10MT54

Fifth Semester B.E. Degree Examination, July/August 2021
Microcontroller

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. Explain with block diagram, the architecture of 8051. **(10 Marks)**
   b. Bring out the architectural differences between microprocessor and a microcontroller. **(04 Marks)**
   c. Explain the working principle of input & output operation of Port – 1. **(06 Marks)**

2 a. Explain different addressing modes of 8051. **(08 Marks)**
   b. Differentiate between the following 8051 instructions:
      (i) SWAP and XCHG   (ii) LCALL and ACALL   (iii) MOVX and MOVC
      (iv) Bit level ANL and Byte level ANL. **(08 Marks)**
   c. Write a program to logically OR the contents of port P1 and P2 and put the result in internal RAM location 56h. **(04 Marks)**

3 a. Write a sequence of events that occur in 8051 microcontroller when the CALL and RET instructions are executed. **(06 Marks)**
   b. Differentiate between JMP and CALL instructions. Explain different Byte level and Bit level jump instructions. **(08 Marks)**
   c. Write an ALP in 8051 to add two 16 bit numbers stored in 3536h and 4546h. Store the result in 77 78 79h. **(06 Marks)**

4 a. Explain the various data types in C. **(06 Marks)**
   b. Calculate the period of machine cycle for the following crystal frequency with respect to 8051 system, (i) $f_{osc} = 11.0592$ MHz (ii) $f_{osc} = 16$ MHz (iii) $f_{osc} = 24$ MHz. **(06 Marks)**
   c. Write a C program to convert ASCII digit of '3' and '6' to packed BCD and display them on P_2. **(08 Marks)**

5 a. What is timer? Explain basic timer/counter diagram and also write the bit pattern of TMOD register. **(08 Marks)**
   b. Briefly explain the various modes of timer. **(06 Marks)**
   c. Write a C program to generate frequency of 2.5 kHz on pin P1.2, use Timer 1, mode 2 to create a delay. **(06 Marks)**

6 a. List out the difference between synchronous and asynchronous serial communication. **(06 Marks)**
   b. Discuss RS-232 Hand shaking signals. **(08 Marks)**
   c. Write a 'C' program for the 8051 to transfer the message "HELLO" serially at 9600 baud rate, 8-bit data, 1 stop bit, Do this continuously. **(06 Marks)**

7 a. What are interrupts and interrupt subroutine? Explain IE and IP special registers with their bit pattern. **(10 Marks)**
   b. Explain the five interrupts of 8051, with their priority and interrupt vector table. **(07 Marks)**
   c. Give difference between interrupt and polling. **(03 Marks)**

8 a. Show the interfacing circuit and functional pins of LCD. Write a C program to interface LCD with 8051 to display message "INDIA". **(10 Marks)**
   b. Describe the 8051 connection to stepper motor and write a program to rotate the motor clockwise direction. **(10 Marks)**

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