Chapter 11
Microcontroller

One Mark questions (Knowledge)

1. What is microcontroller?
2. What is microprocessor?
3. Mention the size of RAM in 8051.
4. Mention the size of the on chip ROM in 8051.
5. What is the width of data bus in 8051?
6. What is Accumulator?
7. What is 'B' register?
8. What is data pointer (DTPR)?
9. What is stack pointer?
10. What is the function of the Program Counter?
11. Name any one 16 bit register of 8051.
12. What is the function of the Stack Pointer?
13. Expand PSEN in 8051 microcontroller.
14. Expand SFR.
15. Expand PSW.
16. What is an interrupt?
17. What is Addressing mode in 8051?
18. Expand EEPROM.
19. Expand SRAM.
20. Expand RAM.
21. What is machine language?
22. Mention one example for data transfer instructions.
23. Mention one example for arithmetic instructions.
24. Mention one example for logical instructions.
25. Mention one example for branch instructions.
26. What is the use of MOV X instruction?
27. What is assembler?
28. What is debugger?
29. What is the purpose of NOP instruction?
30. What is PIC microcontroller?
31. Expand PIC.

One Mark questions (understanding)

1. Why 8051 is called 8 bit microcontroller?
2. How many serial ports are there in 8051?
3. How many timers are there in 8051?
4. How many interrupt sources are there in 8051?
5. Which register holds the address of the next instruction to be executed?
6. How many bits of binary data can a register A hold?
7. How many bits of binary data can a register R hold temporarily?

8. How many bits of address can register PC hold?
9. How much of total external data memory can be interfaced to the 8051?
10. How many I/O ports are there in 8051?
11. How many interrupts are there in 8051?
12. Which is the only register without internal on-chip RAM address in 8051?
13. Which memory is referred as data memory?
14. Which memory is referred as code memory or program memory?
15. Why oscillator circuit is used?
16. Which addressing mode can be used with PUSH and POP instructions?
17. Which is the addressing mode for the instruction MOV A, #50H?
18. Which is the addressing mode for the instruction MOV A, 50H?
19. Which is the addressing mode for the instruction MOV A, @R0?
20. What does the following instruction do? "MOV A, 0F0H"
21. What does the following instruction do? "MOV A, 1FH".
22. Which is the addressing mode for the instruction MOVC A, @A+DPTR?
23. Which symbol is used in the instruction while using register indirect addressing mode?
24. Which symbol is used in the instruction while using immediate addressing mode?
25. Why ROM is non-volatile?
26. Why RAM is volatile?
27. Why is the instruction MOV R1,, R0 invalid?
28. Which conditional jump instruction checks the contents of accumulator for zero?
29. Which operation is performed by stack pointer during its incremental phase?
30. Which operation is performed by stack pointer during its decremental phase?

One Mark questions (skill)

1. Register R0 contains 50H and Accumulator contains 01H. What will be the content of A after executing the instruction MOV A, R0?

Two Mark questions (knowledge)

1. Mention the features of 8051 microcontroller?
2. What is an addressing mode? Why is it necessary?
3. Write any two examples for direct addressing instructions?
4. What is register addressing mode? Mention one example.
5. What is direct addressing mode? Mention one example.
6. What is indirect addressing mode? Mention one example
7. What is immediate addressing mode? Mention one example.
8. What are the fields of an assembly language instruction?
9. What are data transfer instructions? Give one example.
10. What are arithmetic instructions? Give one example.
11. What are logical instructions? Give one example.
12. What are branch instructions? Give one example.
13. Write the instructions to load value FFH internal RAM address 50H using direct and indirect addressing modes.
14. What is the difference between MOVC and MOVX instructions of 8051?

15. What are single bit instructions? Give example.
16. Mention two assembler directives?
17. What are the instructions used to access external RAM?
18. What is meant by mnemonic ACALL and LCALL?
19. What is the advantage of short jump over long jump instruction?
20. Define the terms op-code and operand.
21. Mention the main features of PIC microcontroller.

Two Mark questions (understanding)

1. Mention two differences between microprocessor and microcontroller.
2. Differentiate between program memory and data memory.
3. Which general purpose registers are used for multiplication and division operations in 8051?
4. Differentiate between LCALL and ACALL instructions of 8051.
5. Distinguish between PIC and Microcontroller.

Two Mark questions (skill)

1. What will be the contents of A after execution of following instructions.
   i. MOV A , #54H
   ii. CPL,A
2. Draw the internal RAM memory organization of 8051.

Three Mark questions (knowledge)

1. List the features of 8051 microcontroller.
2. List the applications of microcontroller.
3. What is the function of stack pointer? How stack works?
4. What is meant by Addressing mode in 8051? Name any two addressing modes.
5. Mention the addressing modes of 8051 microcontroller.
6. What are the fields of assembly language instruction? Explain with one example.
7. Write the instructions to add numbers 10H and 20H and store the result in to internal RAM address 30H.
8. What is meant by unconditional jump? List the unconditional jump instructions of 8051.
9. What is meant by conditional jump? List the conditional jump instructions of 8051.

Three Mark questions (understanding)

1. Explain the functions of PUSH and POP with example.
2. Explain immediate addressing mode with example.
3. Explain direct addressing mode with example.
4. Explain register addressing mode with example.
5. Explain register indirect addressing mode with examples.
6. Classify the instruction set of 8051 with respect to their functions.
7. How many bytes are required by SJMP, AJMP and LJMP instructions?

Five Mark questions (knowledge)

1. What is meant by addressing mode? How many addressing modes are there in 8051? Mention one example for each.

Five Mark questions (understanding)

1. Compare microprocessor with microcontroller.
2. With a flow chart explain the steps used in creating assembly language program in 8051.

Five Mark questions (skill)

1. Draw the general block diagram of microcontroller.
2. Draw the block diagram of microcontroller 8051.
3. Draw the pin diagram of 8051 IC.

Programs:

1. Write a program to add two numbers 07H and 82H and store the result at memory location 40H.
2. Write a program to multiply two 8 bit numbers 06H and 09H at memory locations 40H and 41H respectively. Store the result at memory locations 42H (Lower Byte) and 43H (Higher Byte)
3. Write a program to divide two 8 bit numbers stored at memory locations 40H and 41H respectively. Store the quotient at memory locations 42H and remainder at memory location 43H
4. Write a program to add the values of locations 40H and 41H and store the result in locations 50H and 51H.
5. Write the instructions to move value 34H into register A and value 3FH into register B, then add them together.
6. Write the instructions to add the values 16H and CDH, place the result in register R_2.
7. Write a program to add 25H and 34H and put the result in register A.
8. Write a program to add two 8-bit numbers and store it in R6. The numbers are 01EH and 01CH.
9. Subtract 21H from 30H and write the program and solve.
10. Write instructions to subtract 10H from 30H using immediate and register addressing.
11. Write a program to divide 95 by 10.
12. Write a program to multiply two 8 bit numbers stored at internal RAM address 10H and 11H. Store the result at address 12H (MSB) and 13H (LSB).