Question Paper

Exam Date & Time: 29-Nov-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. ENGG. END SEMESTER EXAMINATION - NOV./ DEC. 2018
Microprocessor and Microcontroller [EC 246]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

Missing data may be suitably assumed.
Write comments or explain the logic for all the programming questions.

1) A) Explain the programing model of 8051. Write the PSW register format and explain the function of each bit. (10)

B) With proper illustration, explain the following instructions of 8086. Write the addressing mode/s supported by of each of these instructions. (10)

i) AAA ii) IDIV iii) DAA iv) MUL

2) A) Name the memory segments of 8086 and explain their purpose. What are the advantages of memory segmentation? (8)

B) Identify the addressing mode used in each of the following instruction of 8051 and explain the function of each instruction. (12)

i) MOV R0, #23
ii) MOVX A, @A+DPTR
iii)XCH A, R0
iv) MOV 2, 3
v) POP 0E0H
vi) MOV 40H, #25H

3) A) Explain the following data definition directives with examples and memory allocation sketches for each. (10)

a) DB b) DW c) DD d) DT

B) With the help of data memory and code memory organization diagrams of 8051, explain the use of MOV, MOVX and MOVC instructions of 8051. (10)

4) A) Write steps for programming timer of 8051 in mode-0. Write a program to send two digit hexadecimal up count value to port-1, with a delay of 0.02 seconds. Use timer-0 in mode-1 to generate the delay (assume crystal frequency= 11.0592MHz). (10)

B) Explain the functions of the following 8086 pins. Mention their direction (IN/OUT or Bi-directional). (10)

a) $\overline{TEST}$ b) ALE c) INTR d) $\overline{WR}$ e) READY

5) A) Write a program for 8051 to add ten, 16-bit signed numbers that are stored at memory location 40H onwards, and store the result in memory location 50h onwards. (10)

B) Differentiate between polling and interrupt method of IO communication. Define ISR and write the IVT for 8051. Write down the steps taken by 8051 when it encounters an interrupt. (10)

6) A) Define timing diagram and machine cycle. Draw one machine cycle of 8051.Find the time taken to execute an 8051 instruction which requires 3 machine cycles. Assume 16 Mhz as the clock frequency. (10)

B) With neat diagram, explain the pin structure of port-1 of 8051. Explain the steps for writing a logic '1' to the 'port pin' of port-1. (10)

7) A) Write a program for 8051 to find the sum of 100, 8-bit signed numbers stored in the array starting from 7000H onwards. Store the result at 8050H onwards. (10)

B) Write a program in 8086 to find the square and cube of a given 8 bit number and write the result in memory. (10)

8) A) Two switches SW0 and SW1 are interfaced to 8051 through P2.0 and P2.1 pins. Write a program to send 00 to **PORT-0** when key SW0 is pressed. If key SW1 is pressed, send FF to **PORT-1**. Poll the keys continuously. (10)

B) Find the value to be loaded into the timer register to get a baud rate of 9600. Assume crystal frequency of 16 Mhz. Write the steps to transmit data serially using 8051 serial port. (5)

C) Write a program for 8051 to receive bytes of data serially, and send them to **Port-1**. Set the baud rate at 2400, 8-bit data, and 1 stop bit. Assume 11.0592 Mhz crystal frequency. (5)

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