

Question Bank

Subject: Microprocessors and Microcontrollers

Subject Code: BTEC-402-18

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B. Tech (Electronic & Communication Engineering)

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Unit 1: Microprocessor 8085

Topic: History of microprocessors; microprocessor 8085 Architecture, Pin configuration; Memory Interfacing; Microprocessor programming model; 8085 instructions; addressing modes; programming techniques, interrupts; Counters and time delays; stack and subroutines.

Marks: 2 each

1. List the components of a computer.
2. Explain the function of each component of a computer.
3. What is a Microprocessor? What is the difference between a Microprocessor & CPU?
4. Define bit, byte, word, double word, quad word and instruction
5. What determines that Microprocessor is an 8, 16 or 32 bit?
6. Explain the difference between the machine language and the assembly language of the 8085 microprocessor.
7. What is an assembler?
8. What are low and high level languages?
9. What are the advantages of an assembly language in comparison with high level languages?
10. List the four operations commonly performed by the MPU.
11. Specify the four control signals commonly used by the 8085 MPU.
12. Specify the function of the address bus and the direction of the information flow on the address bus.
13. Why is the data bus bidirectional?
14. What is a bus?
15. How many memory locations can be addressed by a microprocessor with 14 address lines?
16. How many address lines are necessary to address two megabytes (2048K) of memory?
17. Why is the data bus bidirectional?
18. Specify the control signal and the direction of the data flow on the data bus in a memory-write operation.
19. What is the function of the accumulator?
20. What is a flag?
21. Why are the program counter and the stack pointer 16-bit registers?
22. What is the function of the WR signal on the memory chip?
23. Specify the number of registers and memory cells in a 128 x 4 memory chip.
24. What is the memory word size required in an 8085 system?
25. While executing a program, when the 8085 MPU completes the fetching of the machine code located at the memory address 2057H, what is the content of the program counter?

26. What is the role of clock in Microprocessor?
27. Explain the stack with PUSH and POP instruction.
28. Explain the role of clock in a microprocessor.
29. Calculate the count to obtain a 100s loop delay and express the value in Hex.
30. What are the advantages of an assembly language in comparison with high level language?
31. If the 8085 adds fetch the machine code located at the memory location 205FH. Specify the content of program counter.
32. Explain the control and status signal of 8085.
33. What is the function of RST and ALE signals?
34. Enlist some salient features of 8085.
35. List the different flags of 8085 microprocessor.
36. How many ways an 8051 can be interrupted?
37. Discuss the difference between ADD and ADDC instruction.
38. If the frequency of the crystal connected to 8085 is 6MHz, calculate the time to fetch and execute NOP instruction.

Marks: 5 each

39. What is the difference between INR & INX instructions?
40. List all the interrupt signals of 8085 microprocessor.
41. Write short note on evolution of microprocessors.
42. Explain the functions of the ALE and IO/M signals of the 8085 microprocessor.
43. List the sequence of events that occurs when the 8085 MPU reads from memory.
44. If the 8085 adds 87H and 79H, specify the contents of the accumulator and the status of the S, Z, and CY flags.
45. If the clock frequency is 5 MHz, how much time is required to execute an instruction of 18 T-states?
46. Discuss the programming model of 8085 μ P with the help of suitable diagram.
47. Draw and explain the timing diagram for opcode fetch operation
48. Discuss various types of addressing modes of 8085.
49. Explain why the number of output ports in the peripheral-mapped I/O is restricted to 256 ports.
50. In the peripheral-mapped I/O, can an input port and an output port have the same port address? Explain.
51. What are the control signals necessary in the memory-mapped I/O?
52. List the four categories of 8085 instructions that manipulate data.
53. Define opcode and operand, and specify the opcode and the operand in the instruction MOV H, L.
54. Write logical steps to add the following two Hex numbers. Both the numbers should be saved for future use. Save the sum in the accumulator. Numbers:

A2H and 18H.

55. Write instructions to store the contents of register B (32 H) in the memory location 8085 H using the opcodes: MOV, STAX and STA.

56. Explain in detail about arithmetic and program control instructions of 8085.

57. Explain the addressing mode of 8085 with suitable examples.

58. Data byte 28H is stored in register B and data byte 97H is stored in the accumulator. Show the contents of registers B, C and accumulator after the execution of the following two instructions considering 8085 microprocessor.

MOV A, B

MOV C, A

59. Draw the interrupt structure of 8085 and discuss it in detail.

60. Draw the block diagram showing the important blocks of 8085 architectures.

61. Explain with all necessary diagram the internal structure of DMA controller\

62. Answer briefly:

What is the significance of SWAP instruction?

What is the use of SMOD bit in 8051?

What is the use of DPTR?

63. Differentiate between memory mapped I/O and peripheral mapped I/O in case of 8085 microprocessor.

64. Draw and explain the timing diagram of memory read cycle.

65. Classify and explain different types of 8085 instructions with examples.

66. Give two examples of branch instructions in 8085.

67. What is meant by polling and interrupt?

68. Define instruction cycle, machine cycle and T-state for 8085.

69. What is the difference between the shift and rotate instructions?

Marks: 10 each

70.a) Specify the contents of the registers and the flag status as the following instructions are executed.

i. MVI A, 00H

ii. MVI B, F8H

iii. MOV C, A

iv. MOV D, B

v. HLT

(b) Write instructions to load the hexadecimal number 65H in register C and 92H

in the accumulator A. Display the number 65H at PORT0 and 92H at PORT1.

71. Draw and explain the block diagram of a microprocessor 8085.
72. Write an 8085 assembly language program using minimum number of instructions to add the 16 bit no. in BC, DE & HL. Store the 16 bit result in DE pair.
73. With suitable examples, explain 8085 instruction set in detail.
74. (a) Explain in detail the following instructions:-
(i) ADC (ii) LHL (iii) RLC (iv) DI
(b) Define & explain the term addressing modes.
75. (a) Why the lower order address bus is multiplexed with data bus? How they will be de-multiplexed? (b) Differentiate between maskable and non-maskable interrupts.
76. Explain the requirement of a program counter, stack pointer and status flags in the architecture of 8085 microprocessor.
77. Write an assembly language program to run stepper motor at different speed.

Unit 2:

Topic: Microcontroller 8051 – Building Blocks:

Microprocessor vs microcontroller; RISC vs CISC architectures; Microcontroller 8051: architecture, pin configuration, flag-bits and PSW register, input-output ports, register banks and stack; Semiconductor memories: ROM, SRAM, DRAM, virtual memory, cache memory; memory organization.

Marks 2 each

- Q:1 What is 8051 Microcontroller?
- Q:2 What is the Difference between Microprocessor and Microcontroller?
- Q:3 What are different registers in Microcontroller 8051?
- Q:4 What is Stack Pointer in 8051 Microcontroller?
- Q:5. List some features of 8051 Microcontroller.
- Q:6 Write about PSW of 8051 Microcontroller.
- Q:7 What is Address Bus, Data Bus and Control Bus in Microprocessor 8051 ?
- Q:8 What is a PIC microcontroller?
- Q:9 What is the use of PIC microcontroller?
- Q:10 What is ARM microcontroller?
- Q:11 Where ARM chips are used?
- Q:12 What is a data pointer in 8051 Microcontrollers?
- Q:13 What is embedded Microcontroller?
- Q:14 What are the functions of an accumulator in microprocessor and microcontroller?

Q:15 When is it required to use the control signals WR and RD?

Q:16 What is the function of RST and TDX signals?

Q:17 Enlist some salient features of 8051.

Q:18 Give specifications of ARM processors.

Q:19 What are the data types and assembler directives of 8051?

Q:20 What do you mean by virtual memory?

Q:21 What do you mean by cache memory?

Q:22 What is the function of ALE pin in Microcontroller 8051?

Marks 5 each questions

Q:23 Differentiate RISC and CISC Architecture?

Q:24 List some 8051 Microcontroller applications in embedded systems?

Q:25 What are applications of 8051 microcontrollers?

Q:26 List major components of microcontroller?

Q:27 What are different types of Microcontrollers?

Q:28 Discuss the various registers of 8051 microcontroller.

Q:29 State the function of RS1 and RS0 bits in the flag register of intel 8051 microcontroller.

Q:30 What are the two conditions under which program of codes are fetched from external, rather than internal memory?

Q:31 What is bit addressability feature? List various bit addressable registers of 8051.

Q:32 Write a note on ROM and RAM memories.

Q:33 Write about SRAM and DRAM memories.

Marks 8 each question

Q:34 Explain architecture of 8051 Microcontroller?

Q:35 Explain the functional pin diagram of 8051 Microcontroller.

Q: 36 Differentiate RISC and CISC architectures in detail.

Unit 3:

Microcontroller 8051 – Programming:

Assembly language programming; data types and directives; jump loop and call instructions; I/O port programming; Addressing modes and accessing memory using various addressing modes; Arithmetic instructions and programs; logic instructions and programs; single bit instructions and programming, 8051 interrupts; timer/counter programming in the 8051.

Marks 2 each

- Q:37 How many ways an 8051 can be interrupted?
- Q:38 Explain the difference between MOVX and MOV instruction.
- Q:39 How RETI and RET instructions differ?
- Q:40 List the various interrupts of 8051 microcontroller.
- Q:41 List some 8051 microcontroller interrupts?
- Q:42 Which interrupt has highest priority in Microcontroller ?
- Q:43 Write an assembly language program to add two numbers?
- Q:44 Define DPTR.
- Q:45 What is the purpose of PSW register?
- Q:46 Define clock cycle.
- Q:47 Define machine cycle.
- Q:48 Mention two assembler directives?
- Q:49 Explain the bit addresses for I/O of 8051.
- Q:50 Explain TMOD and TCON registers

Marks 5 each

- Q:51 What are the different types of instructions of 8051 Microcontroller?
- Q:52 Discuss DJNZ instructions of 8051 microcontroller.
- Q:53 Write a sequence of instructions to set the AC flag.
- Q:54 Write an assembly language program to multiple two numbers?
- Q:55 Discuss the function of these instructions :

CJNE
ACALL
LCALL
MOVX

Q:56 What is an Interrupt service routine in Microcontroller?

Q:57 What is an interrupt? List various types of interrupts available in 8051 Microcontroller?

Q:58 List various interrupts of 8051 Microcontroller?

Q:59 Explain the interrupt structure of 8051 microcontroller. Also explain how interrupts are prioritized.

Q:60 Discuss different conditional jump instructions.

Q:61 How can you perform multiplication using 8051 microcontroller?

Marks 10 Each

Q:62 What is the significance of addressing modes? Discuss various addressing modes for 8051 microcontroller with suitable examples for each mode.

Q:63 Explain the Architecture of 8051. What are the blocks in Microcontroller.

Q:64 Explain the Pin Diagram of 8051.

Q:65 Explain the Instruction set with examples.

Q:66 Explain the block diagram of 8051 Microcontroller.

Unit 4:

Microcontroller 8051 - Interfacing

Parallel and serial ADC& DAC interfacing; LCD interfacing, Keyboard interfacing; sensor interfacing; interfacing with external memory; matrix keypad; stepper motor interfacing; DC motor interfacing and PWM.

Marks 2 Each

Q:67 Discuss the RS 232 interface.

Q:68 What do you mean by parallel and serial communication?

Q:69 Define peripherals.

Q:70 What is interfacing?

Q:71 What is the use of 8255?

Q:72 Mention the ports placed in group a and group b of 8255.

Q:73 Specify some important LCD modules.

Q:74 What is the use of stepper motor?

Marks 5 Each

Q:75 How LCD can be interfaced with Microcontroller 8051?

Q:76 How Keyboard can be interfaced with Microcontroller 8051? Explain with the help of suitable diagrams.

Q:77 Explain about the serial port programming.

Q:78 Draw the interfacing diagram of RS232 with 8051 and explain its operation.

Marks 10 Each

Q:79 Show the connections for Interfacing of DAC with 8051 and write a program to demonstrate its working.

Q:80 Explain the interfacing of ADC with Microcontroller 8051.

Q:81 How a sensor can be interfaced with Microcontroller 8051?