Ref. No.: Ex/MI203/2022

M.SC. INSTRUMENTATION SCIENCE FIRST YEAR SECOND SEMESTER EXAM- 2022

SUBJECT: EMBEDDED SYSTEM

Time: 4 Hours | Full Marks: 80

Use separate sheet for each part.

Part-I

Answer any four questions

1. a) Explain with diagram the architecture of 8051 Microcontroller. b) What is the address range of SFRs in 8051? [8+2]

2. Write the types of addressing modes in 8051 microcontroller (μc) available. Describe the register addressing mode in details with example. [2 + 8]

3. 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]

4. Describe role of interrupt in microcontroller. What are the five interrupts provided in 8051 microcontroller. [3+7]

5. 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]

6. a) Describe with circuit in detail, the interfacing of an unipolar Stepper Motor with microcontroller along with driver Transistors.
   b) Write down in tabular form the output sequence for full step control of the above stepper motor. [8+2]

[Turn over

PART-II

Answer question No. 1 and any six from the rest **!0 + 5x6 = 40**

1. A. Explain the operation of XTHL in 8085?
   B. Explain the interrupt and their types in 8085?
   C. Write the control word format for BSR mode of 8255.
   D. What is PSW?
   E. What are the advantages of segmented memory in 8086?

2. Give the register classification of 8085? What is the operation of RD signal?

3. Explain the operation of 8255 PPI Port A programmed as input and output in Mode 1 with necessary handshaking signals.

4. Show and explain the ADC interfacing with 8085 microprocessor.

5. What is stack pointer (sp)? Give the purpose of ALE/PROG signal.What is the use of timing and control unit in 8085?

6. Compare Microprocessor and Microcontroller. Draw the format of 8086 flag register.

7. Write an assembly language propram which decrement a counter one by one and halt when counter value is zero.

8. Write a program to test the 5^{th} bit of a binary number, which is stored in a data memory location C050. **If it is zero then store FF at** location C070, else store 00 at the same location.

9. What is the maximum memory size that can be addressed by 8085? What are uses of AD_7 - AD_0 lines in 8085?

10. Write a Program to multiply two binary numbers located in two consecutive location of the data memory and store the result in the register C. Ignore the overflow, if any.

11. How 2k ROM and 2k RAM be interfaced with microprocessor 8085? Write the memory address range with necessary diagram.