Department of Computer Science.
Islamiah College (Autonomous).

Question Bank

Microprocessor and its Applications

for
III B.Sc.,/B.C.A./ B.Sc., (SW)
Third Year – Fifth Semester

(173 Questions)

Unit	No of Questions
I	39
II	52
III	31
IV	31
V	20
Total Questions	**173**

Unit-I: 8085 MICROPROCESSOR AND ARCHITECTURE

1. Give the difference between a microprocessor and a microcomputer. Draw the block diagram of a microcomputer and explain each block.
2. Write briefly about evolution and applications of microprocessors.
3. What are the steps to fetch an instruction from memory locations?
4. Define (i) Assembler (ii) Interpreter (iii) Compiler
5. Explain the differences among (i) Machine Language (ii) Assembly Language (iii) High Level Language.

6. How memories can be classified? Give examples and distinguish between them.
7. Bring out the differences and advantages among (i) RAM and ROM (ii) SRAM and DRAM.
8. Answer the following:
    - (i) How many memory locations can be accessed with 14 address lines?
    - (ii) How many address lines are required to access two megabytes of memory?
    - (iii) How many memory chips are required to make up 1 KB from 256 x 1 bit memory chips?
    - (iv) What is the starting address of 8 KB memory chip if the last address is FFFFh?
    - (v) What is the last address of 4 KB memory chip if the starting address is 2000h?
9. What are the different types of ROM. Explain in detail?
10. Interface 8Kx8 ROM and 4K x 8 RAM to 8085. Show the memory map.
11. Explain how a 3-8 decoder could be used to interface eight 8K memory chips.
12. Interface four 8Kx8 RAMs and show the memory map.

13. Draw the pin configuration and functional pin diagram of 8085 and explain each pin
14. What is the function of ALE and how does it function?
15. What is an interrupt? Give some real examples. List the hardware interrupts of 8085 with their priority.
16. Explain hardware/software, maskable/non-maskable interrupts.
17. Explain the functions of the two DMA signals of 8085.
18. How the pins of 8085 are grouped? Explain them.
19. Discuss how vector interrupts of 8085 microprocessor are triggered, enabled and masked. How are the vector locations computed ?
20. Name the different control signals of 8085 microprocessor and explain the use of each one.
21. How can you generate MR', MW', lOR' and lOW' control signals in 8085 microprocessor?
22. Draw the architecture of 8085 and explain its various functional blocks.
23. Why SP and PC in 8085 are 16-bits?
24. List few differences between memory locations and registers. What are the merits and demerits of having less or more number of registers in a microprocessor?
25. With the help of a schematic diagram, explain how the bus AD7 – AD0 is demultiplexed?
26. Give the salient features of 8085 microprocessor.
27. What are the flags in ALU of 8085 and state its data conditions.
28. List any 8 features of 8085 microprocessor.

29. Define Fetch cycle, Execute Cycle, Machine Cycle and Instruction Cycle.
30. What are the different machine cycles in 8085?
31. Draw the Opcode Fetch machine cycle of 8085 and discuss.
32. Briefly describe Memory Read and Write machine cycles and show the timing diagrams.
33. Explain the steps and the timing of data flow for the execution of MOV C,A stored in location 2005h.
34. Explain the steps and the timing of data flow for the execution of MVI A,32 stored at 2000h and 2001h.
35. Explain the steps and the timing of data flow for the execution of STA 2065h stored from 2010h.
36. If the clock frequency is 5 MHz, how much time is required to execute an instruction of 18 T-states?

37. Discuss in details about address space partitioning and its types.
38. Describe the comparison of I/O mapped and memory mapped I/O interfacing.
39. In peripheral I/O technique:
    (i) What instructions are used?   (ii) Find number of output ports.   (iii) Specify the control signals

Unit II : PROGRAMMING THE 8085

1. Explain the following instructions of 8085.   DAD   DAA   LDA   LDAX
2. Compare the similarities and differences of CALL and RET instruction with PUSH and POP instructions.
3. Write the instruction length and addressing mode of the following instructions 8085.
    STA 8000   ADI 99   ADD C   LDAX D   CMA
4. What is use of stack memory? List instructions which alters either stack content or stack pointer.
5. What is the value of Acc. after execution of the following segment
    MVI A, 45
    MOV B, A
    STC
    RAR
    XRA B
6. Write an 8085 ALP to generate a time delay of 100ms.
7. Write a subroutine to implement a time delay using a register pair.
8. Define Macro with an example.
9. Write 16-bit register to 16-bit register transfer instructions available in 8085.
10. Explain how the instruction set of Intel 8085 is classified and list the instructions in each group.
11. Write an 8085 assembly program for arranging an array of 8 bit unsigned number in ascending order.
12. Explain the usage of all the arithmetic and logical operations of the 8085 processor with suitable example.
13. Describe the instruction formats and addressing modes of 8085 microprocessor with example.
14. Write a program in 8085 to find the smallest/largest number in a set of 8 numbers.
15. Write an 8085 program with a flowchart to multiply two 8-bit numbers.
16. Write 8085 program for (i) Block copy (ii) Block reverse.
17. Explain interrupt related instructions of 8085.
18. Write an 8085 program to find the number of negative, zero and positive numbers from a block.
19. Explain (i) BCD to Binary (ii) Binary to BCD code conversion techniques with programs.
20. Write at least five different techniques to clear Accumulator. Write 8085 instructions for each technique.
21. What are different ways to transfer the content of one memory location to another memory location? Write 8085 instructions for each.
22. Write an 8085 ALP to perform Division of two 8-bit numbers.
23. Write an 8085 ALP to perform (i) addition (ii) Subtraction of two 16-bit numbers.
24. Write an 8085 program to perform (i) Hex to ASCII (ii) ASCII to Hex code conversion.
25. Show the bit positions of various flags in 8085. What is the use of Aux Carry Flag?
26. Mention the operation performed by 8085 instructions PCHL, XTHL, SPHL, XCHG
27. Which bit will you check to find a number is even or odd? How?
28. Write 8085 instructions to (i) exchange the data of PSW and HL (ii) set two LSBs and reset two MSBs and complement rest of the four bits of the accumulator.
29. Explain the operations of following instructions of 8085 microprocessor :
    (i) PCHL, (ii) XTHL, (iii) DAA, (iv) LHLD 8000H, (v) ADC M,
    (vi) RST 7, (vii) RET, (viii) MVI M, 42H, (ix) STAX B, (x) XRA A
30. Explain the use of RIM and SIM instructions of 8085.
31. Write 8085 program to count the number of 1's in BC register pair.
32. Write 8085 program to (i) add and (ii) subtract two BCD numbers.
33. Calculate total delay of all instructions using 2 MHz clock frequency of the system.
    MVI C, FFH   7
    LOOP: DCR C   4
    JNZ LOOP   10/7

34. Calculate delay of following routine:
    MVI B, 10H
    LOOP2: MVI C, FFH
    LOOP1: DCR C
    JNZ LOOP1
    DCR B
    JNZ LOOP2

35. Explain the following 8085 instructions with example.
      JP   CM   RPE   DI   ORI

36. Write an8085 program to count continuously from FFH to 00H with a delay between each count and display on an output port.

37. What is Program Status Word? List its related instructions with examples.

38. Explain the difference between following 8085 instructions.
      (i) INR and INX   (ii) SUB and CMP
      (iii) DAD and DAA   (iv) LDA and LDAX
      (v) RLC and RAL

39. Write an 8085 program using minimum number of instructions to add the 16 bit no. in BC, DE & HL. Store the 16 bit result in DE pair.

40. How do the instructions of 8085 is classified based on their function and word length? Give examples.

41. What are the signals and instructions available in 8085 for serial I/O communication?

42. If B=49h and A=3Ah, Find the values in registers A, B and Flag after SUB B instruction.

43. Write an 8085 program with flow chart to add all positive numbers out of ten numbers. Discard all negative numbers. Store result and carry.

44. Write an 8085 program to count number of 1s and 0s in B register and store number of 1s in H register andnumber of 0s in L register.

45. Write an8085 program to compare two string of ASCII characters to see if they are same. The length of the string is at 90XXH; one string starts from AOXXH and the other from BOXXH. If the two strings match, clear the memory location BOXXH otherwise set memory location BOXXH to FF H.

46. What, is the difference between MACROS and subroutine? Explain with example.

47. Suppose [AX] = 85H and [BX] = 64H, [SP] = 2000H. What will be the value of AX, BX and SP after the following instructions are executed?   (i) PUSH AX (ii) POP BX

48. Ten numbers are stored from location 1000 onwards. Write an 8085 program to find the average of these. Draw the flowchart also.

49. Write an 8085 program to store the status of flags S,Z,AC,P and Cy as 00h(FFh) if they are reset(set) in five memory locations from 1000h.

50. Ten numbers are stored from location 1000 onwards. Write an 8085 program to count the number of odd numbers with flow chart.

51. If SP=2000h, BC=1234h, HL=5678h, Show the Stack and SP contents after executing
    PUSH H
    POP D
    PUSH B

52. What are the machine control instructions of 8085? Give example for each.

Unit-III: 8086 MICROPROCESSOR AND ARCHITECTURE

1. State the functions for the following pins of 8086 : NMI, BHE', TEST', DEN'
2. Explain the following pins of 8086: LOCK', BHE'/S7, DT/R'
3. Explain with example how an effective address is translated to physical address for code and data access.

4. Draw and explain the minimum mode configuration of 8086.
5. Compare minimum and maximum mode. Explain the maximum mode pin functions.
6. Bring out the differences between minimum mode and maximum mode operation of 8086.
7. Draw the complete schematic of 8086 working in the maximum mode configuration. Explain the function and need for each support component.
8. How 8086 selects 8-bit or 16-bit data from odd or even memory banks?
9. Explain with an example why and how a 20 bit address is generated in 8086?

10. Explain how queuing speeds up the processing of 8086 operations.
11. Explain the concept of pipelining in 8086. Discuss its advantages and disadvantages.
12. What are the roles of each element in BIU of 8086? Explain with a neat diagram. How is the 20-bit physical address for memory segment generated? Explain with an example.
13. Sketch the internal hardware architecture of Intel 8086 and explain each block.
14. What are the different status that are given out on the bus S2', S1' and S0' in maximum mode of 8086. How different control signals are generated from this bus? Explain briefly each of these control signals.
15. Draw the 8086 pin diagram and explain the function of all the pins.
16. Explain the internal architecture and the use of various flags in 8086.
17. Discuss the various addressing modes in 8086 with suitable instruction examples.
18. Explain the difference between near and far procedure of 8086.

19. With proper reasons justify the need for multiplexing address and data lines in 8085/8086. Explain with a figure, generation of control signals IORD', IOWR', MEMR' and MEMW'.

20. What are maskable and non-maskable interrupts? Give examples. How will you mask an interrupt in 8086?

21. Compare 8085 and 8086 address and data buses.
22. Mention any ten major features introduced in 8086 as compared to 8085.

23. Explain the flag register of 8086 with instructions affecting the flags.
24. List and explain pointer and index registers of 8086.
25. Explain the register organization of 8086 in detail.
26. List all the 16 bit general purpose registers of 8086 microprocessor. Mention special use of each, if any.
27. What is the role of SI, DI registers and DF bit?
28. What is meant by segmented memory? What are the different segments of memory with which 8086 can work'? List the advantages of segmented memory.
29. Distinguish between OV (overflow) flag and CF (carry) flag.

30. Explain briefly why and when wait states are required?
31. What are the advantages of DMA controller data transfer over interrupt driven or program controller data transfer.

Unit-IV: PROGRAMMING THE 8086

1. Explain the string manipulating instructions of 8086.
2. What are Assembler directives? Given example for each.
3. Write a program in 8086 to sort ten bytes in ascending/descending order.
4. Write a program in 8086 to convert string of characters from uppercase to lowercase with appropriate comments.
5. Explain the following 8086 instructions: XLAT, AAS, LOCK, TEST
6. Describe the operation carried out when the following instructions are executed by 8086.
MOV [SI],AX	MOV [BX],CX	XLAT	DAS
MUL BL	DIV BX	ROL AL,CL	SHL AL,CL
7. How do you classify the instructions of 8086? Give examples for each.
8. What is the minimum and maximum length of an instruction in 8085 and in 8086?
9. With illustrative examples explain the arithmetic instructions available for multiplication and division in 8086.
10. Explain the 8086 instructions: JMP, AAA,JCXZ, STD, LOOPE,WAIT
11. Explain the following string instructions: MOVSB,STOSW,SCASB,CMPS
12. Explain the usage of all the arithmetic instructions of the 8086 processor.
13. In 8086,
    If AX=1100h BX=0ABCh, Find AX and BX after executing ADD AX,BX
    If CL=04h BX=1234h, CF=0, Find BX and CF after executing RCR BX,CL.
    If CS=ABCDh IP=1234h, Find the effective address.
14. What physical address is represented by 4370 : 561E H
15. Write an 8086 ALP to (i) display a string (ii) to reverse a string.
16. Write the 8086 code segment for adding/subtracting two 16 bit numbers.
17. List and explain any 4 flag manipulation instruction of 8086 microprocessor.
18. How many times LOOP1 will be executed in the following program? What will be the contents of BL after the execution?
    ```
    MOV BL, 00H
    MOV CL, 05H
    LOOP1: ADD BL, 02H
    DEC CL
    JNZ LOOP1
    ```
19. Give five examples for each of the following 8086 instructions.
    (i)String instructions   (ii) Process control instructions
    (iii) Bit Manipulation instructions   (iv) Program execution transfer instructions.
20. Write DOS function INT numbers to achieve the following:
    Read key with an echo   Read key without an echo   Read an entire line
    To display a string of characters. To rename a file.
21. If CS=CBA0h, CS=4000H, SI=4567H and IP=2055h, what is the address of the instruction that is fetched? What is the address of data?
22. Explain the operation of the DIV instruction. What is the difference between DIV and IDIV?
23. Explain the different types of jump and call instructions of 8086.
24. Give the state of all status flag bits in 8086 after addition of 30A2h with F01Ch.
25. Differentiate between the following pair of instructions
    AND and TEST   NOT and NEG   MOV and MOVSB   LAHF and SAHF
26. Write an 8086 program to generate and add the first 10 even numbers and save the numbers and result in memory location Num and Sum.
27. Write an 8086 program to generate first 10 Fibonacci numbers.
28. Write an 8086 program to count number of vowels in a given string.
29. Write an 8086 program to add 5, 16-bit unsigned binary numbers and save the sum and average in memory locations.

30. Explain with examples how the following instructions are executed. Make suitable assumptions for the examples. LEA CX,[5648H]   DAA   MUL CX   SHR BX,CL (CL=2)

31. Explain execution of the following instructions. What will be content of destination register? Also mention effect on flags after execution of

DAA	if AL=8Ah CF=0, AF=0
AND AX,OFFOh	if AX=5678 , CF=0
DIV BH	if AX=0050, BX=1000h
ROR AX,CX	if AX=0420h , CX=0002h
PUSH CX	if CX=4020h, SP=00FFFh.

Unit-V: INTERFACING PERIPHERALS

1. What is the use of mode 2 in 8255A PPI?
2. Write the control word format of Programmable Peripheral Interface 8255.
3. With a neat diagram explain the how a seven segment display can be interfaced with PPI 8255.
4. Discuss about BSR (bit set reset) mode of operation of 8255 programmable peripheral chip.
5. Draw the internal architecture of 8255 programmable peripheral interface chip in a block diagram and explain.

6. Give the architecture of 8253 with a neat diagram and control word format. Discuss its different modes of operation.
7. Draw a block diagram of 8254 timer. Explain mode 0 and mode 3 with the help of timing diagram.
8. Draw and explain the block diagram of 8254 software programmable timer. Explain how the GATE input controls its operation in any two modes of operation.

9. How the signals of 8237 are classified?
10. Discuss in detail about DMA controller and explain its operations.
11. What is DMA? Which hardware pins are used for DMA control? Draw and explain the architecture of 8237 DMA controller.

12. Discuss, with suitable examples, various priority modes of programmable interrupt controller 8259.
13. With suitable diagram, explain how the Priority Interrupt controller 8259 can be interfaced with 8086 in cascade mode.
14. Explain with block diagram, the working of 8259 and also explain ICW's and OCW's.

15. Compare Asynchronous Serial Communication with Synchronous Communication. Draw the command instruction format of 8251 and explain it.
16. Illustrate and explain the transmitter and receiver section of 8251.
17. Write short notes on   (i) USART   (ii) DMA controllers.

18. Sketch the block diagram to interface 8085 microprocessor with A/D convertor and D/A convertor.

19. List the major components of the 8279 keyboard/display interface and explain their functions.
20. Design a suitable interface for a 4x4 Hex keyboard and 4 seven-segment LED.