



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

EC-502

MICROPROCESSORS AND MICROCONTROLLERS

Time Allotted: 3 Hours

Full Marks: 70

The questions are of equal value.

The figures in the margin indicate full marks.

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

All symbols are of usual significance.

GROUP A
(Multiple Choice Type Questions)

1. Answer any *ten* questions.

10×1 = 10

(i) 8086 exchanges data word with odd memory bank when:

(A) $(BHE)'=0$ and $A_0=0$

(B) $(BHE)'=0$ and $A_0=1$

(C) $(BHE)'=1$ and $A_0=0$

(D) $(BHE)'=1$ and $A_0=1$

(ii) A single instruction to clear the higher four bits of the accumulator in 8085 microprocessor is

(A) XRI 0FH

(B) ANI FOH

(C) ANI OFH

(D) XRI F0H

(iii) Machine cycle in "PUSH B" instruction are

(A) 6

(B) 5

(C) 4

(D) 3

- (iv) Address lines require for 64 k-byte memory chip is
(A) 13 (B) 14 (C) 15 (D) 16
- (v) Which one of the following is not a NON-Mask able interrupt of 8085 microprocessor?
(A) TRAP (B) INTR (C) RST 7.5 (D) RST 3
- (vi) How many segments are present in 8086 1MB memory space?
(A) 12 (B) 10 (C) 18 (D) 16
- (vii) 'DAD H' is a
(A) data transfer instruction
(B) logical instruction
(C) I/O & machine control instruction
(D) none of these
- (viii) How many modes are there in 8253?
(A) 5 (B) 6 (C) 7 (D) 8
- (ix) The port of 8255 which can be used in I/O mode is
(A) Port A only (B) Port B only (C) Port C only (D) All ports
- (x) Length of physical address in 8086 is
(A) 16 bit (B) 4 bit (C) 24 bit (D) 20 bit
- (xi) The 8051 microcontroller has
(A) 128 bytes on chip Ram (B) 8 K bytes on chip Rom
(C) 16 K bytes on chip Ram (D) 32 K bytes on chip Rom
- (xii) What will be the content of the accumulator and the status of CY flag after RLC operation, if the content of the accumulator is BC H and CY is 0?
(A) 79H, 1 (B) 78H, 1
(C) 5EH, 0 (D) 5DH, 0

GROUP B
(Short Answer Type Questions)

Answer any *three* questions.

3×5 = 15

2. (a) What are the function of ALE, HOLD and READY?
(b) Discuss the function of following instruction of 8085:
LHLD C020, DCXB. 3+2
3. Explain the need to de-multiplex the bus AD0-AD7. Show how it can be demultiplexed in 8085 microprocessor. 2+3
4. (a) Differentiate between peripheral mapped I/O and memory mapped I/O.
(b) With respect to 8237 explain the DMA operation. 2+3
5. What are interrupts? How many interrupts are there in 8085? What are the mask able and non-mask able interrupt? Discuss SIM instruction. 2+2+1
6. (a) Interface two 2K×8 RAM with 8085 microprocessor by using IC 74138 decoder such that starting address assign to them are 8000H and 9000H respectively. 3+2
(b) What do you meant by interrupt service subroutine (ISS)?

GROUP C
(Long Answer Type Questions)

Answer any *three* questions.

3×15 = 45

7. (a) Draw the timing diagram of op-code fetch machine cycle. 4+4+4+3
(b) What is meant by subroutine? Briefly discuss the sequence of events that takes place while executing CALL instruction.
(c) What is DMA explain burst mode and cycle stealing mode.
(d) How many flag bits are there in 8085 microprocessor? Explain each of them.

8. (a) What is the difference between microprocessor and microcontroller?
(b) Discuss the memory organization of 8051 microcontroller.
(c) Explain interrupts of 8051 controller.
(d) Explain SFR of 8051 microcontroller.
(e) Write an assembly language program to add two 16 bit numbers using the 8051 controller.
9. (a) What are the main function of BIU and EU of 8086 microprocessor?
(b) Describe MIN/MAX mode operations of 8086 microprocessor.
(c) Describe the different addressing modes of 8086 microprocessor.
(d) How is pipelining achieved in 8086 microprocessor?
(e) What is the function of BHE pin in 8086 microprocessor?
- 10.(a) What do you mean by asynchronous and synchronous data transfer scheme? 3+2+6+
(b) What are the different transfer modes of 8237? Explain them in brief.
(c) What do you mean by MODE 0, MODE 1, MODE 2 operation of 8255 microprocessor?
(d) What do you meant by BSR mode of PPI? Write a assembly language program for 8085 microprocessor to periodically turn on and off of two switches by setting 8255 PPI to BSR mode. The duty cycle is 50%.
- 11.(a) Write a assembly language program to pack two unpacked number.
(b) Write a subroutine to convert a Hexadecimal digit (0 to F) into ASCII HEX code.
(c) What is the purpose of DMA controller?
(d) Write short note of 8259 interrupt controller.
(e) What are the various modes of 8053 IC chip.
12. Write notes on any *three* of the following: 5×
(a) Synchronous mode of data transfer
(b) Interrupt service subroutine
(c) Designing I/O port.
(d) Serial mode of operation using 8085 microprocessor.
(e) Generation of square wave using 8253.