Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023

Semester : Semester VI - 2020
Course Code : ECE3014
Course Name : Sem VI - ECE3014 - Microcontroller Applications
Program : ECE

Date : 21-JUN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. Thumb-2 technology allows more complex operations to be carried out in the Thumb state, thus allowing higher efficiency by reducing the number of states switching between ARM state and Thumb state. Differentiate between ARM instruction set and Thumb instruction set.

(CO4) [Knowledge]

2. Addressing Mode define the machine language instructions for a particular architecture to identify the operand (or operands) of each instruction. Name the addressing mode used in Push and Pop instructions while performing stack operation.

(CO5,CO2) [Knowledge]

3. in 8051, Serial Communication uses timers to set the baud rate. With XTAL = 20 MHz, find the TH1 value needed to have the following baud rates.
(a) 9600
(b) 2400

(CO3) [Knowledge]

4. An instruction set is a group of commands for a CPU in machine language. Mention the two flag bits of PSW register that are affected by DA A instruction.

(CO2,CO1) [Knowledge]

5. Microcontroller has two Timers each of 16 bits used to generate time delay. Calculate the Initial count that have to be loaded in Timers that generate 100μsec delay. Assume xTAL frequency 11.0592MHz, Timer 0 in mode 2.

(CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(2 X 15 = 30M)**

6. In 8051 microcontroller has on chip memory. For the given application, if the programmer requires extra storage , microcontroller supports external memory interfacing which has different interfacing pins and control pins to enable external RAM & ROM chip. With neat connections, show how a 64KB ROM and 32KB RAM memories are interfaced with 8051 Microcontroller along with control signals. Also calculate starting & ending memory addresses for each memory.

(CO1) [Comprehension]

7. Suppose you are a design engineer at ARM®. Two pass codes are coming through the system. Each pass code is 8 bits long. The format of the pass code is PQ and RS. Here P, Q, R, and S are nibbles. The numbers PQ and RS are by default available in locations 40H and 50H respectively. Your job is to give the system a new pass code which is generated by using the following arithmetic operation.

$(2P + Q)(R + 2S)$

Write a program in 8051 Assembly Language to perform the same and store the new passcode in location 70H.

(CO5,CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **(3 X 20 = 60M)**

8. A Personal Computer is interface with the Microcontroller 8051 for data communication between them. Write an assembly language program to transfer the message “Your Last Name” serially to Personal Computer continuously. Use baud rate as 19200, 8-bit data, 1-stop bit.

(CO3) [Application]

9. Data flow models are used to graphically represent the flow of data in an information system by describing the processes involved in transferring data from input to file storage and reports generation. With diagram illustrate the Data flow model for ARM core processor.

(CO4) [Application]

10. For a given application, it is required to have a clock signal of frequency 2KHz with 70% duty cycle. But the clock frequency of 8051 is 11.0592MHz. Using Timers to generate a signal of said frequency on P2.1. Use timer 1 in mode 1.

(CO3) [Application]