

**MICROPROCESSORS, MICROCONTROLLERS & SYSTEMS
(ECEN 3104)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

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

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: 10 × 1 = 10
 - (i) I/O mapped systems identify their input/output devices by giving them

(a) 8-bit port number	(b) 16-bit port number
(c) 8-bit buffer number	(d) 8-bit instruction.
 - (ii) A microprocessor is said to be 8 bit, 16 bit etc. depending on its

(a) address bus	(b) data bus
(c) control bus	(d) ALU.
 - (iii) The number of register pairs in 8085 microprocessor are

(a) 5	(b) 4	(c) 3	(d) 2.
-------	-------	-------	--------
 - (iv) The instruction XCHG exchanges the contents of

(a) Accumulator and HL Pair	(b) HL pair and BC pair
(c) HL pair and DE pair	(d) HL pair and Flag Register.
 - (v) The instructions INR and DCR affects all the flags except the

(a) Carry flag	(b) Sign flag
(c) Parity flag	(d) Auxillary Carry flag.
 - (vi) The number of T-states required for the execution of the instruction STA 2050H is

(a) 13	(b) 10	(c) 7	(d) 4.
--------	--------	-------	--------
 - (vii) When subroutine is called, the address of the instruction next to 'CALL' is saved in

(a) stack pointer register	(b) program counter
(c) stack	(d) PSW.

- (viii) Which of the following instruction is illegal in 8051 microcontroller?

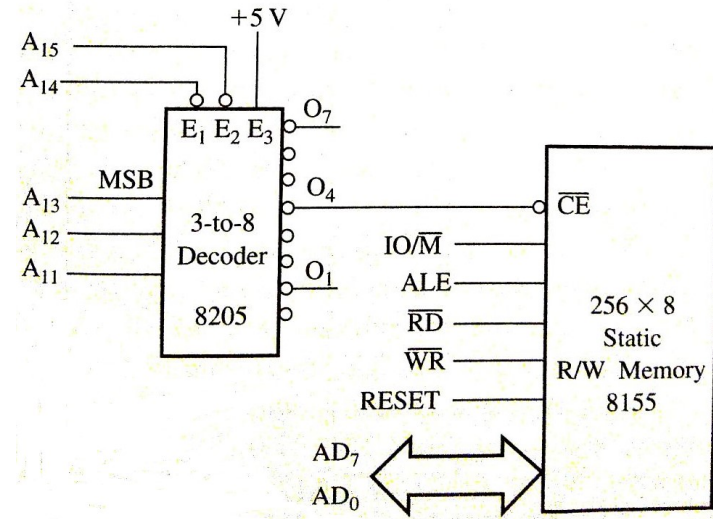
(a) MOV A, #55H	(b) MOV R0, 23H
(c) INC R0	(d) ADD R4, R3
- (ix) The BSR control word to set bit PC₇ in 8255 PPI is

(a) 0EH	(b) 07H	(c) 06H	(d) 0FH.
---------	---------	---------	----------
- (x) 8259 is

(a) programmable DMA controller	(b) programmable interval timer
(c) programmable interrupt controller	(d) none of these.

Group - B

2. (a)



In the above figure, specify the memory address range if the output line O₄ of the decoder 8205 is connected to the \overline{CE} signal. Specify the range of the foldback memory.

- (b) The memory address of the last location of an 1K byte memory chip is given as FBFFH. Specify the starting address.
- (c) What are the functions of the signals INTR, READY, HOLD and ALE for 8085 microprocessor?

5 + 3 + 4 = 12

3. (a) Describe the flag register of 8085 microprocessor.
 (b) Explain with the help of a diagram the process of demultiplexing of the bus AD₇-AD₀.
- 6 + 6 = 12**

Group - C

4. (a) Differentiate between Memory-Mapped I/O and Peripheral I/O.
 (b) Draw and explain the timing diagram for the instruction MOV C, A (Opcode = 4FH).
 (c) Assuming the microprocessor is completing an RST 7.5 interrupt request, check to see if RST 6.5 is pending. If it is pending, enable RST 6.5 without affecting any other interrupts; otherwise, return to the main program.
- 3 + 5 + 4 = 12**
5. (a) Explain with example which instruction is used for masking operation. Explain the operations of BIU and EU present in 8086 microprocessor.
 (b) Explain the addressing modes of 8086 microprocessor citing an example for each.
- (2 + 4) + 6 = 12**

Group - D

6. (a) What do you mean by Mode 0, Mode 1 & Mode 2 for 8255 PPI chip?
 (b) Write down the control word for the following in Mode 0 :
 Port A = Input, Port B = Not used, Port C_U = Input, Port C_L = Output.
 (c) Write a BSR control word subroutine to set bits PC₇ and PC₃ and reset them after 10 ms. Assume that a delay subroutine is available and Hex address of Port A = 80 H.
- 4 + 2 + 6 = 12**
7. (a) Describe the control word register of 8254 Programmable Interval Timer.
 (b) Explain any two modes for 8254 Timer.
- 6 + 6 = 12**

Group - E

8. (a) What is the difference between the instruction MOV R0, #55H and MOV R0, 55H? Describe the PSW register of 8051 microcontroller
 (b) Explain the interrupt system of 8051 microcontroller.
- (2 + 5) + 5 = 12**
9. (a) What is the difference between a microprocessor and microcontroller?
 (b) Discuss the different addressing modes in 8051 microcontroller.
 (c) Explain the difference between polling and interrupt with respect to 8051 microcontroller.
- 2 + 6 + 4 = 12**