



CBCS SCHEME

21EE43

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Fourth Semester B.E. Degree Examination, June/July 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. List the features of 8051 microcontroller. (06 Marks)
- b. What are special functions registers? Name any 6 SFRS with their byte address. (06 Marks)
- c. Explain the bit pattern of PSW and show the status of the CY, AC and parity after the addition of 88H and 93H. (08 Marks)

OR

- 2 a. Show the design of interfacing 8K bytes program ROM and 16 kbytes of Data ROM to 8031/51 based system. (08 Marks)
- b. Identify whether the following instructions are valid or not. If they are not valid, what corrections are needed to make them valid? After correcting the instructions mention the type of addressing modes supported by each one:
 - i) POP A
 - ii) MOV #25, A
 - iii) MOV @R1, B
 - iv) MOVC A, @A + DPTR
- c. List the differences between 8051 and 8052 microcontroller. (06 Marks)

Module-2

- 3 a. Write an ALP to get a byte of hex data from P₁ and convert it to decimal. Save the digits in R₇, R₆ and R₅, where the LSB is in R₇. (06 Marks)
- b. Explain the different range of Jump and Call instructions. (10 Marks)
- c. Explain when the overflow flag is raised? Indicate the status of the OV flag for the following code.
MOV A, #-128
MOV A, #-2
ADD A, B (04 Marks)

OR

- 4 a. What is check sum byte? Find the checksum byte for the following hexadecimal data 25H, 62H, 3FH and 52H. Perform checksum operation to ensure data integrity. If the second byte is changes to 22H show how checksum byte detects error. (08 Marks)
- b. What are assembler directive? Explain any four of them with an example. (06 Marks)
- c. Find the content of A reg after each of the following is executed.
 - i) CLR C
MOV A, #4DH
SWAP A
RRC A
RRC A
RRC A
 - ii) SETB C
MOV A, #39H
SWAP A
RL A
RL A

(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-3

- 5 a. Write an 8051 C program to monitor bit P1.5. If it is high, send 55H to P0, otherwise send AAH to P2. (06 Marks)
- b. Write an 8051 C program to convert packed BCD 0x29 to ASCII and display the bytes on P1 and P2. (06 Marks)
- c. Explain the different data types supported by 8051 C. (08 Marks)

OR

- 6 a. Assuming that XTAL = 11.0592 MHz, write a program to generate square wave of 50 Hz frequency on pin P3.4. Use timer-1 and operate the timer-1 in Mode-1 (08 Marks)
- b. Write an 8051 C program to toggle only pin P1.5 continuously every 250 ms. Use Timer0, mode2 to create the delay. (08 Marks)
- c. Explain the bit pattern of TCON register. (04 Marks)

Module-4

- 7 a. Explain how interrupt priority can be changed using IP register. Also explain the default priorities assigned to interrupts in 8051 microcontroller. (06 Marks)
- b. Write a C program using interrupts to do the following :
 i) Generate a square wave of frequency 10 kHz on P2.1 using T0 8-bit auto reload.
 ii) Use timer-1 as an event counter to count up a 1-Hz pulse and display it on P0. The pulse is connected to EX1. (10 Marks)
- c. What is Baud rate? Find the baud rate if $TH_1 = -6$; $TH_1 = -24$; for SMOD = 1. Assume crystal frequency = 11.0592 MHz. (04 Marks)

OR

- 8 a. Write an 8051 C program to transfer the message 'VTU' serially at 9600 baud rate, 8 bit data, 1 stop bit. DO this continuously. (06 Marks)
- b. Explain the bit pattern of IE and SCON Registers. (08 Marks)
- c. Explain the importance of TI and RI Flag. (06 Marks)

Module-5

- 9 a. Explain the control word format of 8255. Find the control word for the following configuration:
 i) All ports of A, B and C as O/P ports.
 ii) $P_A = \text{in}$, $P_B = \text{OUT}$
 $P_{CL} = \text{in}$, $P_{CH} = \text{OUT}$ (08 Marks)
- b. Write an 8051 C program to send letters 'B', 'Y', 'R', 'A', 'M'. To LCD using Busy flag. (12 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) SW = 0, the stepper motor should move clockwise
 ii) If SW = 1, the stepper motor should move anticlockwise (10 Marks)
- b. Explain how to interface ADC 0809 to 8051 microcontroller. (10 Marks)
