

**Department of Computer Science & Engineering**  
**National Institute of Technology Srinagar**

**Major Examination (Autumn 2019)**

**Course: Microprocessor**  
**Max Marks: 90**  
**Sem: 5<sup>th</sup>**

**No. of credits: 04**  
**Time allotted: 03 hours**  
**Course code: CSE 503**

**Course Outcomes (CO)**

<b>CO1</b>	<b>Understand the architecture, memory organization of microprocessors 8085 and 8086.</b>
<b>CO2</b>	<b>Apply the programming (assembly level language) in 8085 microprocessor for simple arithmetic, logical and real time applications.</b>
<b>CO3</b>	<b>Identify the different ways of interfacing memory and I/O with microprocessors.</b>
<b>CO4</b>	<b>Apply and analyze the interfacing concept of different programmable interfacing modules with microprocessors and controllers for real time applications.</b>

**Note:**

- 1. Solve only 05 questions.**
- 2. All programs must be complete with memory-address, label, mnemonics and comments.**

- Q1.** (a) Draw the 8085 Hardware and Software models. Explain the function of the various units in each of the models.  
(b) Why are SP and PC 16 bit registers? What is their significance in programming of 8085 microprocessor?

**CO1 (7x2, 4)**

- Q2.** Draw timing diagrams for the following instructions:  
(i) MOV r1, r2  
(ii) DCX rp  
(iii) MVI M, data  
(iv) Memory Read and Memory Write

**CO2 (4x3, 6)**

- Q3.** (a) What is the function of a bus in a microprocessor system? Explain the function and working of various buses available in 8085 microprocessor.  
(b) With the help of a suitable diagram explain the de-multiplexing of the data bus.  
(c) If the memory chip size is 2048 x 8, how many chips are required to make up 16-K memory? If the address of the last location is FFFFH, find the starting address?

**CO1, CO3 (6, 6, 6)**

- Q4. (a) What is the significance of counters and time delays in programming? Briefly explain the various methods for setting up time delays.
- (b) A set of three readings is stored in memory starting at XX50H. Write a program to sort the readings in an ascending order. Assume data (H) 87, 56, 42.
- (c) Write a program to generate a continuous square wave with the period of 500  $\mu$ s. Assume the system clock period is 325 ns, and use bit D<sub>0</sub> to output the square wave.
- CO3, CO4 (5, 6, 7)**

- Q5. (a) Describe the concept of stack and subroutine with the help of a programming example.
- (b) A railway crossing signal has two flashing lights run by a microcomputer. One light is connected to data bit D<sub>7</sub> and the second light is connected to data bit D<sub>6</sub>. Write a program to turn each signal alternately ON and OFF at an interval of 1 second. Assume a clock frequency of 1 MHz.
- (c) Explain briefly:
- (i) nesting of subroutines
  - (ii) subroutine with multiple endings
- CO2, CO4 (6, 8, 4)**

- Q6. (a) Draw the block diagram of 8155 chip and describe the following:
- (i) Chip enable logic, and
  - (ii) Control word
- (b) Describe the RIM and SIM instructions. Explain their use with the help of a small program.
- (c) Design a 1-minute timer using a 60 Hz power line as an interrupting source. The output ports should display minutes and seconds in BCD. At the end of the minute, the output ports should continue displaying one minute and zero seconds.
- CO3, CO4 (3x2, 4, 8)**

**END OF PAPER**