CBCS SCHEME

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17EC563

Fifth Semester B.E. Degree Examination, July/August 2022
8051 Microcontroller

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Give the comparison between Microprocessor and Microcontroller. **(06 Marks)**

b. With a neat diagram, explain the internal block diagram of 8051. **(10 Marks)**

c. Mention any two applications of 8051 microcontroller. **(04 Marks)**

OR

2 a. Explain the function of the following pins of 8051 :
(i) ALE (ii) $\overline{EA}$ (iii) $\overline{PSEN}$ (iv) RST **(08 Marks)**

b. Briefly discuss the uses of A, B and PSW registers. **(08 Marks)**

c. Explain the instructions to access external data memory. **(04 Marks)**

Module-2

3 a. What is addressing mode? Explain immediate, bit direct and indexed addressing mode with necessary examples. **(08 Marks)**

b. Define Machine Cycle. For 8051 microcontroller operated at 12 MHz crystal oscillator, find the execution time for following instruction:
(i) MOV A, #52 H
(ii) ADD A, 50 H
(iii) MOV DPTR, #2000H
(iv) DIV AB **(08 Marks)**

c. Explain the operations of 8051 instruction MUL AB. **(04 Marks)**

OR

4 a. Explain the operations of the instructions:
(i) RLC A
(ii) RR A
(iii) RRC A
(iv) SWAP A **(08 Marks)**

b. Write and explain an Assembly Language Program to add 10 BCD numbers stored in successive memory location starting from 20H in internal RAM locations and store the result at address 40H and 41H. **(10 Marks)**

c. Write a program to set the carry flag to 1 if the member in register 'A' is even and set the carry flag to 0 if the number in register 'A' is odd. **(02 Marks)**

Module-3

5 a. Discuss the features of four I/O ports of 8051. **(06 Marks)**

b. Write an ALP 8051 program to find the checksum byte of data steam 30H, 4AH, 65H and 10 H. Convert the binary value of checksum into decimal and display the value of the BCD digits on ports P_0, P_1 and P_2. **(10 Marks)**

c. Write an ALP to toggle all bits of Port 1, with a time delay between toggling. **(04 Marks)**

OR

6 a. Write an ALP to read switch given in Fig.Q6(a). If switch is closed turn ON the LED else turn OFF the LED.

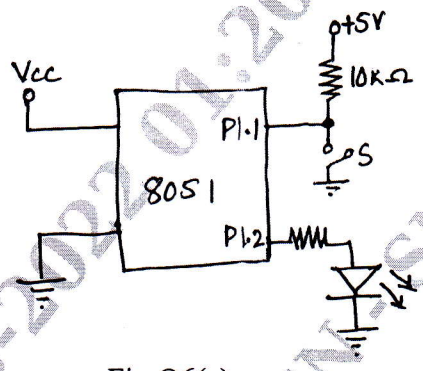

Fig.Q6(a) **(05 Marks)**

b. Write an 8051 C program to read the content of port 1. If it is greater than 200, wait for 250 m sec and send the data to port P2 otherwise wait for 150 msec and send the data to port P0. **(08 Marks)**

c. For an 8051 system of 11.0592 MHz, find the time delay for the following subroutine.

```
Delay : MOV R3, #250
Back: NOP
      NOP
      DJ NZ R3, BACK
      RET
```

(07 Marks)

Module-4

7 a. Explain TMOD and TCON registers with its bit pattern. **(10 Marks)**

b. Write an ALP to generate a waveform with ON time of 7 msec and OFF time of 21 msec on P0.5. Assume XTAL of 11.0592 MHz. Use time 0. **(10 Marks)**

OR

8 a. Write a note on asynchronous serial communication and data framing. **(08 Marks)**

b. Write a C program that continuously receives a single bit of data from P1.0 and sends it to P2.0, while simultaneously creating a square wave of 400 µs period on pin P2.5. Use timer 0 to create the square wave. Assume that XTAL = 11.0592 MHz. **(12 Marks)**

Module-5

9 a. Compare polling and interrupts. **(05 Marks)**

b. What are the steps microcontroller performs upon activation of an interrupt? **(05 Marks)**

c. Explain interrupt priority and interrupt destinations in detail. **(10 Marks)**

OR

10 a. Write an ALP to rotate the stepper motor in clockwise direction, if the status of a switch connected to port pin P1.2 is ON. Otherwise rotate it in counter clockwise direction. **(10 Marks)**

b. Interface ADC 0804 to 8051 and write a C program to perform A/D conversion and read digital values for the interface. **(10 Marks)**

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