



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)

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 baud, 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 baud 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 baud, 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.
(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)
