



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : CS-502

PUID : 05013(To be mentioned in the main answer script)

**MICROPROCESSORS AND MICRO-
CONTROLLERS**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own
words as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) The frequency of CLOCK OUT signal of 8085 microprocessor is
- a) 6 MHz b) 3 MHz
c) 6kHz d) 2 MHz.
- ii) The interrupt pin available in the 8085A microprocessor chip is
- a) ALE b) HOLD
c) INTR d) SOD.

- iii) When the RET instruction at the end of sub-routine executed
- a) the information where the stack is initialized is transferred to the stack pointer
 - b) the memory address of the RET instruction is transferred to the PC
 - c) two data bytes stored in the top two locations of the stack are transferred to the PC
 - d) two data bytes stored in the top two locations of the stack are transferred to the SP.
- iv) A single instruction to clear the lower four bits of the accumulator in 8085 microprocessor is
- a) XRI OFH
 - b) ANI FOH
 - c) ANI OFH
 - d) XRI FOH.
- v) Machine cycles in "CALL" instruction are
- a) 6
 - b) 5
 - c) 4
 - d) 3.
- vi) Address lines required for 32 k-byte memory chip are
- a) 13
 - b) 14
 - c) 15
 - d) 16.
- vii) The call location for TRAP interrupt is
- a) 0000H
 - b) 0020H
 - c) 0024H
 - d) 0034H.

- viii) What will be the content of the accumulator and status of CY flag after RLC operation, if the content of the accumulator is BC H and CY is 0 ?
- a) 79 H, 1 b) 78 H, 1
c) 5E H, 0 d) 5D H, 0.
- ix) Select the invalid instruction :
- a) MOV M, A b) ADI 67
c) LDAX B d) STAX H.
- x) What is the function of the instruction DAD B ?
- a) It adds B register and C register
b) It adds B register to D register
c) It adds B-C register pair and H-L register pair
d) It adds B-C register pair.
- xi) The instruction, MOV AX, [2500H] is an example of
- a) immediate addressing mode
b) direct addressing mode
c) indirect addressing mode
d) register addressing mode.
- xii) EU is used for
- a) encoding b) fetching
c) decoding d) both (a) and (b).

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. If the system clock is 2MHz, find the time to execute the given instruction code :

MVI A, 5A_H

MHI B, A7_H

ADD B

INR A

XRA A

HLT

3. In memory mapped I/O, how does microprocessor differentiate between an I/O and Memory ? Can Memory and I/O have the same address ? Compare Memory mapped I/O and Peripheral mapped I/O.

2 + 1 + 2

4. Discuss the functions of following instructions of 8085 microprocessor :

5 × 1

LHLD 8050_H, RLC, LDAX B, DAD D, STA 2000_H

5. Write an assembly language program in 8085 to count the number of 1s and number of 0s in a data byte and store the counts in two different memory locations.

6. Describe the different addressing modes of 8086 microprocessor.

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Specify the content of Accumulator and Flag when the following instructions are executed. $2 + 2$

MVI A, 01_H

MVI B, 02_H

ADD B

XRA A

HLT

- b) Differentiate between absolute memory address decoding and partial memory address decoding. 2

- c) Explain the memory address range of 1K-byte R/W memory by using partial decoding for 8085 microprocessor. 4

- d) What are the functions of RESET, INTR, HOLD, READY, HLDA pins of 8085 microprocessor? 5

8. a) Explain the instruction execution cycle of IN 01_H by using timing diagram. 5

- b) Why is demultiplexing address/data bus needed? How 8085 microprocessor demultiplexes address/data bus? $2 + 2$

- c) If size of the memory chip is 2048×8 bits, how many chips are required to make up 16K-byte memory? 2
- d) What is subroutine? Briefly discuss the sequence of events that takes place while executing CALL instruction. 1 + 3
9. a) What are the different interrupts in 8085? Give their locations? Distinguish between maskable and non-maskable interrupts. 2 + 2 + 2
- b) Write the accumulator bit pattern for SIM and RIM instructions. 3
- c) Write the program for enable the RST-7.5, RST-6.5 and disable RST-5.5. 3
- d) Explain in brief the different transfer modes of 8237 DMA controller. 3
10. a) List the operating modes of 8255A PPI. 3
- b) Write a BSR control word subroutine to set bits PC5 and PC7 and reset them after 15 millisecond. Assume that delay subroutine is available. 2
- c) In Mode 1 operation of 8255 PPI, what are the control signals when ports A and B act as input ports? Discuss the control signals. 5
- d) Describe the priority scheme and EOI scheme of 8259. 5

11. a) Explain the operations of BIU and EU present in 8086 microprocessor. 4
- b) What is the difference between MAX Mode operation and MIN Mode operation in 8086 microprocessor ? 4
- c) How is pipelining achieved in 8086 microprocessor ? 3
- d) Explain how 20 bit physical address is generated in 8086 microprocessor ? 4
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