

**ADVANCED MICROPROCESSORS AND MICROCONTROLLERS
(AEIE 3203)**

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) Data bus of 8086 μ P is
 - (a) 8 bit unidirectional
 - (b) 8 bit bidirectional
 - (c) 16 bit unidirectional
 - (d) 16 bit bidirectional.
- (ii) Address/data bus connected to odd memory bank is-
 - (a) AD0 - AD7
 - (b) AD8 - AD15
 - (c) AD16 - AD19
 - (d) AD0 - AD19.
- (iii) IN AX,40_H instruction transfers
 - (a) 8 bit data from input device to AL
 - (b) 8 bit data from input device to AX
 - (c) 16 bit data from input device to AX
 - (d) 16 bit data from AX to input device.
- (iv) In MOVSW instruction source address is pointed by which registers?
 - (a) CS:IP
 - (b) DS:SI
 - (c) SS:SP
 - (d) ES:DI.
- (v) What is the vector location for INT4 interrupt?
 - (a) 0006_H
 - (b) 0010_H
 - (c) 000C_H
 - (d) 0003_H.
- (vi) How many 16 bit Timer register are present in 8051 μ C?
 - (a) 2
 - (b) 3
 - (c) 4
 - (d) 5.
- (vii) Addressing mode of ADD A, @R0 instruction is
 - (a) immediate addressing mode
 - (b) direct addressing mode
 - (c) register addressing mode
 - (d) memory indirect addressing mode.

- (viii) After reset operation content of SP register in 8051 μ C is-
 (a) 00_H (b) 07_H (c) 0000_H (d) FF_H.
- (ix) To select Bank 0 in 8051 μ C register bank selection bits are
 (a) RS1 = 0 RS0 = 0 (b) RS1 = 0 RS0 = 1
 (c) RS1 = 1 RS0 = 0 (d) RS1 = 1 RS0 = 1.
- (x) How many I/O ports are present in 8051 μ C?
 (a) 2 (b) 3 (c) 4 (d) 5.

Group - B

2. (a) What is the function of instruction queue in 8086 μ P?
 (b) Write the different memory segments used in 8086 μ P and their functions.
 (c) Determine the physical address from the following register combinations-
 (i) DS = 2000_H and BX = 2000_H
 (ii) SS = 1000_H and BP = FFFF_H.
 (d) Discuss the function of following signals of 8086 μ P (*any two*) –
 (i) $\overline{\text{BHE}}$
 (ii) $\text{MN}/\overline{\text{MX}}$
 (iii) $\overline{\text{TEST}}$.

$$2 + 4 + 2 + (2 \times 2) = 12$$

3. (a) Explain the function of following instructions of 8086 μ P (*any two*) –
 (i) OUT DX,AX (ii) NEG CX (iii) CMPSW.
 (b) Write a program to unpack a 16 bit data stored at memory locations. Store the result at memory locations.
 (c) Describe the operation of INTO instruction. What memory locations contain the vector for a type 10 interrupt?

$$(2 \times 2) + 4 + (2 + 2) = 12$$

Group - C

4. Design an interface between 8086 μ P and four chips of (8K \times 8) RAM. The starting address of RAM is 90000_H. Calculate the memory map.

$$10 + 2 = 12$$

5. Interface a 16 bit DIP switch with 8086 such that the addresses assigned to it are 80_H and 81_H. Write a program to read the data from DIP switch and store the number of switch pressed in memory location.

$$5 + 7 = 12$$

Group - D

6. (a) What are the advantages of microcontroller over microprocessor?
 (b) What are the main features of 8051 μ C?
 (c) What is the function of $\overline{\text{EA}}$ and RST line of 8051 μ C?
 (d) Write a program to blink an LED connected at P2.0 pin of 8051 μ C.

$$3 + 3 + 2 + 4 = 12$$

7. (a) Draw and discuss the internal architecture of 8051 μ C.
 (b) What is the function of RS0 and RS1 bits in the PSW register of 8051 μ C?
 (c) Draw and discuss TMOD register of 8051 μ C.

$$7 + 2 + 3 = 12$$

Group - E

8. (a) What are the main features of PIC microcontrollers?
 (b) Draw the block diagram to interface a stepper motor with PIC 16F877 microcontroller. Write a program in C or in assembly language to rotate the stepper motor in clockwise direction.

$$4 + (3 + 5) = 12$$

9. (a) Discuss the program memory organization of PIC 16F877 microcontroller.
 (b) Draw the block diagram to interface a DAC with PIC 16F877 microcontroller. Write a program in C or in assembly language to generate a square wave.

$$4 + (3 + 5) = 12$$