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18EE52

Fifth Semester B.E. Degree Examination, Feb./Mar. 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. With a neat block diagram, explain 8051 microcontroller's each block. (08 Marks)
- b. Explain Addressing modes of 8051 with example for each. (06 Marks)
- c. Explain the bit pattern of Program Status Word (PSW). (06 Marks)

OR

- 2 a. Show the status of CY, AC and P flags after adding the following data:
(i) 9CH and 64H
(ii) 88H and 93H (06 Marks)
- b. Describe the functions of various pins of 8051 microcontroller with Pin diagram. (08 Marks)
- c. Compare the Microprocessor and Microcontroller. (06 Marks)

Module-2

- 3 a. Explain the following assembler directives:
(i) ORG (ii) EQU (iii) END (iv) DB (08 Marks)
- b. Write an ALP program for the addition of two 16-bit numbers, the numbers are FC45H and 02ECH. Place the sum in R7 and R6, R6 should have lower Byte. (06 Marks)
- c. Explain the following instructions with an example:
(i) RRC A (ii) XCHD A, @Rp (iii) SWAP A (06 Marks)

OR

- 4 a. Write an assembly language program to complement the value 55H, 700 times. (06 Marks)
- b. Explain JUMP and CALL instructions. With a neat diagram explain the range of JUMP and CALL instructions. (08 Marks)
- c. With a neat diagram, explain working of PORT 0. (06 Marks)

Module-3

- 5 a. Explain the different Data types supported by 8051 C microcontroller. (08 Marks)
- b. Write an 8051 C program to create a square wave of frequency 2500Hz on port pin P_{2.7}. Use timer1 in mode 2 to create the delay $f = 11.0592$ MHz. (08 Marks)
- c. Explain TMOD Register. (04 Marks)

OR

- 6 a. Assume crystal frequency as 11.0592 MHz. What value do we need to load into the timer register if we want to have a time delay of 5 msec? Write an assembly language program for the same with timer 0 to create a pulse width of 5 msec on P_{2.3} (06 Marks)
- b. Write a C program for counter 0 in mode 2 to display seconds and minutes on P₁ and P₂. Assume that 60Hz external clock is supplied to TO pin (P_{3.4}). (06 Marks)
- c. Write a C program to toggle all bits of P₂ continuously every 500 msec. Use Timer 1 in mode 1 to create delay. (08 Marks)

Module-4

- 7 a. Explain the bit status of SCON register. (06 Marks)
b. Explain the importance of MAX 232 line driver for connecting RS232 to 8051 with a neat sketch show the interface of RS232 to 8051 using MAX 232. (08 Marks)
c. Write a C program for 8051 to transfer the letter "A" serially at 4800 baud continuously. Use 8-bit data and 1-stop bit. (06 Marks)

OR

- 8 a. Explain different interrupts of 8051 indicating their vector address. (06 Marks)
b. Write an 8051 C program to transfer the message "WELCOME" serially at 9600 baud, 8-bit data, 1-stop bit. Do this continuously. (08 Marks)
c. Write a 8051 C program to receive bytes of data serially and put them in port P₁. Set the baud rate at 4800, 8-bit data and 1 stop bit. (06 Marks)

Module-5

- 9 a. Explain the construction and working of stepper motor. Explain the 4-step sequence, step angle and steps per revolution. (06 Marks)
b. Explain the architecture and working of 14 pin LCD. Draw the interface diagram of LCD with 8051 microcontroller. (08 Marks)
c. With a neat diagram explain interfacing of DAC 0808 to 8051 microcontroller. (06 Marks)

OR

- 10 a. Explain the internal architecture of ADC 0804. Explain the interfacing diagram of 8051 microcontroller with ADC 0804. (10 Marks)
b. A switch is connected to pin P_{2.7}. Write a program to monitor the status of SW and perform the following :
(i) If SW = 0, the stepper motor moves in clockwise.
(ii) If SW = 1, the stepper motor moves in counter clockwise. (10 Marks)
