Total number of printed pages: 4 **Programme (UG)/ 5th Semester/Paper Code: UIE501;**

2022

MICROPROCESSOR & MICROCONTROLLER

Full Marks : 100

Time : Three hours

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

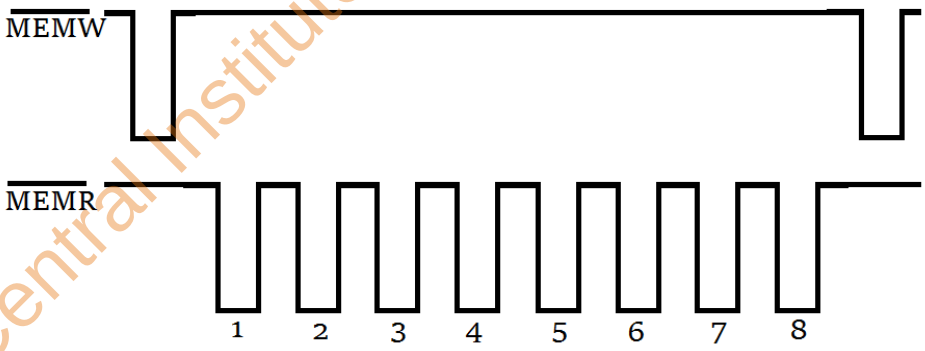
***Question No.1** is **compulsory** and answer **any four** questions from the rest.*

1. a) If the 8085 adds 75H and 77H, specify the contents of accumulator and the status of the **S**, **Z** and **CY** flags. **3**

   b) The instruction ***MOV B,M*** copies the contents of memory location in Register-B. Its a 1-byte instruction with two machine cycles and 7-T states. Identify the second machine cycle and its control signal. **2**

   c) For the following program, identify the ***MEMR*** signals of the ***Opcode Fetch*** machine cycles in the given figure. **4**

```
START: MVI A, 99H
       STA C000H
       JMP START
```



   d) The memory address of the last location of a 1K byte memory chip is given as FBFF H. Specify the starting address. **2**

   e) Write a program to reset all the flags of 8085 microprocessor. **4**

   f) Explain how many times the following loop will iterate: **2**

```
Label:  MVI B, 03H
        DCR B
        JZ "Label"
```

   g) The following program reads one data byte at a time. Identify the data bytes from the **3**

following set that will transfer the program to location ***ACCEPT***.

[Data Bytes: 19, 20, 64, 8F, D8, F2]

```
        IN PORT1
        MVI B, 20H
        CMP B
        JC REJECT
        JM REJECT
        STA 3099H
        JMP ACCEPT
REJECT: JMP INVALID
```

2. a) Calculate the 16-bit ***COUNT*** value to be loaded in register D-E to obtain a loop delay of 2-seconds. Assume the system clock period as 0.33μSec. **5**

```
        MVI B, 16 H
Loop2:  LXI D, COUNT        (10T)
Loop1:  DCX D               (6T)
        MOV A,D             (4T)
        ORA E               (4T)
        JNZ Loop1           (10/7T)
        DCR B               (4T)
        JNZ Loop 2          (10/7T)
```

b) Read the following program and answer the questions : **6**

Line No	***Mnemonics***
1	LXI SP, 0500 H
2	LXI B, 1066 H
3	LXI H, 33DD H
4	LXI D, 30AC H
5	PUSH H
6	PUSH B
7	MOV A,L
...	...
...	...
20	POP H

i) What is saved in the stack pointer register after the execution of line 1?

ii) What is the memory location of the stack where the first byte data will be stored?

iii) What is stored in ML: 04FE H when line 5 (PUSH H) is executed?

c) Draw an interfacing circuit for a 4Kbyte EPROM using a 3 to 8 decoder such that the memory address range will be E000 H – EFFF H. **5**

d) Differentiate between the following: **4**

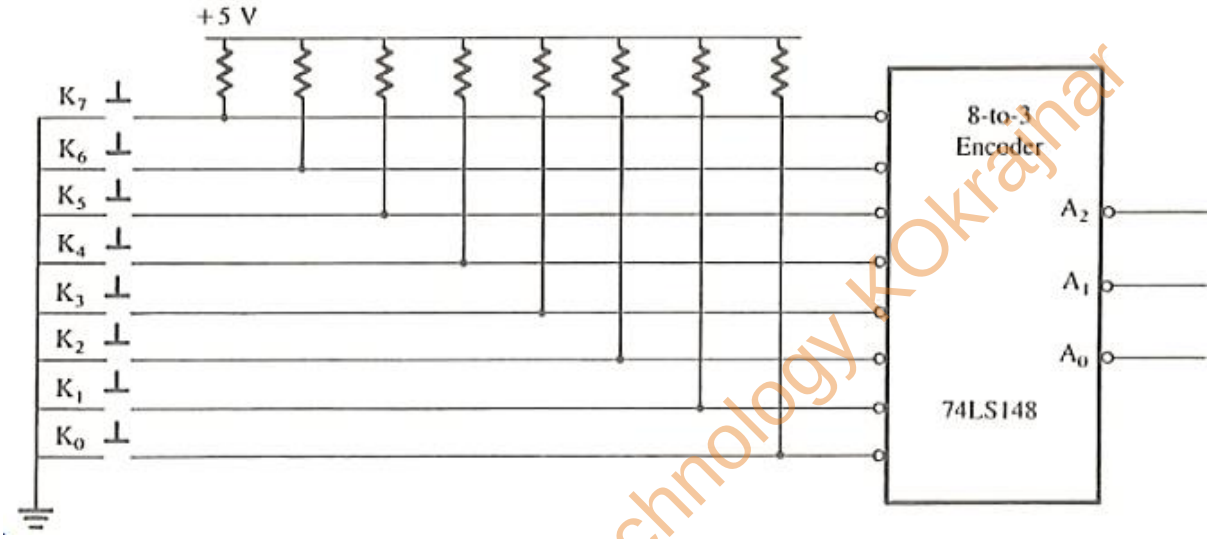
i) High level language and low level language.

ii) Instruction cycle, Machine Cycle and T-states.

3. a) List the various interrupts and their properties, available in the 8085 microprocessor. **5**

b) Draw the functional block diagram of 8085 Microprocessor and explain the functions of each blocks. **7**

c) What is the output of the encoder if the key K3 is pushed? **4**



d) Make a comparison between Memory-Mapped I/O and Peripheral I/O technique. **4**

4. a) 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**

b) Write an assembly language program for 8085 to find smallest number in an array of sixteen numbers of data which is store in memory location starting from D000H and store your result in C000H. **5**

c) Draw a circuit to implement **RST-3** instruction[Hex code: DF H] **5**

d) Calculate the values of the LSB, MSB and full scale output for an 8-bit DAC for the 0 -15 V range. **5**

5. a) Compare the similarities and differences between PUSH/POP and CALL/RET instruction. **7**

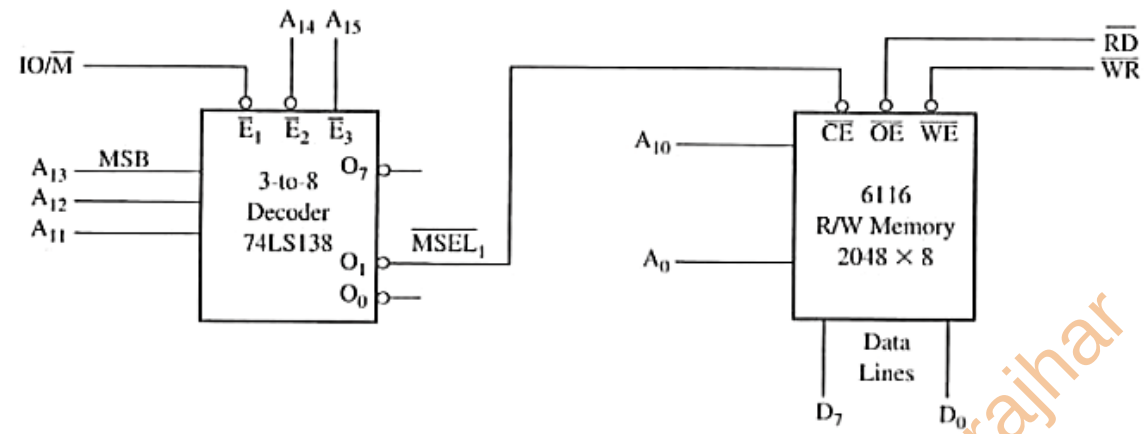
b) Describe the interpretation of the accumulator bit pattern for the SIM-instruction. **5**

c) Explain the functions of handshake signals. **4**

d) What do you mean by fold back or mirror memory? Illustrate with an example. **4**

6. a) List the major components of the 8279 keyboard/display interface, and explain their functions. **8**

b) In the following figure, exchange the address lines A12 and A14, and identify the memory map. **5**



c) Draw and explain the bus timing diagram of the instruction **STA D050H**. Also, find the time required by the microprocessor to execute this instruction, if the clock frequency is 5 MHz. **7**

7. Write short notes on: **5 x 4 = 20**

a) Binary weighted DAC

b) The control logic of 8155

c) Nesting

d) Addressing Modes