Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(ICE)/SEM-5/IC-503/2009-10

2009

MICROPROCESSOR & 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) What will be the operating frequency of 8086 if it uses a 12 MHz crystal oscillator ?

a) 12 MHz b) 6 MHz

c) 2 MHz d) 4 MHz.

ii) Which one of the following segments is used by the 'CMPSB' string instruction for the destination ?

a) CS b) DS

c) ES d) SS.

iii) 8086 exchanges data byte with odd memory bank when

a) $\overline{BHE}$ = 0 and A_0 = 0

b) $\overline{BHE}$ = 0 and A_0 = 1

c) $\overline{BHE}$ = 1 and A_0 = 0

d) $\overline{BHE}$ = 1 and A_0 = 1.

iv) What is the size of the instruction queue in 8086 ?

a) 8-bytes b) 16-bytes

c) 6-bytes d) 6-bits.

v) The information in address/data bus of 8086 during T1 states of bus cycle is

a) data b) address

c) both (a) and (b) d) none of these.

vi) In a microcomputer, wait states are used to

a) make the processor wait during a DMA operation

b) make the processor wait during an interrupt processing

c) make the processor wait during power shutdown

d) interface slow peripherals to the processor.

vii) How many modes are there in 8253 ?

a) 5 b) 6

c) 7 d) 8.

viii) IP and SP in 8086 architecture are within

a) BIU only

b) EU only

c) BIU and EU respectively

d) None of these.

ix) Which is an illegal instruction for 8086 ?

a) MOV ES, 4000H b) MOV ES, AX

c) MOV DI, 0000H d) None of these.

x) Which registers are used as the base location for all executable instruction and stack ?

a) CS and SS respectively

b) DS and SP respectively

c) ES & SS respectively

d) None of these.

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

a) wait

b) idle

c) wait and remain idle

d) all of these.

xii) For 8255 PPI, the bidirectional mode of operation is supported in

a) mode 1

b) mode 2

c) mode 0

d) both in mode 0 and mode 1.

xiii) In which addressing mode MOV R2, 07 instruction of 8051 falls ?

a) Immediate addressing mode

b) Direct addressing mode

c) Register addressing mode

d) Indirect addressing.

GROUP – B

(Short Answer Type Questions)

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

2. a) Explain the concept of segmented memory. What is its advantage ?

b) Describe the operation that an 8086 will perform when it executes each of the following instruction :

MOV BX, 03FFH

MOV DH, CL

MOV AX, BX

SHL 01H 3 + 2

3. Write a program in 8086 to find out the number of even and odd numbers from a given series of 16-bit hexadecimal numbers. 5

4. Write initialization insturction for the 8255A to set up

- Port *A* as an output in Mode 0
- Port *B* as an output in Mode 1 for interrput I/O.
- Port C_U as an output in Mode 0. 5

5. a) State the difference between 8086 and 8088 microprocessor.

b) Explain the physical address formation in 8086. 3 + 2

6. Describe the process of data transfers from the peripheral to the system memory under 8257 DMA controllers. 5

GROUP – C

(Long Answer Type Questions)

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

7. a) What are the differences between memory mapped I/O and isolated I/O ?

b) Describe the input output data transfer technique.

c) What do you mean by handshaking ?

d) Describe the following instruction of 8086 :

i) AAA ii) XLAT 3 + 6 + 2 + 4

8. a) Design a 16-bit i/p port using two octal latches and a 16-bit o/p port using two octal buffers. Connect 16 switches with the buffers such that when a switch is closed it gives a ZERO. Also connect 16 LEDs with the latches in common cathode configuration. Write a program to display the status of the switches on the LEDs. 6

   b) Interface a 4 ∞ 4 keyboard with 8086 using 8255. The keys are numbered 0 to F. Write a program to read the keyboard and store the key number in reg. BL. Assume only one key will be pressed at a time. 9

9. a) What is an assembler ? Explain the difference between the machine language and the assembly language of the 8085 microprocessor. 2 + 2

   b) What are the functions of the pins “READY” and “ALE” in 8085 microprocessor ? 2 + 2

   c) In a memory mapped I/O, how does microprocessor differentiate between an I/O and memory ? Can an I/O have the same address as a memory register ? 3

   d) If the memory chip size is 256 ∞ 1-bits, how many chips are required to make up 1K (1024) bytes of memory ?2

   e) What is the advantage of bit-addressability for 8051 ports ? 2

10. a) Interface an I/P port 74LS245 to read the switches SW1 to SW8. The switches when shorted input a ‘1’ else input a ‘0’ to the microprocessor system. Store the status in register BL. The address of port is 0740 H. Also write required ALP.

b) Interface ADC (ICL 7109) with 8086 using 8255 port and write required ALP.

c) i) Find the ICWs of the 8259 if it is used with an 8086 cpu, single, level triggering IRs and IR0 is assigned "INT 50H". The 8259 is in slave buffered mode with normal EOI.

ii) Show the program to initialize the 8259 using port addresses 26H and 27H.

iii) Find the addresses associated with IR0, IR1, IR2 in the interrupt vector table. 5 + 4 + 6

11. a) Describe different functional units of Intel 8255 PPI with a block schematic representation. 5

b) What is Interrupt ? How many different types of interrupts are there in 8085 microprocessor ? Describe them in brief. 2 + 4

c) Write an ALP to add a series of 10 data stored in consecutive memory location from 4000H onwards and store the result at 5000H onwards. 4