VIT Reg. No. :

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. Revathi S**	Slot	**A1+TA1**
		Class Nbr	**CH2022235001095**
Time	**3 Hours**	Max. Marks	**100**

PART-A (4 X 5 Marks)
Answer All questions

01. Draw a block diagram for the following tasks to be carried out by a Microprocessor with necessary components, and briefly describe the block diagram. [5]
   a) Read Temperature from analog sensor repeatedly after a specific unit of time
   b) Store the temperature at external RAM location
   c) Display the temperature value at a LCD display

02. Explain the function of the following pins of 8086. [5]
   a) ALE
   b) MN/MX'
   c) NMI
   d) READY
   e) RD'

03. Write an assembly language program in 8086 to find $(a+b)^2$. Assume "a" and "b" values are 16-bits and stored in memory location 2000h and 2002h respectively. Store the result in location 3000h. Assume the result is not exceeding FFFFH. [5]

04. Write an ARM assembly language program to compute the sum of 'n' numbers using the formula $[n(n+1)]/2$, where $n = 10$. [5]

PART-B (5 X 10 Marks)
Answer All questions

05. Discuss the architecture of Programmable Interval Timer (8254) in detail with a neat sketch. [10]

06. Describe the architecture of 8051 microcontroller with neat a block diagram. [10]

07. Write an 8051 assembly language program to count the number of 1's and 0's in an 8-bit number which is stored in the memory location 45H. Store the number of 1's in R1 and number of 0's in R2. [10]

08. With a neat diagram, discuss the ARM register set in detail and write the status of the ARM processor for the CPSR register values given in Figure-1. [10]

1	0	1	1	0			1					1	1	0	1	0	0	1	1

Figure-1

09. Write the values stored in the registers after executing the following ARM instructions. [10]
Assume R1= 0X00000020; R2=0X00000300; R3=0X00000003; R4=0X00000003.
   a) MOV R0, R2, LSL #3
   b) MOV R0, R2, ROR #4
   c) ADD R0, R1, R2, LSL R3

(d) ORR R0, R1, R2

(e) MLA R0, R3, R4, R1

PART-C (2 X 15 Marks)

Answer All questions

11. (a) Write an 8051 assembly language program to generate a square wave of 10ms time period on pin P2.4. Use timer 0 in mode1. Assume the crystal frequency is 11.0592 MHz. (7 Marks) [15]

(b) Write an 8051 assembly language program to transfer "SENSE" serially at a 9600 baud rate with 8 bit data, 1 stop bit and do this continuously. (8 Marks)

12. The 8051 microcontroller is interfaced with 4x4 keypad and LCD as shown in Figure 2. Answer the following. [15]

(i) Write the configuration for P0, P1, P2 and P3. (3 marks)

(ii) Write the look-up table for the keypad information stored in the ROM location starting from 400H (3 marks)

(iii) Write the steps how 8051 will identify the key pressed? (3 marks)

(iv) Write the LCD initialize subroutine that can display the key pressed in 2nd line 3rd position. (3 marks)

(v) Write the LCD command subroutine and data subroutine to display the key pressed. (3 marks)

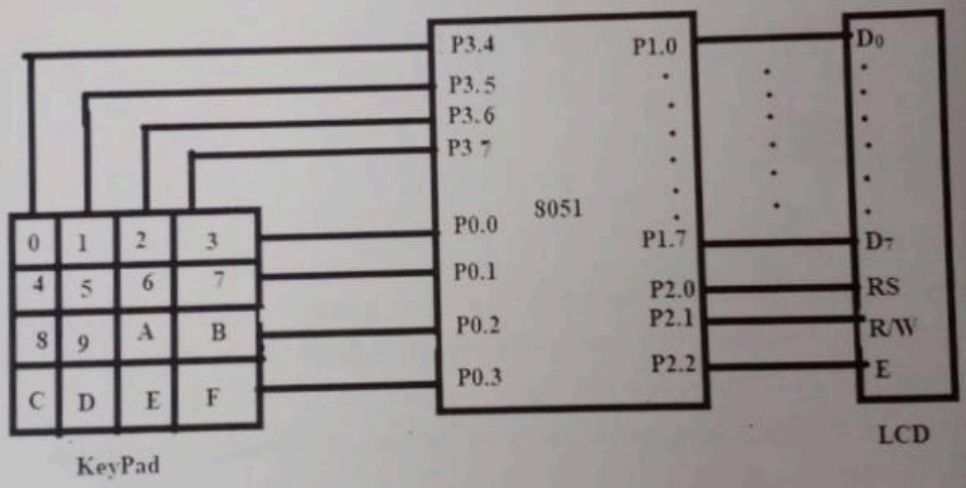

Figure-2