Reg. No. _____

Indian Institute of Information Technology Ranchi

Department of Electronics & Communication Engineering/Computer Science & Engineering

B. Tech End Semester Examination – Spring Semester 2022-23

Semester: 4th | **Course Instructor: Dr.Priyank Khare / Dr. Puja Ghosh**

Course Code: EC 2004/EI 2004 | **Course Name: Microprocessors and Microcontrollers**

QUESTION PAPER

Duration: 3 Hrs. | **Max Marks: 100**

Instructions:

(1). Number in [ ] indicates marks.
(2). Any missing data can be assumed suitably.
(3). Symbols have their usual meaning.
(4). Non-programmable scientific calculator is allowed.

Section A: Answer all the questions.

1 **(a)** An 8085 microprocessor accesses two memory locations (2001H) and (2002H), that contain 8-bit numbers 98H and B1H respectively. The following program is executed. **[10]**

```
LXI H, 2001H
MVI A, 21H
INX H
ADD M
INX H
MOV M, A
HLT
```

At the end of the program, what is the content of the memory location 2003H in decimal (base 10)?

(b) Draw the block diagram of 8085 microprocessor and explain the functioning of all the blocks. **[10]**

2 **(a)** In the 8085 microprocessor, the following program is executed **[10]**

Address location - Instruction

2000H	XRA A
2001H	MVI B, 04H
2003H	MVI A, 03H
2005H	RAR
2006H	DCR B
2007H	JNZ 2005
200AH	HLT

At the end of program, register A contains

(b) Write the similarities and differences between CALL-RET and PUSH-POP instructions **[5]**

(c) What is a subroutine? **[5]**

3 **(a)** Explain the operation of stack with reference to 8085 microprocessor with suitable example **[10]**

(b) Explain how the peripheral devices interface with 8085 microprocessor using handshaking signals. [10]

Section B: Answer any **two** questions

4 (a) Write an assembly language program to convert an 8-bit binary data to BCD. The binary data is stored in 4200H. Store the hundred's digit in 4251H.store the ten's and unit's digits in 4250H. [5]

(b) Draw the Pin configuration of 8255 clearly explaining all the pins? [5]

(c) With suitable diagram explain the architecture of 8279 in detail? [10]

5 (a) Draw block diagram of 8155 programmable input/output ports. Explain control word definition of the same. [10]

(b) Calculate the count to obtain a 100μs delay for the loop. Take the clock period as 325ns. [10]

```
                          T-states
        MVI B,COUNT       3
LOOP:   NOP               4
        NOP               4
        DCR B             4
        JNZ LOOP          10/7
```

6 (a) Write a BSR control word subroutine to set bits PC7 and PC3 and reset them after 10ms. [5]

(b) Explain the register and register pair methods for generating delay in an assembly language program. [7]

(c) Accumulator has data FFH. Determine the status of flag registers under the following operation [8]

(i) 01H is added
(ii) Accumulator is incremented by one
(iii) RAR

End