Total number of printed pages: 6 **Programme (D)/4th Semester/Paper Code DIE403**

2023

DIE403: Microprocessor

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) Define the terms: Bit, Byte, Nibble, and Word. 4

   b) Explain the terms: SSI, MSI, LSI, and VLSI. 4

   c) Calculate the number of registers in the following memory chips: 2

   (i) 32kB, (ii) 1kB

   d) Calculate the no of address lines required to identify the following memory chips: 4

   (i) 2kB, (ii) 4kB, (iii) 16kB, (iv) 64kB

   e) Describe the various flags found in Flag-register of 8085 microprocessor. 5

   f) If the clock frequency is 3MHz, how much time is required to execute instruction of 18 T- states? 1

2. a) State the functions of the signals: ALE, IO/$\overline{M}$. 2

   b) Define opcode and operand. 2

   c) If the size of a memory chip is 1024 X 4 bits, how many such chips will be required to make up 32Kbytes of memory? 2

   d) Design a 4-bit register (4 input lines and output lines) to store 8 bits using flip flops. 4

   e) Write an Assembly language program for 8085 microprocessor to exchange the contents of memory block A000 H-A004 H with that of F000 H-F004 H. 5

   f) Identify the m/c cycles of the instructions: 5

   (i) ADD B;
   (ii) ADI FDH;
   (iii) STA C000H;
   (iv) LDA D000H;
   (v) JMP E234 H

3. a) For the following program given below- 2+2

```
LXI H, A000H
MVI A, E3H
ADI B5H
ORA A
INX H
STAX H
RST 1
```

Answer the followings:

i) What is the status of flags after the execution of the instruction ORA A?

ii) At the end of the program, what will be the content of accumulator and where will it be stored?

b) Write an assembly language program to generate a delay of 50msec. 5

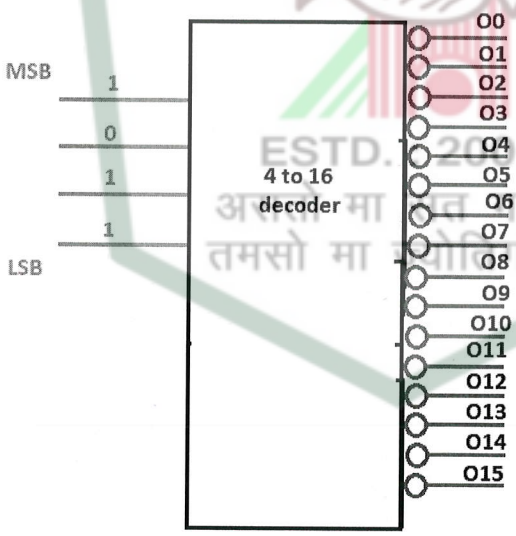
c) Make a comparison between Memory mapped I/O and I/O mapped I/O interfacing schemes. 5

d) If 8085 adds FD H & 03 H, specify the contents of the accumulator. 1

e) State the need to demultiplex the bus AD0-AD7. How is demultiplexing done? 3

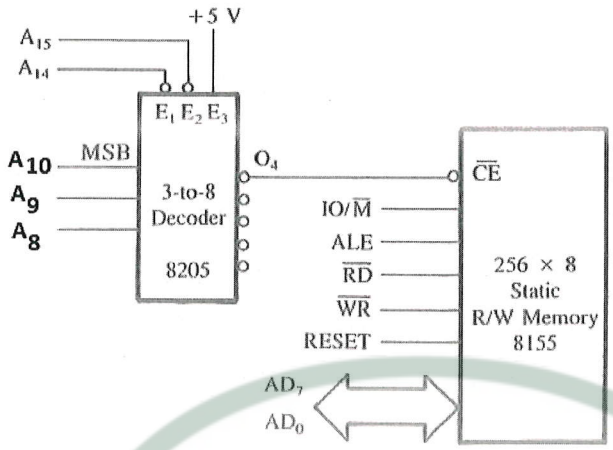
f) Name the machine control instructions of 8085. 2

4. a) 2



Specify the output line of the 4 to 16 decoder that goes low if the input to the decoder is 1101 as shown in the figure above.

b) 5



Identify the memory address range of the above interfacing.

c) Draw ad explain the timing diagram of STA EFAB H instruction. 7

Assume the instruction is written as:

Memory Location	Mnemonics	Hex Code
D012 H	STA EFAB H	32
D013 H		AB
D014 H		EF

d) Specify the size of the following instructions: 4

(i) MOV A, M

(ii) CPI 22 H

(iii) LDA B123 H

(iv) JP C000 H

e) Differentiate between microprocessor & microcontroller with diagram. 2

5. a) Draw an interfacing circuit for a 4Kbyte EPROM using a 3 to 8 decoder such that the memory address range will be F000H-FFFFH. 5

b) Explain how many times the following two loops will be executed: 2+2

(i)
```
      MVI B, 0AH
LOOP: DCR B
      JNZ LOOP
```

(ii)
```
      LXI B, 000AH
LOOP: DCX B
      MOV A,B
      ORA C
      JNZ LOOP
```

c) Assemble the following program starting with memory address EFCDH and 5

specify the total number of bytes consumed-

LXI B, FF12H
LXI D, 12FFH
MOV A,D
SUB B
STA FF13H
RST1

d) In FIG.1 design the chip select logic Hardware with NAND gates so that the memory address range will be as indicated. 6

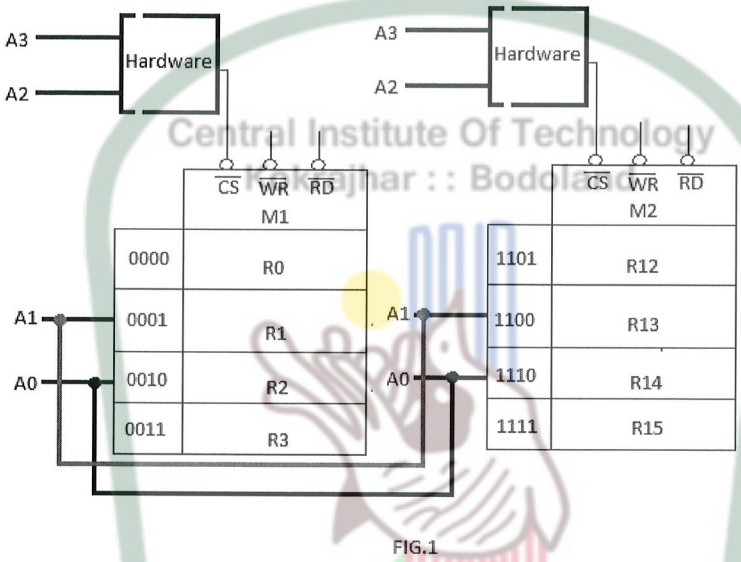
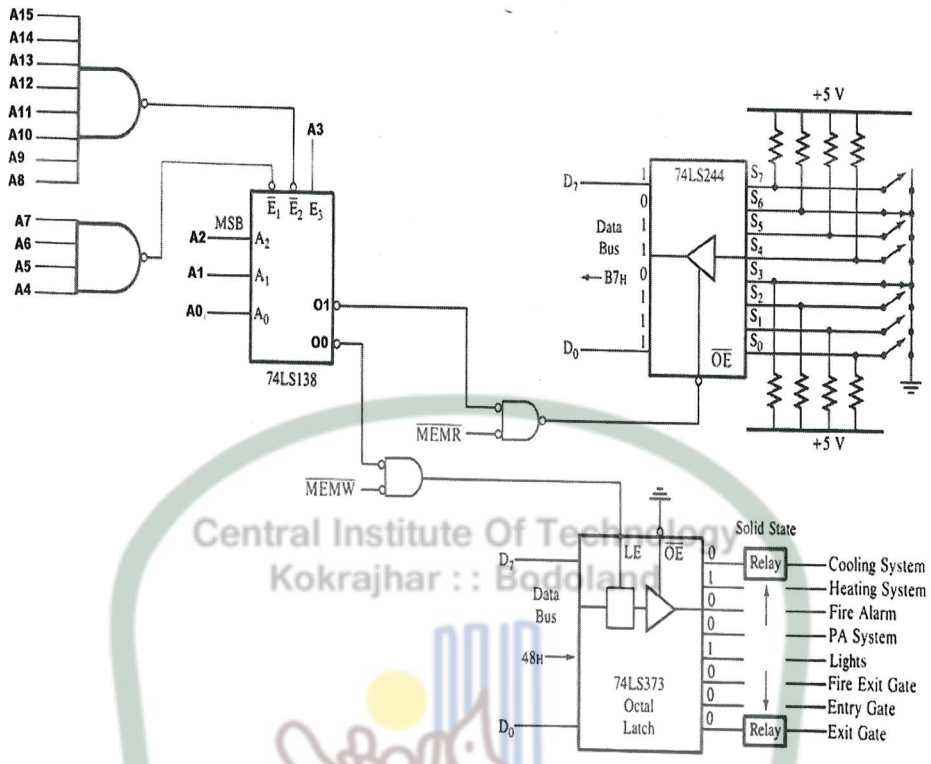


FIG.1

6. a) For the following figure answer the questions: 6

i) Identify the I/O interfacing technique.

ii) State the addresses of the input & output device.



b) Calculate the COUNT to obtain a 100μSec loop delay and express the value in Hex. Assume system frequency as 5 MHz. 6

		T-States
	MVI B, COUNT	7
LOOP:	CMA	4
	CMA	4
	DCR B	4
	JNZ LOOP	10/7

c) Two numbers are stored in the ML: D000 H & D001 H. Write an assembly language program to subtract the 2nd number [D001H content] from the 1st number [D000 H content]. Store the result of this subtraction in ML: F000 H. 6

d) What will be the outputs of the following programs? 2

```
MVI A, 00 H
DCR A
RST 1
```

7. Write assembly language programs for 8085 to load whatever contain in memory location CF05H to register 'L' by using 5x4=20

Method: 1 by using "MOV L, M"

Method: 2 by using "LDA"

Method: 3 by using “LDAX”

Method: 4 by using “LHLD”