

CBCS SCHEME



15EC563

Fifth Semester B.E. Degree Examination, June/July 2019 8051 Microcontroller

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. i) Differentiate between microprocessor and microcontroller. (04 Marks)
ii) What is an Embedded Microcontroller and What is an Embedded System? (02 Marks)
b. Sketch the neat diagram of 8051 PIN-OUT and explain its pins:
ALE, RST, $\overline{\text{PSEN}}$, $\overline{\text{EA}}$, $\overline{\text{RD}}$, $\overline{\text{WR}}$, TXD and RXD (10 Marks)

OR

- 2 a. Explain the organization of internal RAM memory of 8051. (08 Marks)
b. Show the interfacing connections of external EPROM and RAM to the 8051 Microcontroller and explain how 8051 access them. (08 Marks)

Module-2

- 3 a. Explain the four data addressing modes of an 8051 microcontroller with an example for each. (06 Marks)
b. Explain the following instructions:
i) XCHD A, @R₀
ii) SWAP A
iii) MOVC A, @A+DPTR
iv) CJNE A, 10H LOOP
v) DA A (10 Marks)

OR

- 4 a. Explain Jump Instructions of 8051 with their ranges of Jump. (06 Marks)
b. Write an ALP to find the value of an expression $S = [(M/N) + 30H]$ values of M and N are stored in the internal memory locations 22H and 23H respectively. Store the result in 24H. (06 Marks)
c. Explain the Logical OR instruction with all possible addressing modes. (04 Marks)

Module-3

- 5 a. Write an ALP to find the Largest number in an array of 10 bytes, stored in the internal memory block starting with 20 H. Store the result at 60 H. (08 Marks)
b. Write an ALP to find sum of ten 8-bit numbers, stored in the internal memory block starting with 30H. Store the 16 bit sum at locations 40H and 41H. (08 Marks)

OR

- 6 a. Explain the operation of PUSH and POP and LCALL, ACALL and RET instructions of 8051 giving all the steps involved. (08 Marks)
b. Write an ALP to transfer 10 bytes of data from location starting with 8030H to location starting with 8041H without overlap. (08 Marks)

Module-4

- 7 a. Explain TMOD register format of 8051. (04 Marks)
b. Explain MODE-1 programming of Timers of 8051. (04 Marks)
c. Write an ALP to generate square wave a frequency of 100 kHz on Pin P1.1. Assume crystal frequency, XTAL = 12 MHz. Use Timer1 in Mode 1. (08 Marks)

OR

- 8 a. Explain the principle of operation of serial port of 8051 to transmit and receive a character serially. (06 Marks)
b. Explain the following RS232 Handshaking signals: RTS and DTR. (02 Marks)
c. Write an 8051 C program to transfer the message 'GOD' serially at 9600 baud rate with XTAL = 11.0592 MHz. (08 Marks)

Module-5

- 9 a. Interface 8051 to a stepper motor and write an ALP to rotate it 64° in clockwise direction. Step Angle = 2°. (08 Marks)
b. Explain the different interrupts of 8051 (both external and internal). How to enabled mask them? (08 Marks)

OR

- 10 a. Write a 'C' program using interrupts to do following:
i) Receive data serially and send it to P₀.
ii) Read Port P1, transmit data serially and give a copy to P₂.
iii) Make timer 0, to generate a square wave of 5 kHz frequency on P_{0.1}.
Assume XTAL = 11.0592 MHz with baud rate at 4800. (08 Marks)
b. Write a C program to send 'M', 'D', 'E' to the LCD using delays. (08 Marks)

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