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
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> 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)   Address bus of 8086 µP is de-multiplexed using-
            (a) Latch   (b) Tri-state buffer
            (c) 3:8 decoder   (d) De-multiplexer

    (ii)   In 16x16 bit multiplication operation the higher 16 bit result is stored in-
            (a) AX   (b) BX
            (c) CX   (d) DX

    (iii)   In MOV AH, [2000] instruction data is transferred via -
            (a) D0-D7   (b) D8-D15
            (c) D0-D15   (d) None of these

    (iv)   The last instruction in an interrupt service routine is-
            (a) JMP   (b) HLT
            (c) RET   (d) IRET

    (v)   MOVSW instruction transfers -
            (a) 8 bit data from SI to DI
            (b) 16 bit data from SI to DI
            (c) 8 bit data from memory pointed by SI to DI
            (d) 16 bit data from memory pointed by DS:SI to ES:DI

    (vi)   In 8086 µP direction of data flow is controlled by-
            (a) ALE   (b) DT/$\bar{R}$
            (c) $\overline{BHE}$ (d) $\overline{DEN}$

    (vii)   In 8086 µP NMI is an
            (a) Non-maskable interrupt   (b) Vectored interrupt
            (c) Hardware interrupt   (d) All of these

(viii) How many I/O ports are present in 8051 μC?
  (a) 2   (b) 3
  (c) 4   (d) 5

(ix) In 8051 μC function of CLR C instruction is
  (a) Clear C register content   (b) Complement C register content
  (c) Clear CY flag bit   (d) Complement CY flag bit

(x) In 8051 μC if $RS_1=1$ and $RS_0=0$ then the selected register bank is-
  (a) Bank 0   (b) Bank 1
  (c) Bank 2   (d) Bank 3

Group – B

2. (a) What is the function of BIU and EU in 8086 μP?

   (b) What is the function of DX register in MUL and DIV instructions?

   (c) Let, the content of $CS=0000_H$, $DS=1000_H$, $SS=2000_H$, $ES=3000_H$. Calculate the physical address for the following instructions-
   i) MOV AL,[8000_H]
   ii) MOV [BX],CL ; Where, BX= 8050_H.

   (d) What is memory segmentation? What are the advantages of memory segmentation?

   2 + 3 + 3 + (2 + 2) = 12

3. (a) Explain the function of following instructions of 8086 μP (*any two*) –
   (i) CMPSW, (ii) STD, (iii) LOOP 8050_H.

   (b) Write a program to unpack an 8 bit data stored at memory location $1000:2000_H$. Store the result at memory location starting from $2000:1000_H$.

   (c) With one suitable circuit diagram discuss how address bits are separated from multiplexed address and data buses.

   (2 × 2)+ 4 + 4 = 12

Group – C

4. (a) Design an interface between 8086 μP and two chips of 32K X 8 RAM using 3:8 decoder. The starting address of RAM is 90000_H. Calculate the final address of the memory chips.

   (b) What are the differences between MOV [2000], AL and MOV [2000], AX instructions?

   9 + 1 + 2 = 12

5. Interface two 7-segment displays with 8086 such that the addresses assigned to them are 80_H and 81_H. Write a program to display and blink (with 1 sec delay approx.) the last two digits of your autonomy roll number continuously.

   (6 + 6) = 12

Group – D

6. (a) Draw the flag register of 8051 μC and discuss the function of RS0 and RS1 bits.

   (b) What is the function of $\overline{EA}$ pin in 8051 μC?

   (c) Draw the interfacing circuit (including power on reset, crystal oscillator and power supply) to connect one LED to P1.0 pin of 8051 μC. Write an assembly level program to add two 8 bit numbers and blink the LED if addition generates a carry, otherwise LED is OFF. Let the delay subroutine is available at XXXX$_H$ memory location.

   (1 + 2) + 2 + (3 + 4) = 12

7. (a) Write an assembly level program for 8051 μC to *cut paste* a block of 10 byte data from one memory to another memory location (internal RAM) in reverse order.

   (b) Write short notes on (any two)
   (i) TMOD register of 8051 μC
   (ii) Internal RAM of 8051 μC
   (iii) Serial data communication in 8051 μC.

   4 + (4 × 2) = 12

Group – E

8. (a) Write the main features 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

9. (a) Write short notes on (*any three*)   **(3 × 4) = 12**
   (i) STATUS register of PIC 16F877 microcontroller
   (ii) Memory organization of PIC 16F877
   (iii) I/O ports of PIC 16F877
   (iv) Direct and Indirect addressing in PIC 16F877.

Department & Section	Submission Link
AEIE	https://classroom.google.com/c/MzY0NTQ4ODY5Mjk1/a/MzY0NTQ4Mzk0MTk4/details