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2022

BINA CHOWDHURY CENTRAL LIBRARY
(GIMT & GIPS)
Azara, Hatkhowapara,
Guwahati - 781017

B.Tech. 5th Semester End-Term Examination

EE, IE

MICROPROCESSORS

(New Regulation & New syllabus)

Full Marks – 70

Time – Three hours

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

Answer question 1 any *four* from questions 2 to question 7.

1. Choose the correct option for the following: (10 × 1 = 10)
- (i) Which of the following circuit is used as a special signal to demultiplex the address bus and data bus?
- (a) Priority Encoder (b) Decoder
(c) Address latch Enable (d) Demultiplexer
- (ii) How many flip-flops are there in a flag register of 8085 microprocessor?
- (a) 4 (b) 5
(c) 7 (d) 10
- (iii) A memory connected to a microprocessor has 20 address lines and 16 data lines. What will be the memory capacity?
- (a) 64 KB (b) 1024 KB
(c) 16 MB (d) 64MB
- (iv) Which of the following is a software interrupt?
- (a) TRAP (b) INTR
(c) RST-6.5 (d) RST-5
- (v) Which of the following is true about MOV A, B instruction?
- (a) It means move the content of register A to register B
(b) It uses immediate addressing mode
(c) It doesn't effect the flag register
(d) It is a 2-byte instruction

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(vi) Which of the following interfacing IC is used for keyboard/display Interfacing?

- (a) 8257/37 (b) 8155
(c) 8253/54 (d) 8279

(vii) What is true about Program counter?

- (a) It is an 8-bit register, which holds the temporary data of arithmetic and logical operations
(b) When an instruction is fetched from memory then it is stored in the program counter
(c) It provides timing and control signal to the microprocessor
(d) It is a 16-bit register used to store the memory address location of the next instruction to be executed.

(viii) There are _____ general purpose registers in 8085 processor.

- (a) 5 (b) 6
(c) 7 (d) 8

(ix) Suppose registers 'A' and 'B' contain 50H and 40H respectively. After instruction MOV A, B, what will be the contents of registers A and B?

- (a) 40H, 40H (b) 50H, 40H
(c) 50H, 50H (d) 60H, 40H

(x) Which Interrupt has the highest priority?

- (a) INTR (b) TRAP
(c) RST 6.5 (d) RST 5

2. (a) With suitable diagram, explain how the Address/Data bus ($AD_0 - AD_7$) of 8085 microprocessor is de-multiplexed. Explain the functions of the ALE, IO/\overline{M} , \overline{RD} and \overline{WR} signals of the 8085 microprocessor.

(b) Draw the architectural diagram of 8085 microprocessor and list out the following. (5+7+3)

- (i) General Purpose Registers
(ii) Special Purpose registers with their functions
(iii) Flags in the flag register with required explanation

- (c) Assume that the memory location 2075H has a data byte 47H. Specify the contents of the address bus $A_{15} - A_8$ and the multiplexed bus $AD_7 - AD_0$ when the MPU asserts the \overline{RD} signal.
3. (a) How are the different signals classified in a 8085 microprocessor? What are the control signals used in a 8085 microprocessor? (4+4+7)
- (b) If the memory chip size is 1024 x 4 bits, how many chips are required to make 2K bytes of memory? The memory address of the last location of a 1Kbyte memory chip is given by FBPF H. Specify the starting address.
- (c) Design a memory system for 8083 such that it should contain 2KB of EPROM and 2KB of RAM with starting address 0000H and 6000H.
4. (a) Define Instruction cycle, Machine cycle and T-state. Draw the timing diagram for the instruction. (10+5)

Address	Assembly Language	Code/Data
C900	MVI A, 32 H	3E
C901		32

Also, calculate the execution time if the 8085 clock frequency is 3 MHz.

- (b) What are the data transfer instructions and control signals for peripheral mapped I/O(I/O mapped I/O) and memory mapped I/O. Can an input port and output port have the same port address?
5. (a) Write a program using the ADI instruction to add two hexadecimal numbers 3AH and 48H and to display the result at an output port. (4+5+2+4)
- (b) Write instructions to clear the CY flag, to load FFH in register C and to add 01H to C. If the carry flag is set, display 01H at the output port otherwise display the contents of the register C
- (c) Explain how many times the following loop will be executed:

```

LXI B, 0007H
DCX B
LOOP: MOV A, B
      ORA C
      JNZ LOOP

```

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- (d) Describe the PUSH and POP Instruction. What will be the contents of the registers A and B after the execution of the following instructions:

```
LXI SP, 200HH
MVI A, 84H
MVI B, 6211
LOOP:  PUSH PSW
        PUSH B
        POP PSW
        POP B
        HIT
```

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6. (a) Describe the different type of interrupts used in 8085 microprocessor. What is the difference between Hardware and Software interrupt? (4+3+8)
- (b) What is masking and why it is required? What is the function performed by DI and EI instruction?
- (c) Provide the control word of 8253 timer/counter and explain the operating modes of 8253 timer/counter.
7. (a) The pins A_1 and A_0 of the 8255 is connected to the A_1 and A_0 of the address lines, Use a decoder circuit with inputs A_2-A_7 (not necessary to use all of them) and output to be connected to the \overline{CS} line. Identify the port addresses. Write initialization instruction to set up port A as an output mode in Mode 0, Port B as an output mode in Mode 1 for interrupt I/O and port C_u as output port in Mode 0.
- (b) Draw functional block diagram of PPI 8279 and explain the functioning of key board and display section of the service. Provide and explain the following control words of the device: (i) Key board and Display control word (ii) Frequency division control word and (iii) Display write control word. (7+8)