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17EE52

Fifth Semester B.E. Degree Examination, July/August 2022 Microcontroller

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What is microcontroller? Compare microprocessor and microcontroller. (04 Marks)
b. Explain the block diagram of 8051 microcontroller. (10 Marks)
c. Explain the program status word and flag bits. (06 Marks)

OR

- 2 a. Explain the internal RAM organization of 8051 with a neat diagram. (08 Marks)
b. How many address lines are required for accessing the data in the following memory ICS while data is organized as bytes. (i) 1024 byte ROM (ii) 16K RAM (04 Marks)
c. Explain the various addressing modes of 8051 with an example for each. (08 Marks)

Module-2

- 3 a. What are assembler directives? Explain various assembler directives. (08 Marks)
b. Explain the operation of following instruction of 8051:
(i) MUL AB (ii) DIV AB (iii) SWAP A (iv) ADD A, @R₀ (08 Marks)
c. Write a program to convert decimal digit to displayable ASCII digits. (04 Marks)

OR

- 4 a. With a neat diagram, explain the range of JUMP and CALL instruction. (08 Marks)
b. Identify the addressing modes in the following instructions:
(i) MOV A, 45H (ii) ADD A, #0 (iii) INC R2 (iv) MOV A, @R₀ (04 Marks)
c. Write a program to toggle the bits of port 1 with a delay which depends on the value of a number in R₀. (08 Marks)

Module-3

- 5 a. Explain the various data types in 8051 C. (08 Marks)
b. Write an 8051 C program to convert ASCII digit of '4' and '7' to packed BCD and display them on P1. (06 Marks)
c. With a frequency of 22 MHz, generate a frequency of 100 kHz on pin P2.3. Use timer 1 in the mode 1. (06 Marks)

OR

- 6 a. Describe bits of TMOD register and various operating modes in detail. (10 Marks)
b. Write an 8051 C program to toggle all bits of P2 continuously every 500 ms. Use Timer 7, mode 1 to create the delay. (10 Marks)

Module-4

- 7 a. What is serial data communication? Explain Simplex, half duplex and full duplex transfer. (06 Marks)
b. Explain the use of various bits of SCON SFR. (08 Marks)
c. Write a C program for the 8051 to transfer the letter 'A' serially at 4800 baud continuously. Use 8 bit data and 1 stop bit. (06 Marks)

OR

- 8 a. What is an interrupt? Explain the steps in executing an interrupt. (08 Marks)
b. Describe the bits of TCON register. (06 Marks)
c. With XTAL = 11.0592 MHz, find the TH1 value needed to have the following baud rates: (06 Marks)
(i) 9600 (ii) 2400 (iii) 1200

Module-5

- 9 a. Explain matrix keyboard connection to ports of 8051. (08 Marks)
b. Write short notes on:
(i) MAX 1112 ADC
(ii) DAC 0808
(iii) Relay and Relay diagram (12 Marks)

OR

- 10 a. Draw the control word format of 8255 and explain various modes of 8255. (08 Marks)
b. Define Stepper motor and explain 8051 connection to stepper motor. (06 Marks)
c. 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, the stepper motor moves clockwise.
(ii) If SW = 1, the stepper motor moves counter clockwise. (06 Marks)
