MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : EE-504C

MICROPROCESSOR & MICROCONTROLLER

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.

The questions are of equal value.

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternative for *any ten* of the following: 1×10=10

(i) What is the direction of address bus?

(a) Unidirectional into MP

(b) Unidirectional out of MP

(c) Bidirectional

(d) Mixed direction when lines into MP and some other out of MP

(ii) The control signal, 'ALE' is sent by 8085 in order to

(a) inform I/O device that the address is being sent over the AD line.

(b) achieve separation of address from data.

(c) inform memory device that the address is being sent over the A/D line.

(d) inform I/O and memory that the data is being sent over the AD line.

(iii) A memory system has a total of 8 memory chips, each with 12 address lines and 4 data lines. The total size of the memory system is

(a) 6 kbytes

(b) 32 kbytes

(c) 48 kbytes

(d) 64 kbytes

(iv) How many T state is required to execute the instruction MVI M, 32?

(a) 1
(b) 2
(c) 5
(d) 10

(v) If the clock frequency is 5MHz then the execution time of the instruction MVI B, 00H is

(a) 1.8μs
(b) 1.4 μs
(c) 1.4 ms
(d) 0.4 ms

(vi) When SHLD is executed, number of T-states required are

(a) 10
(b) 14
(c) 13
(d) 15

(vii) In an 8085 microprocessor, the contents of Accumulator, after the following instructions a executed will become

XRA A
MVI B F)H
SUB B

(a) 01H
(b) 0FH
(c) F0H
(d) 10 H

(viii) Which of the following load/retrieve methods best describes a microprocessor stack?

(a) FIFO
(b) LILO
(c) Ring buffer
(d) LIFO

(ix) In which of the following parallel I/O methods the microprocessor assumes that the peripheral is always ready for data transfer?

(a) Simple I/O
(b) Strobe I/O
(c) Handshake I/O
(d) DMA controlled I/O

(x) The number of bytes of On-chip ROM contained in 8051 Microcontroller is

(a) 256
(b) 512
(c) 1024
(d) 4K

(xi) The size of Instruction queue in 8086 μP is

(a) 4 bytes (b) 6 bytes

(c) 8 bytes (d) 16 bytes

(xii) Assume Intel 8086 real mode: The offset is 24H. The segment register contains 0B500H. What resulting physical address?

(a) 0B524H (b) 0B5024G

(c) 24B5H (d) 240b5H

Group – B
(Short Answer Type Questions)
Answer *any three* of the following. 5×3=15

2. Write an assembly language program supported by 8085 processor to multiply two 8-bit numbers.
3. Draw the timing diagram of the instruction STA 4000H and explain it.
4. Explain the use of when a subroutine is called stack and stack pointer.
5. What are the functions of status and control flags in 8086 μP?
6. Explain the following instructions of 8085 processor with suitable examples.
   (a) SPHL
   (b) DAA
   (c) XCHG
   (d) RAR
   (e) MOV B, M

Group – C
(Long Answer Type Questions)
Answer *any three* of the following. 15×3=45

7. (a) Draw a diagram to interface a 6K ROM and a 2K RAM consecutively with microprocessor 8085, starting with ROM interfacing at address 8000H.

   (b) Set the interrupt mask so that RST 5.5 is enabled, RST 6.5 is masked and RST 7.5 is enabled.

   (c) Write an assembly language program to check if RST 5.5 is pending. If it is pending, enable RST 5.5 without affecting any other interrupt. 7+4+4=15

8. (a) What do you mean by Mode 0, Mode 1 and Mode 2 operations of 8255 PPI?

(b) Write the control word format for I/O mode in 8255.

(c) In mode 1 operation of 8255 PPI, what are the control signals when ports A & B act as output ? Discuss the control signals. 6+3+

9. (a) Describe the need for I/O ports in a microcomputer system.

(b) Bring out the merits and demerits of I/O mapped and memory mapped I/O.

(c) Explain the execution of the DAD D instruction.

(d) What is the utility of HOLD and HLDA instructions? 5+4+3+

10. (a) With the help of block diagram explain the operation of 8051 microcontroller.

(b) Write an 8051 assembly language program to add two 16-bit nos.

(c) How many register banks are there in the RAM of 8051 microcontroller? Explain their functions. 7+4+4

11. (a) What are the main functions performed by BIU & EU unit of 8086 microprocessor?

(b) What are the differences between minimum mode and maximum mode operations of 8086?

(c) Explain the concept of segmented memory. What are its advantages?

(d) How does the 8086 differentiate between an opcode and data? 5+3+4+3=
