

CBCS SCHEME

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21EE43

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Microcontroller

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Draw and explain the internal architecture of 8051 Microcontroller. (10 Marks)
b. Distinguish between microprocessor and microcontroller. (04 Marks)
c. Explain the operation performed by the following instruction:
(i) SWAP & XCHG
(ii) MOVX & MOVC (06 Marks)

OR

- 2 a. Explain with an example the various addressing model of 8051. (10 Marks)
b. With a neat sketch interface 8051 to external RAM and ROM and examine how 8051 can access them. (10 Marks)

Module-2

- 3 a. Define assembler directive. With an example, explain all assembler directive supported by 8051 Microcontroller. (10 Marks)
b. Write an 8051 ALP program to multiply 25 by 10 using repeated addition. (05 Marks)
c. Use ACALL and RET instruction to write an 8051 ALP to count from 0FFH to 00H and show the output in PORT-1. (05 Marks)

OR

- 4 a. Write an 8051 ALP to toggle all the bits of PORT-1 between the values 55H and AAH. (06 Marks)
b. Write an ALP to count number of zeros and ones in a byte. (06 Marks)
c. Write a program to exchange the lower nibble of data present in external memory 6000H and 6001H. (08 Marks)

Module-3

- 5 a. Write an 8051 ALP to generate square wave with $T_{ON} = 3$ msec and $T_{OFF} = 7$ msec on all pins of PORT-0. System clock is 22 MHz. Use Time 0 in Mode-1. (10 Marks)
b. Explain the bit patterns of TCON. (05 Marks)
c. Explain different data types supported by 8051 C Microcontroller. (05 Marks)

OR

- 6 a. Explain Mode-2 programming characteristics and describe the different steps to program in Mode-2. (08 Marks)
b. Write an 8051 C program to toggle only bit P1.5 continuously for every 50 msec. Apply Timer 0, 16-bit mode in TMOD to generate Time delay. $f = 11.0592$ MHz. (06 Marks)
c. Apply the concept of data serialization to write C program to bring a byte of data serially one bit at a Time via P1.0. MSB should come first. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Discuss in brief the bit pattern of IP register. (06 Marks)
b. Write an 8051 C program to transfer the message "VTU" serially at 9600 band, 8 bit data, 1 stop bit. Do this continuously. (08 Marks)
c. Write ALP program in 8051 to receive bytes of data serially and put them in P1. Set band rate at 4800, 8 bit data and one stop bit. (06 Marks)

OR

- 8 a. Compare polling versus interrupt. (06 Marks)
b. Write an 8051 ALP to transfer "YES" serially at 9600 band, 8 bit data, 1 stop bit. Do this continuously. (08 Marks)
c. Explain the bit status of SCON Register and specify the purpose of MAX-232 while interfacing. (06 Marks)

Module-5

- 9 a. Show the interfacing circuit and functional pins of LCD. Write an ALP program to send the command "shift cursor right" and cursor at line1, POS.4. (10 Marks)
b. With a neat sketch, explain the function of each block of 8255. (10 Marks)

OR

- 10 a. A switch is connected to pin P2.7. Write a C program to monitor the status of 'SW' and perform the following:
(i) If SW = 0, stepper motor moves clockwise. (10 Marks)
(ii) If SW = 1, stepper motor moves counter clockwise. (10 Marks)
b. With an interfacing diagram, explain in detail serial ADC MAX1112 ADC Interfacing to 8051. (10 Marks)
