VIT
Vellore Institute of Technology

Reg. No. : [redacted]

Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	**B.Tech**	Semester	**Winter Semester 2022-23**
Course Title	**MICROPROCESSORS AND MICROCONTROLLERS**	Course Code	**BECE204L**
Faculty Name	**Prof. DHEEREN KU MAHAPATRA**	Slot	**G2+TG2**
		Class Nbr	**CH2022235001403**
Time	**3 Hours**	Max. Marks	**100**

Section 1 (2 X 5 Marks)
Answer All questions

01. Explain the function of opcode prefetch queue in 8086 [5]

02. Draw and explain current program status register of ARM processor [5]

Section 2 (2 X 8 Marks)
Answer All questions

03. (i) Let [SS] = 3000H, [SP] = 2000H, [32000H] = 2B, [32001H] = 3C and [AX] = A2B3. Show the content of AX, BX and stack memory after the execution of following instructions in order [8]

a. POP BX
b. ADD AX, BX
c. PUSH AX

(ii) Identify the signals used for the following operations in 8086.

a. Transfer of data over the higher order data bus
b. Type of operation carried out by the processor
c. Indicate segment register currently being used
d. Local bus masters to force the microprocessor to release the local bus
e. Acknowledgement signal from I/O devices

04. Assume the following register and memory contents in an ARM computer. Registers R0, R1, R2, R6, and R7 contain the values 1000, 2000, 1016, 20, and 30, respectively. The numbers 1, 2, 3, 4, 5, and 6 are stored in successive word locations starting at memory address 1000. What is the effect of executing each of the following two instruction blocks, starting each time with the given initial values? [8]

LDR R8,[R0]
LDR R9,[R0,#4]
ADD R10,R8,R9
STR R6,[R1,#−4]!
STR R7,[R1,#−4]!
LDR R8,[R1],#4
LDR R9,[R1],#4
SUB R10,R8,R9

Section 3 (2 X 12 Marks)

Answer All questions

05. Draw the 8255-8086 hardware interface scheme and write an ALP to sense the position of the doors in a multiplex entrance having 6 doors. Use port A of 8255 to sense the door position and display the sensed pattern in a series of LEDs connected at port B. Use port C upper to display the number of opened doors among the six doors. Address of port A is 0540H. [12]

06. With a neat diagram, explain the different hardware components of an embedded device based on the ARM core. Explain in detail about Exceptions and Interrupts in ARM processors [12]

Section 4 (5 X 10 Marks)

Answer All questions

07. A string of 5 bytes is placed in the memory location starting from 30h. Write an 8051-assembly language program to find the smallest element in the given string and store it at the memory location 38h. [10]

08. Explain the interrupt structure of 8051 Micro-controller. Explain how interrupts are prioritized and how it can changed according to user preferences?. [10]

09. Write an 8051-assembly language program to produce a sine wave using DPTR with DAC connected to Port 1 of 8051. [10]

10. Write an 8051-assembly language program to display the message "Microcontroller" on LCD display using DPTR at line 2 and character position 5. [10]

11. With suitable examples, explain the various methods/modes for specifying the operand address in the instructions of 8051. [10]