VIT Vellore Institute of Technology

Reg. No. : 22BAI1266

Final Assessment Test (FAT) - November/December 2023

Programme	**B.Tech.**	Semester	**FALL SEMESTER 2023 - 24**
Course Title	**MICROPROCESSORS AND MICROCONTROLLERS**	Course Code	**BECE204L**
Faculty Name	**Prof. S Selvendran**	Slot	**E1+TE1**
		Class Nbr	**CH2023240100951**
Time	**3 Hours**	Max. Marks	**100**

Part A (2 X 5 Marks)
Answer all questions

01. Discuss the differences between Microprocessor and Microcontroller. [5]

02. Write an ARM assembly language program to find the sum of first N natural numbers. [5]

Part B (9 X 10 Marks)
Answer all questions

03. With a neat sketch, discuss the architecture of the Programmable Interval Timer (8253) in detail. [10]

04. Write an 8086 assembly language program to sort the given array stored starting from the memory location 2000H in ascending order. Store the result starting from location 2500H. [10]
Array= {10h,15h, 23h, 42h, 71h,56h, 83h, 93h, 54h, 64h}.

05. Draw the architecture of 8051 and explain the functional blocks in detail. Also, discuss the program status word register. [10]

06. Write an 8051 assembly language program for the following task. [10]
Let R2=20D and R3= 204D. Increment R2 and decrement R3, until both the values are equal. Store the equal value in R4. Also find how many iteration it takes to make R2 and R3 equal and store the number of iterations in R5.

07. Write an 8051 assembly language program to generate a square wave of 2kHz frequency on P1.0 using timer 0 in mode1. Assume the crystal frequency as 11.0592MHz. [10]

08. Design an 8051-based LED display system where 16 LEDs are connected in a 4X4 matrix using port-0 and port-1. Initially, the character "N" is displayed on LEDs and upon receiving external interrupt INT0 which is edge triggered displays the character "S" in LEDs. Draw the schematic diagram and write an assembly language program for the same. [10]

09. Given a 1X4 keypad as an input device and an LCD screen as an output device, write an 8051 assembly language program to: (Each 5 Marks) [10]
a) Read the input from the keypad.
b) Display the corresponding operation ("+", "-", "*", or "/") on the LCD screen based on the keypad input.
Note: Each key on the 1X4 keypad corresponds to one of the operations.

10. Draw the architecture of an ARM processor and explain the various functional units in detail. [10]

11. In the table below, fill the contents of each register after the execution of every ARM instruction in the following single program. [10]

	r1	r2	r3	r4
Initial Values of Registers	0x00000005	0x00000007	0x0000000C	0x0000000E
ADD r4,r2,r3 LSL #1				
MLA r1,r2,r3,r4				
BIC r3,r2,r2				
CMP r1,r4				
EORGT r4,r1,r2