

Indian Institute of Engineering Science and Technology, Shibpur

B. Tech. (CST) 5th Semester Mid-Term Examination, September, 2022

Microprocessor Based Systems (CS 3101)

Full Marks: 100 (Final Weightage 30)

Time: 2 Hours

- Attempt any four (4) questions.
- Answers should be precise, to the point, and in your own words as far as practicable.
- If not explicitly mentioned, assume Intel 8085A as the base microprocessor.
- Make your own assumptions, if necessary, and state them at proper places.

1. (a) Explain (with suitable examples) the different ways in which parameters and return value can be managed for subroutines in assembly language. What are the pros and cons of each of the approaches.
(b) Explain the advantage(s) (justification) of having software interrupt instructions in addition to typical subroutine call instructions in the Instruction Set of a microprocessor.
(c) Write an assembly language subroutine "unsigned int reverse_digit(int n)" that reverses and returns the 8 bit Hex number n. For example, if n is B5H, the subroutine should return 5BH.
[10+7+8]
2. (a) Say, the memory space for an Intel 8085A microprocessor has to be populated with 128Kb (that is, $16K \times 8 = 16KB$) ROM, 256Kb (that is, $32K \times 8 = 32KB$) RAM and one Intel 8255 PPIO chip. With a suitable diagram propose and explain how to achieve this.
(b) Write an assembly language subroutine "int largest(int a[], unsigned int n)" that finds and returns the largest among the n elements of the array a of 8 bit Hex numbers.
[15+10]
3. Say, a microprocessor based system is to produce 4 square waves of approximately 10Hz, 20Hz, 30Hz, and 40Hz frequency at 4 of its output lines. Propose a suitable design for the system. Write a suitable assembly language program for the system that will produce the desired output.
[25]
4. (a) Explain the role of the Monitor Program of a typical Microprocessor based System Development Kit (eg, SDK-85 kit).
(b) Given a typical Microprocessor based System Development Kit, what information the user must know for utilizing the kit?
[13+12]
5. Write short notes on the following.
 - (a) IO mapped IO for Intel 8085A microprocessor.
 - (b) Memory Folding
 - (c) Software versus Hardware Interrupts for Intel 8085A microprocessor
[7+9+9]