

**ADVANCED MICROPROCESSORS & 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) 8086 μ P exchange data word with 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 $A_0 = 1$.
 - (ii) Address bus length of 8086 μ P is

(a) 8 bit	(b) 16 bit	(c) 20 bit	(d) 32 bit.
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 - (iii) Address/data bus connected to odd memory bank is

(a) AD0-AD7	(b) AD8-AD15
(c) AD16-AD19	(d) AD0-AD19.
 - (iv) The instruction queue length of 8088 μ P is ____ byte.

(a) 2	(b) 4	(c) 6	(d) None of these.
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 - (v) In MOVSB instruction destination address is pointed by which registers?

(a) CS:IP	(b) DS:SI	(c) SS:SP	(d) ES:DI.
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 - (vi) Numbers of internal 16 bit timers in 8051 μ C chip are

(a) 2	(b) 3	(c) 4	(d) 5.
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 - (vii) 8051 μ C will read instruction from its internal program memory if

(a) RST pin is at logic 0	(b) RST pin is at logic 1
(c) \overline{EA} pin is at logic 0	(d) \overline{EA} pin is at logic 1.
 - (viii) How many I/O ports are present in 8051 μ C chip?

(a) 2	(b) 3	(c) 4	(d) 5.
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 - (ix) Number of bit addressable RAM location in 8051 μ C chip is

(a) 128	(b) 256	(c) 2K	(d) 4K.
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 - (x) To select Bank 2 in 8051 μ C chip 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.

Group – B

2. (a) Discuss the function of following signals of 8086 μ P (*any three*)
 (i) \overline{TEST} (ii) \overline{DEN} (iii) QS_0 and QS_1 (iv) \overline{BHE}
 (b) Explain the function of following instructions of 8086 μ P (*any three*)
 (i) XCHG AX, [BX] (ii) NEG CX (iii) XLAT (iv) STD
 (c) What is the purpose of demultiplexing of address and data/status lines in 8086 μ P? Draw and discuss the process of data bus buffering of 8086 μ P.

3 + 3 + (1 + 5) = 12

3. (a) What is offset address and segment address?
 (b) Explain with suitable example how 20 bit physical address is generated in 8086 μ P.
 (c) Draw and discuss the flag register of 8086 μ P.
 (d) What are the advantages of memory segmentation?

2 + 2 + 6 + 2 = 12

Group – C

4. (a) Design an interface between 8086 μ P and four chips of 16K X 8 RAM. The first address of RAM is 00000_H.
 (b) What is the difference between MOV AX, [2000] and MOV AX, [2001] instruction?
5. (a) What is the difference between absolute and partial address decoding?
 (b) Interface 8 switches (SW_0 - SW_7) and one 7-segment display unit with 8086 μ P. Write a program to read the status of the switches and display the number (position) of switch pressed (assume one switch pressed at a time) to the 7-segment display.

10 + 2 = 12

2 + (4 + 6) = 12

Group – D

6. (a) What are the advantages of microcontroller over microprocessor?
 (b) What are the main features of 8051 μ C?
 (c) Discuss the function of following signals of 8051 μ C (*any two*)
 (i) RST (ii) \overline{EA} (iii) RXD

- (d) Draw and discuss TMOD register of 8051 μ C.

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

7. (a) Write a program to multiply two 8 bit numbers stored in internal RAM and store the result (assume 8 bit) in the external RAM.

- (b) Write short notes on (*Any one*)

- (i) Internal RAM organization of 8051 μ C
- (ii) Timers of 8051 μ C
- (iii) A/D converter interfacing with 8051 μ C

- (c) How many ports in the 8051 μ C are available for I/O purpose, if external memory is connected?

$$5 + 5 + 2 = 12$$

Group – E

8. (a) Write the main features of PIC 16F877 microcontroller.

- (b) Write a PIC 16F877 ALP to add two data, 90_H and 8F_H, and store the result in the internal register file in the addresses 50_H (lower byte) and 51_H (higher byte). Briefly explain.

$$5 + 7 = 12$$

9. Write short notes on (*any three*):

$$(4 \times 3) = 12$$

- (i) STATUS register of PIC 16F877 microcontroller
- (ii) OPTION_REG register of PIC 16F877 microcontroller
- (iii) Program memory organization of PIC 16F877 microcontroller
- (iv) I/O ports of PIC 16F877 microcontroller.