Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (EE-NEW)/SEM-6/EI (EE)-611/2011

2011

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) Whenever the PUSH instruction is executed, the stack pointer is

   a) decremented by 1 b) decremented by 2

   c) incremented by 1 d) incremented by 2.

   ii) A single instruction to clear the lower four bits of the accumulator in 8085 microprocessor is

   a) XRI 0FH b) ANI FOH

   c) ANI OFH d) XRI F0H.

   iii) Machine cycle in "CALL" instruction are

   a) 6 b) 5

   c) 4 d) 3.

iv) Address lines requires for 32 k-byte memory chip is

a) 13 b) 14

c) 15 d) 16.

v) Which one of the following is not a maskable interrupt of 8085 microprocessor ?

a) TRAP b) INTR

c) RST 7·5 d) RST 3.

vi) The number of T-states needed by the 8085 INR A instruction is

a) 1 b) 4

c) 7 d) 5.

vii) STA 9000H is a

a) data transfer instruction

b) logical instruction

c) I/O & machine control instruction

d) none of these.

viii) How many modes are there in 8253 ?

a) 5 b) 6

c) 7 d) 8.

ix) The port of 8255 which can be used in BSR mode is

a) Port A only b) Port B only

c) Port C only d) Port D only.

x) PSW is a

a) 16 bit register b) 32 bit register

c) 08 bit register d) 06 bit register.

xi) 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.

xii) If crystal with 8085 is 3 MHz, the time required to execute MOV A, M instruction is

a) 23·1 μs b) 2·31 μs

c) 1·32 μs d) 13·2 μs.

xiii) In an 8085 microprocessor, which one of the following is the correct sequence of the machine cycle for execution of DCR M instruction ?

a) op-code fetch

b) op-code fetch, memory read, memory write

c) op-code fetch, memory read

d) op-code fetch, memory write, memory read.

xiv) Assume Intel 8086 real mode : The offset is 24H. The segment register contains 0B500H. What is resulting physical address ?

a) 0B524H b) 0B5024H

c) 24B5H d) 240b5H.

xv) The 80C51 microcontroller family has

a) 32 pins for I/O b) 24 pins for I/O

c) 16 pins for I/O d) 8 pins for I/O.

GROUP – B

(Short Answer Type Questions)

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

2. What are the various registers of 8085 microprocessor ? Discuss their function.

3. Describe the function of different status and control signals of 8085 microprocessor.

4. Compare memory mapped I/O and I/O mapped I/O schemes of interfacing I/O devices with 8085 microprocessor.

5. Write an assembly language program for 8085 microprocessor to XOR two 8-bit data without using XRA instruction.

6. Explain the function of the following routines :

```
LXI     SP, 8700H
PUSH    B
PUSH    D
POP     B
POP     D
RET
```

7. 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

8. a) How does ALE signal demultiplex the AD_0 – AD_7 bus of 8085 CPU ? Explain with diagram.

   b) Explain the function of flags in Intel 8085. How are these affected when 4FH and 82H are added ?

   c) Define stack and subroutine. 5 + (3 + 3) + 4

9. a) What are the vectored and non-vectored interrupts ?

   b) Explain the following instruction RIM and SIM. Write the program for enable the RST-7·5, RST-6·5 and disable RST-5·5.

   c) Discuss how 8253 is used to generate square wave.

   d) Draw the schematic diagram of 8237 DMA controller and describe the operation briefly.

   e) Define PSW. 2 + 5 + 3 + 4 + 1

10. a) What is DMA ? Explain burst mode & cycle stealing mode.

    b) Describe the different modes of operation of 8253 timer.

c) Determine control word for the following configuration of the port of Intel 8255 for Mode-2 operation :

Port A-Bidirectional

Mode of Port A - Mode 2

Port B - input

Mode of port B - mode 0

The remaining pins of port C_{lower} i.e., PC_0, PC_1 and PC_2 output.

d) Write the BSR control word for setting PC_4 in 8255A.

5 + 4 + 4 + 2

11. a) What are the differences between 8085 μP and 8086 μP ?

b) How many operating modes does 8086 have ? Discuss them in brief.

c) Explain the operation of BIU & EU present in 8086 μP.

d) What do you mean by physical address and logical address ? Explain with example.

e) What is the function of $\overline{BHE}$ pin in 8086 μP ?

4 + 4 + 4 + 2 + 1

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

a) Interrupts of Intel 8085 Microprocessor

b) Architecture of Intel 8051 Microcontroller

c) Interfacing seven segment LED as an output device for 8085 Microprocessor

d) Program implementation in 8085 μP to convert binary to ASCII.

e) Program implementation in 8085 μP to find the largest number from following series of numbers 3E, 2A and 56.