partial decoding schemes.

(C.O.No.3) [Comprehension]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries EIGHT marks.
(3Qx8M=24M)

7. a. The BSR mode of 8255 is used to set or reset the pins of Port C in Simple I/O mode for interfacing output devices like LEDs etc. Write the BSR control words for the following cases:
    1. PC3 to be set
    2. PC7 to be reset

    3. PC4 to be set
    4. PC1 to be reset

b. The 8255 simple I/O mode is used to interface a number of input devices like keypads and output devices like LEDs. In order to configure their operation, the control register of 8255 has to be programmed. Form the Control Word in Hex for configuring the 8255 in simple I/O mode with the details of Ports as indicated below:

   Port C_L = Output , Port C_U = Input, Port B = Output in Mode 0, Port A = Input in Mode 1

   If the base address is 02h, what will be the addresses for remaining ports and the control

   register?

   Identify the address lines that will be connected to 8255 A_0 and A_1 lines.

[4M+4M]   (C.O.No.3)

[Comprehension]

8. 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]

9. Software Delays are subprograms to introduce an approximate delay for various applications such as for blinking LEDs etc. Determine the total number of clock cycles needed to generate a delay of 20ms. Write an assembly level program to generate the same delay of 20ms, when the processor is operating at a clock Frequency of 10 MHz.

(C.O.No. 3, 5)

   [Application]

Part C [Problem Solving Questions]

Answer the Question. The question carries EIGHTEEN marks.
(1Qx18M=18M)

10. 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]