Time : 3 hours   **Full Marks : 70**

(i) The questions are of equal value

(ii) Answer any *five* questions taking *at least two* from each group

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Group A

1. a) What are the 'flags' in the status register of Motorola 68000? What is the function of the "X" flag?

    b) What is meant by 'auto' increment/decrement with respect to addressing modes of Motorola 68000? Explain with examples.

    c) What functions are carried out by the following instructions of Motorola 68000:
    - LEA $1C(A3,D2),A5
    - EXG D3, D4
    - SWAP D1
    - ADDQ #03, D2

    d) Write a program in MC68000 assembly language to implement the following high level language program segment:
    ```
    SUM = 0
    FOR I = 1 TO 50
    SUM = SUM + I
    END FOR
    ```
    (3 + 3+ 3+ 5)

2. a) For a PIC 8259A connected to a 8086 microprocessor, why are two INTA (active low) pulses required from the processor?

    b) Distinguish among IRR, IMR and ISR in a PIC 8259A, clearly specifying the function of each.

    c) What is 'fully nested' mode in relation to 8259A? What is the difference in operation when a 'rotate-on-specific' command is executed?

    d) What is the minimum number of initialization and operation command words necessary for programming an 8259A?

    e) 'The CAS0, CAS1 and CAS2 signals of the 8259A can function as both inputs and outputs'. Explain.
    (2 + 4 + 3 + 2 +)

3. a) Initialize an 8251A to operate with the following features:
    - Baud rate factor of 16
    - 8 bits/character
    - Odd parity
    - 2 stop bits

    Assuming the internal addresses to be A0H and A1H write an assembly language program to transmit the first nine natural nos. (in BCD format) at a Baud rate of 2400. What is the frequency of the 'Transmit clock' (T_XC)?

    b) Explain with a simple diagram how digital data is transmitted over telephone lines using Modems (DCE) along with 'Data Terminal Equipment'.

    c) What are the different transmission errors that might occur in a USART? Explain each.

    d) What is the advantage of USB over ISA / PCI bus?
    (6 + 3 + 4 + 1)

Group-B

4) Draw and explain the basic architecture of the MAC unit of the ADSP2101. (14)

5) Write a program in Assembly Level Language of the ADSP2101 for the summation of the sequence

 1*2+3*4+5*6+.............. (14)

6a)Show the RAM orientation of the 8051 microcontroller, indicating also the location of atleast five Special Function registers.

 b)Write a program to generate a square wave from the bit P1.2 of the 8051 microcontroller. (7+7)

7)Write a program in 8086 Assembly Level Language to input temperature from a temperature transducer and monitor the same to see if it has crossed the limit. Show the schematic arrangement for obtaining the signal and feeding it to the microcomputer based system. (14)

8)Write short notes on(any two)(2*7)

a)The Power Down Mode in the 8051 Microcontroller.
b)The Memory Management Unit in the 8086 Microprocessor.
c)The Programmable Logic Devices as Interfacing Units.
d)Problems encountered in Multitasking by a Microprocessor in a Multiuser Environment.