Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH/EIE (O)/SEM-5/EI-502/2012-13

2012

MICROPROCESSOR BASED SYSTEMS

Time Allotted : 3 Hours | Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) 16 bit register of 8086 consists of

a) 16 flags b) 8 flags

c) 9 flags d) 7 flags.

ii) Instruction queue of 8088 consists of

a) 6 data b) 8 data

c) 4 data d) 16 data.

iii) Physical memory of 8086 is

a) 1 kB b) 1 MB

c) 64 kB d) 64 MB.

iv) Segment memory capacity of 8086 is

a) 1 MB b) 64 kB

c) 1 kB d) 64 MB.

v) Clock frequency of 8086 and 8088 is

a) 5 – 10 MHz b) 2 – 3 MHz

c) 1 – 3 MHz d) 2 – 5 MHz.

vi) The 8086/88 can be operated in a single step when

a) TF set b) DF set

c) SF set d) AF set.

vii) 2's complement instruction is

a) NEG b) NOT

c) CMP d) CMC.

viii) Result for the addition of two numbers is

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MOV AX, A233
MOV BX, A455
ADD AX, BX
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a) AX = 4688 H b) AX = 4886 H

c) AX = 8846 H d) AX = 6884 H.

ix) What is the O/P of DL after execution of the following instructions ?

MOV DL, 36

AND DL, 0F

a) 06 H b) 60 H

c) 36 H d) 0 FH.

x) 8086 exchanges data word with odd memory bank when

a) BHE = 0 and A_0 = 0

b) BHE = 0 and A_0 = 1

c) BHE = 1 and A_0 = 0

d) BHE = 1 and A_0 = 1.

xi) If ready pin is grounded, it will introduce ..... states into the bus cycle of 8086/8088 mp.

a) wait

b) idle

c) wait and remain idle

d) all of these.

xii) The NMI input is ..... sensitive.

a) edge

b) level

c) both edge and level

d) none of these.

xiii) The 8288 IC is a/an

a) clock generator b) ADC

c) bus controller d) DAC.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is the input signal $x[n]$ that will generate the output sequence $y[n] = \{1, 5, 10, 11, 8, 4, 1\}$ for a system with impulse response $h[n] = \{1, 2, 1\}$.

3. Define energy signal and power signal. Find the energy and power of the signal

$$X(t) = \begin{cases} t & , \ 0 \le t \le 1 \\ 2 - t & , \ t \le 2 \\ 0 & , \ \text{otherwise} \end{cases}$$ 2 + 3

4. a) State sampling theorem.

   b) Suppose that a discrete time signal is given by

   $x[n] = 5{\cdot}6 \sin[0{\cdot}1 * pi * n - (pi / 3)]$

   Given the sampling frequency f_s = 1000 Hz. Find the frequency of the original signal $x(t)$ in the form $x(t) = A \cos(\omega t + \theta)$. If the sampling frequency is changed to 2500 Hz, then what will be the frequency of the original signal ? 2 + 3

5. a) What are the advantages of digital filter over analog filter ?

   b) Compare between FIR and IIR filters. $2\frac{1}{2} + 2\frac{1}{2}$

6. What is Radix-2 FFT algorithm ? What are decimation in frequency and decimation in time in FFT ? What is bit reversal ? 2 + 2 + 1

7. Consider a causal and stable LTI sytem whose input $x[n]$ and output $y[n]$ are related through the second order difference equation

   $$y[n] - \frac{1}{6\,y[n-1]} - \frac{1}{6\,y[n-2]} = x[n]$$

   Determine the impulse response $h[n]$ for the system.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) Draw and explain the architecture of 8086.

   b) Classify and describe the register organization of 8086.

   c) Explain the flags of 8086. 5 + 5 + 5

9. a) Draw and explain the functional block diagram of 8259A.

   b) Describe the priority scheme and EOI scheme of 8259.

   c) Write down the format of ICW1 and ICW2 of 8259.

   5 + 5 + 5

10. Write short notes on any *three* of the following : 3 × 5

    a) Clock generator 8284A

    b) BIU & EU

    c) Odd and even bank memory organizations of 8086

    d) DMA controller

    e) Bus controller 8288.

11. a) What is instruction format ? What are the types of instruction of 8086 microprocessor ?

    b) Write instructions to perform the following operations :

       i) Copy the content of BX to a memory location in the data segment with offset 0234H

       ii) Increment content of CX by 1.

       iii) Multiply AX with 16 bit data 2467H

       iv) Rotate left the content of AL by two bits.

    c) Write an assembly language program for 2 ms time delay. Assume the system clock time period is equal to 0·33 µsec.

12. a) Explain the DMA operation with a suitable diagram. Why are DMA controlled data transfers faster ? What are the building blocks of 8257 ?

b) Write the Minimum / maximum mode operation of 8086 µP.