MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

EE-504C

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. $10 \times 1 = 10$

(i) The control signal used to distinguish between an I/O operation and memory operation is

(A) ALE (B) IO/M'
(C) SID (D) SOD

(ii) Whenever PUSH instruction is executed the stack pointer is

(A) Incremented by 1 (B) Incremented by 2
(C) Decremented by 1 (D) Decremented by 2

(iii) The number of T-States required to execute an Opcode fetch operation is

(A) 1 (B) 2
(C) 3 (D) 4

(iv) Which of the following is not a maskable interrupt?

(A) TRAP (B) INTR
(C) RST 7.5 (D) RST 3

(v) LDA 2050_H is a _____ byte(s) instruction

(A) 1 (B) 2
(C) 3 (D) 4

(vi) The number of register pair of 8085 are _____

(A) 1 (B) 2
(C) 3 (D) 4

(vii) The instruction XCHG exchanges the contents of

(A) BC and HL pairs
(B) BC and DE pairs
(C) BC pair and Accumulator
(D) DE and HL pairs

(viii) The number of machine cycles for 'IN' instruction are

(A) 1 (B) 2
(C) 3 (D) 4

(ix) The address bus of 8085 microprocessor is of _____ bits

(A) 5 (B) 8
(C) 12 (D) 16

(x) 8254 is a _____

(A) Interrupt controller (B) Programmable interval timer
(C) Counter (D) USART IC

(xi) DAD instruction is used to

(A) Decimal Adjust Delay (B) Add register pair to H-L registers
(C) Don't care and Add (D) None of these

(xii) The number of flag bits of 8085 microprocessor are _____

(A) 2 (B) 3
(C) 4 (D) 5

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. With a neat timing diagram explain the purpose of the instruction 'STA' for 8085 microprocessor. 5

3. What do you mean by a 'Subroutine'? What is its necessity in case of 8085 microprocessor? 5

4. What are flag bits? Explain the bit configuration of 8085 flag register. 2+3

5. What is a DMA controller? With diagram explain the interfacing of 8237 DMA controller with 8085 microprocessor. 2+3

6. Elaborate the following instructions related to 8085 programming. 5
(i) INTA' (ii) HOLD (iii) READY (iv) SID (v) SOD

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) Explain with diagram the hardware architecture of 8085 microprocessor. 5
(b) What do you mean by memory mapped I/O? How are MEMW' and MEMR' signals generated? 3+2
(c) Design an interfacing circuit using a 3-8 decoder to interface a 2732 (4096×8) EPROM chip. 5

8. (a) What are Vectored and Non-Vectored Interrupts? 5
(b) Write a program to generate a continuous square wave with the period of 500 μs. Assume the system clock period is 325 ns and use bit D_0 to output the square wave. 5
(c) What are Restart instructions? How many types of Restart instructions are there in 8085 microprocessor? 3+2

9. (a) What are 'Tri-State Devices'? What is the function of a 'Tri-State Buffer'? 2+3
(b) What is a 'Counter'? Explain in brief the 'loop-technique' to design a Counter. 2+3
(c) Write a program to count continuously in hexadecimal from FF_H to 00_H in a system with a 0.5 μs clock period. Use register C to set up a one millisecond delay between each count and display the numbers at one of the output ports. 5

10.(a) What are the different addressing modes of 8086 microprocessor? 5
(b) Explain the hardware architecture of 8051 microcontroller with diagram. 5
(c) In how many modes can 8254 operate? Explain in brief. 5

11. Write short notes on any *three* of the following: 3×5
(a) Stack Memory
(b) Assemblers vs. Cross-Assembiers
(c) BSR mode of 8255
(d) Min-Max mode of 8086
(e) 8259A Programmable interrupt controller.