Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(EE)/SEM-6/EI(EE)-611/2012

2012

MICROPROCESSOR AND MICROCONTROLLER

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 answer for any *ten* of the following from the given alternatives : 10 × 1 = 10

   i) Number of *M*-cycles in JMP instruction is

   a) 3 b) 6

   c) 4 d) 5 .

   ii) If the clock frequency is 5MHz then the execution time of the instruction MVI B, 00H is

   a) 1·8 μs b) 1·4 μs

   c) 1·4 ms d) 0·4 ms.

   iii) The μ*P* is said to be of 8-bit, 16-bit etc. depending on its

   a) data bus b) address bus

   c) ALU d) control bus.

iv) The control signal, 'ALE' is sent by 8085 μP in order to
   a) inform I/O device that the address is being sent over the AD line
   b) achieve separation of address from data
   c) inform memory device that the address is being sent over the AD line
   d) inform I/O and memory that the data is being sent over AD line.

v) What is the restart address for TRAP ?
   a) 0024H b) 0034H
   c) 003CH d) 0038H.

vi) The size of Instruction queue in 8086 μP is
   a) 4 bytes b) 6 bytes
   c) 8 bytes d) 16 bytes.

vii) The Port of 8255 which can be used in BSR Mode is
   a) Port A only b) Port B only
   c) Port D only d) Port C only.

viii) The number modes in 8254 is
   a) 5 b) 6
   c) 4 d) 8.

ix) The no. of interrupts present in 8051 microcontroller is
   a) 2 b) 5
   c) 4 d) 7.

x) The no. of segment registers available in 8086 is
   a) 2 b) 6
   c) 5 d) 4.

xi) Which one is the software interrupt of 8085A microprocessor ?
   a) RST 7·5 b) EI
   c) RST 0 d) RST 5·5.

xii) How many hardware interrupt requests a signal interrupt controller IC 8259 can process ?
   a) 8 b) 15
   c) 16 d) 64.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What are the various registers and flags of 8085 microprocessor ? Discuss their function.
3. Mention the differences between 8085 microprocessor and 8051 microcontroller.
4. Describe the function of different status and control signals of 8085 microprocessor.
5. Show the register contents as each of the following instructions is being executed :

   MVIC, FFH

   LXIH, 8070 H

   LXI D, 8070 H

   MOV M,C

   LDAX D

   HLT
6. What is pipelining ? How is the pipelining concept used in 8086 μP ?

GROUP – C

(Long Answer Type Questions)

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

7. a) The following block of data is stored in the memory locations from XX55H to XX5AH. Transfer the data to the locations XX80H to XX85H in the reverse order (*e.g.* the data byte 22H should be stored at XX85H and 37H at XX80H). Data (H) 22, A5, B2, 99, 7F, 37.

   b) Write an assembly language program for packing and unpacking of any BCD number.

   c) What are interrupts ? How many interrupts are there ? What are maskable and non-maskable interrupts ? Discuss SIM instruction. 5 + 5 + 5

8. a) Draw the timing diagram of the instruction STA 4000H and explain it.

   b) A set of five 8-bit data is stored in five consecutive locations from XX00 to XX04. Write a program to arrange them in ascending order. (Choose any suitable value for XX)

   c) Design a memory interfacing circuit of DRAM (1024 × 8) and specify the address range whose address will be started from C000H. 5 + 5 + 5

9. a) How many ports are there in 8255 and what are they ?

   b) Explain the control words of 8255 and write down the mode 0 control words for the following two cases :

   Port A = Input port, Port B = not used,

   Port C (upper) = Input port,

   Port C (lower) = Output port.

   Port A = Output port, Port B = Input port,

   Port C = Output port

   c) Explain the MODE-O operation of 8253. 2 + 5 + 2 + 6

10. a) Explain how 20-bit physical address is generated in 8086 microprocessor.

    b) What is the purpose of queue ? How many words does the queue store in the 8086 microprocessor ?

    c) How does 8086 support pipelining ? Explain.

    d) What are the advantages of having memory segmentation ? 3 + (1 + 3) + 5 + 3

11. a) Discuss the internal structure of 8051 microcontroller.

    b) Explain the PSW bits, TMOD bits and TCON bits of 8051 microcontroller.

    c) Write an 8051 assembly language program to add two 16-bit nos. 5 + 5 + 5