

M. Sc Instrumentation Science, First Year Second Semester Examination 2023.

Subject: Embedded System (MI-203)

Time : 4 hrs

Full marks-80

Use separate answer paper for each part

Part – I (40 Marks)

Answer any four questions:

4 x 10 = 40

1. Write the types of addressing modes in 8051 microcontroller (μc) available. Describe the register addressing mode in details with example. [2 + 8 = 10]
2. Write op-codes to copy the byte in TCON to register R2 using at least four different methods. (take direct address for TCON (88h) and register R2. [10]
3. Describe role of interrupt in microcontroller. What are the five interrupts provided in 8051 microcontroller. [3+7=10]
4. Draw a detailed Circuit Diagram for unipolar Stepper Motor Controller using ATMEGA 328 Microcontroller fixed on Arduino Board. [10]
5. Answer two of the following questions [5+5]
 - a) Describe Push and pop operation with schematic diagram
 - b) Describe Program Status Word(PSW) Special Function Register
 - c) Name the five functional groups of 8051 instructions.
 - d) Describe the CISC and RISC system with their differences.
6. a) Write down at least 4 basic differences in features of microcontroller 8051 and PIC 16F877A.
b) Describe the basic features of Arduino Uno board including its I/O pins. [4+6]

[Turn over

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Part-II (40 Marks)

Answer any four questions

1. Draw the functional block diagram of 8085 μ p. State the function of following pins:
(i) ALE (ii) READY (iii) $\overline{IO/\overline{M}}$ (iv) SOD [6+4]
2. Describe the interrupts of 8085 μ p. What do you mean by maskable and non-maskable interrupts? Why is the lower order address bus of 8085 μ p multiplexed with the data bus and how will it be demultiplexed? [5+2+3]
3. What is registers and its merits/demerits over a memory location? What is the speciality of HL pair over the other registers pairs? Discuss the program counter and stack pointer. [3+2+5]
4. (a) Write the operation of the following Instructions for 8085 μ p:
(i) LHL D C091 H (ii) STA C099 (iii) XRA A (iv) DAD B (v) LXI H C050
(b) Write an assembly language program for division of two 8 bit numbers for 8085 μ p. [5+5]
5. (a) Write an assembly language program for shorting the smallest number in the array of 20 (Decimal) numbers each of 8 bit for 8085 μ p.
(b) Draw a memory interfacing circuit with 8085 μ p for the following: 4 k ROM (2732) and 4K R/W memory (6132). Write memory address range for ROM and R/W memory. [5+5]
6. (a) Explain the mathematical function that is performed by the following instruction of 8085 μ p:
MVI A 07 H
RLC
MOV B, A
RLC
RLC
RLC
ADD B
RST-1
(b) Specify the contents of memory locations 3070 H to 3074 H after execution of the following instruction of 8085 μ p:
LXI H 3070 H
MVI B 05 H
MVI A 01
STORE MOV M,A
INR A
INX H
DCR B
JNZ STORE
RST- 1 [5+5]