Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(EE-N)/SEM-6/EI(EE)-611/2010

2010

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 alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) A microprocessor is said to be 8-bit, 16-bit or 32-bit processor depending on its

      a) Register b) Data Bus

      c) Address Bus d) ALU.

   ii) The control signal, 'ALE' is sent by 8085 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 A/D line

      d) inform I/O and memory that the data is being sent over the AD line.

iii) Tri-state buffers are often used to make sure the unselected devices have their data outputs placed in the

a) High-impedance state b) Logic 1 state

c) Logic 0 state d) Input state.

iv) How many output devices can be identified by the MPU of 8085 using I/O mapped I/O ?

a) 256 b) 255

c) 1024 d) 128.

v) Whenever POP H instruction is executed

a) data bytes in the HL pair are stored on the stack

b) two data bytes at the top of the stack are transferred to the HL reg. pair

c) two data bytes at the top of the stack are transferred to the PC

d) two data bytes from the HL register that were previously stored on the stack are transferred back to the HL registers.

vi) The number of bytes of On-chip ROM contained in 8051 Microcontroller is

a) 256 b) 512

c) 1024 d) 4K.

vii) How many flag registers are in 8051 ?

a) 9 b) 8

c) 6 d) 5.

viii) When a subroutine is called, the address of the instruction following the CALL instruction is stored in/on the

a) Stack Pointer b) Accumulator

c) Program Counter d) Stack.

ix) Mode 3 of 8253 is an

a) rate generator

b) square wave generator

c) software triggered strobe

d) hardware triggered strobe.

x) How many T state is required to execute the instruction MVIM, 32 ?

a) 1 b) 2

c) 5 d) 10.

xi) The size of 8086 queue is

a) 4 bytes b) 6 bytes

c) 8 bytes d) 16 bytes.

xii) The number of memory locations that can be addressed by an 8086 is

a) 64 kB b) 1 MB

c) 16 MB d) 16 GB.

xiii) In which of the following parallel I/O methods the microprocessor assumes that the peripheral is always ready for data transfer ?

a) Simple I/O b) Strobe I/O

c) Handshake I/O d) DMA controlled I/O.

xiv) The addressing mode used in the instruction STAX B is

a) direct b) register

c) immediate d) register-indirect.

xv) 8259 is

a) programmable DMA controller

b) programmable interval timer

c) programmable interrupt controller

d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. If the system clock is 2 MHz, find the time to execute the given instruction code :

```
MVI A, ( 8 F )
MVI B, ( 55 )
SUB B
XRA A
HLT
```

3. Find the memory address range for the following diagram shown below :

Dia.

4. Explain the need to demultiplex the $AD_7 - AD_0$ of 8085 CPU.

5. Discuss briefly the functioning of

SIM and DI instruction. 3 + 2

6. Draw the timing diagram of MVI A, 32H. Assume that this instruction is loaded at 8000H memory location.

GROUP – C

(Long Answer Type Questions)

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

7. a) An array of 10 numbers (all 8bits) is stored in consecutive memory locations starting from 4000H. Write a program in 8085 assembly language to find out the smallest of those 10 numbers. Save the smallest number in location 5000 H. 10

   b) What is the function of sub-routine ? How is a sub-routine handled in a microprocessor ? 2 + 3

8. a) Describe the need for I/O ports in a microcomputer system.

   b) Bring out the merits and demerits of I/O-mapped and Memory-mapped I/O.

   c) Explain the execution of the DAD D instruction.

   d) What is the utility of HOLD and HLDA instructions ?

   5 + 4 + 3 + 3

9. a) How many register banks are there in the RAM of 8051 microcontroller ? Explain their functons. 5

   b) What is the function of RS1 and RS0 bits of PSW and PD bits of PCON of 8051 microcontroller ? 4

   c) Draw the block diagram of 8253 timer and briefly discuss its different sections. 6

10. a) Explain the memory segmentation scheme with reference to 8086 μP. 5

b) What is the role of Excecution Unit of 8086 μP ? Explain the working of its each section. 5

c) How is the physical address generated in 8086 μP ? Explain with example. 2

d) What are the differences between minimum mode and maximum mode operations 8086 ? 3

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

i) Program implementation in 8085 μP to convert BCD to Binary

ii) Instruction cycle

iii) Interfacing seven segment LED display as an output device for 8085 μP

iv) Primary and secondary memory

v) Synchronous & Asynchronous communications

vi) 8257 DMA controller.