Student Exam No._____

Time: 3 Hours   Total Marks: 70

INSTRUCTIONS:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. The programs in Assembly/ C must be in structured format and must contain the proper comments. **Programs without appropriate comments would not deserve full marks.**

Section - I

Que. – 1

A   Discuss the differences between a Microprocessor and a Microcontroller with the help of their generalized block diagrams.   6

B   Explain any six arithmetic operation instructions of 8051 with examples.   6

OR

Que. – 1

A   Write an assembly language subroutine in which using only one pointer, pack two arrays of BCD digits to create a third array. The higher digits are available from 30h to 3Fh and lower ones from 40h to 4Fh. Packed BCD numbers are to be stored from 50h to 5Fh.   6

B   Write an Assembly Language Program to convert a packed BCD number "ab cd ef gh ij", stored from location 30H to 34H,   into unpacked BCD number to be stored from 40H onwards.   6

Que. – 2

A   What are the addressing modes in 8051 microcontroller? Discuss any two addressing modes in detail with example instructions.   5

B   Assume that a 50 Hz external clock is being fed into pin T1 (P3.5). Write a C program for counter 0 in mode 2 to display the count in ASCII. Display the ASCII digits (in binary) on P0, P1 & P2 where P0 has the least significant digit. Set the initial count to 100d.   6

OR

Que. – 2

A   Explain the applications of 'bit', 'sbit' and 'sfr' declarations in Embedded C.   5

B   Write an 8051 C program to toggle all bits of P1 continuously every second. Use Timer 1 mode 1 to create delay. Take XTAL = 11.0592 MHz.   6

Que. – 3

A   With the help of block diagram and circuit diagram, explain the concept of DC motor control by a microcontroller   6

B   Write an 8051 C program to send two different strings to the serial port. Assuming that SW is connected to pin P2.0, monitor its status and make a decision as follows:

   SW = 0; send your college name

   SW = 1; send your department name

Assume crystal = 11.0592 MHz, baud rate of 9600, serial communication mode 1

Que. – 4

    A. Explain the timing diagram related to external memory access with respect to 8051   6
microcontroller.

    B. Explain the application of special function registers related to the external interrupt of   6
8051.

<div align="center">OR</div>

Que. – 4

    A. Draw and explain the circuit for interfacing LCD with 8051 microcontroller.   6

    B. Draw the hardware circuit diagram for timer/counter control logic & explain it.   6

Que. – 5

    A   Describe the alternate functions of port 3 of 8051 microcontroller.   5

    B   Explain the concept of baud rate used in serial communication with example   6
calculation of timer reload values. What is the provision in 8051 to double the baud
rate?

<div align="center">OR</div>

Que. – 5

    A   Write the general structure (syntax) of an assembly language instruction and explain   5
all the fields.

    B   Write an embedded C program to generate continuous triangular wave at port P1.   6

Que. – 6

    A   Explain the Machine Cycle, Pulse time and T State with respect to 8051   4
microcontroller.

    B   Explain the port pin structure of 8051 port 2 of an 8051 microcontroller.   4

    C   Describe the functions of $\overline{PSEN}$, $\overline{EA}$, TxD & RxD pins of 8051 microcontroller.   4

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