

GBCS SCHEME

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18EI/BM43

Fourth Semester B.E. Degree Examination, July/August 2022 Embedded Controllers

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Compare
- CISC and Risc Architecture
 - Von-neuman and Harvard Architecture
 - Micro processor with microcontroller. (12 Marks)
- b. What is an SFR in embedded controller? List out the different types of SFR along with its address. Mention the applications of each SFR for 8051 microcontroller. (08 Marks)

OR

- 2 a. Discuss the internal RAM and ROM memory organization of 8051 microcontroller. (06 Marks)
- b. Explain the bit format of program status word register. (04 Marks)
- c. With a diagram, explain port 0 and port 1 pin circuit of 8051 microcontroller. (10 Marks)

Module-2

- 3 a. Discuss the advantages and limitations of register indirect addressing mode. (06 Marks)
- b. Write a program to copy the value 20H into RAM memory locations 40H to 45H using:
- Direct addressing mode
 - Register indirect addressing mode without a loop
 - With a loop. (09 Marks)
- c. A switch is connected to pin P1.7. Write a program to check the status of the switch and perform the following:
- If switch = 0 send letter 'N' to P2
 - If switch = 1 send letter 'Y' to P2. (05 Marks)

OR

- 4 a. What do you understand by assembler directives? Explain the following assembler directives: i) ORG ii) END iii) EQU. (08 Marks)
- b. Write ALP to transfer n = 10 bytes of data from location 8035H to 8050H location without overlap. (06 Marks)
- c. Write a program to find the number of 1s in a given byte. (06 Marks)

Module-3

- 5 a. A Door sensor is connected to the port P1.1 pin and a buzzer is connected to P1.7. Write an 8051C program to monitor the door sensor, and when it opens, sound the buzzer. You can sound the buzzer by sending a square wave of a few hundred Hz. (08 Marks)
- b. Discuss bit wise logical operators in C which is used for 8051 programming. (04 Marks)
- c. What is stepper motor? With a diagram, explain the interfacing of 8051 to stepper motor. (08 Marks)

OR

- 6 a. Write an 8051C program to convert ASCII digits of '4' and '7' to packed BCD and display them on P1. (06 Marks)
- b. Write a C program to send out the value 44H serially one bit at a time via P1.0. The LSB should go out first. (06 Marks)
- c. With necessary interface diagram write a C program to generate a triangular wave using DAG interface. (08 Marks)

Module-4

- 7 a. Explain the bit format of the following special function registers: i) SCON ii) TMOD. (08 Marks)
- b. Write ALP for 8051 C program to toggle all the bits of port P1 continuously with some delay in between. Use Timer 0, 16-bit mode to generate the delay. (08 Marks)
- c. Discuss the importance of TI flag in serial communication of 8051 micro controller. (04 Marks)

OR

- 8 a. What is an Interrupt? Discuss the six interrupts of 8051 microcontroller. (08 Marks)
- b. Write a C program that continuously gets a single bit of data from P1.7 and sends it to P1.0 while simultaneously creating a square wave of 200 μ s period on pin P2.5. Use mode-2 and timer 0 to create the square wave. Assume that XTAL = 11.0592MHz. (08 Marks)
- c. List out the characteristics and operations of mode 1 for timer operation. (04 Marks)

Module-5

- 9 a. With a block diagram, explain the architecture of MSP430F2013. (10 Marks)
- b. List out the different types of addressing modes of MSP430F2013 and explain all the addressing modes with suitable example. (10 Marks)

OR

- 10 a. Discuss the clock system of MSP430 microcontroller, with the help of diagram. (10 Marks)
- b. Explain various low power operating modes of MSP430. (10 Marks)
