U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: IV**
Branch: ES Cluster (EEE/ET/ECE/EIE/MD) **Duration: 3 hrs.**
Course Code: 19ES4CCMCS **Max Marks: 100**
Course: Microcontrollers

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	CO	PO	Marks
1	a)		Analyze the Port 0 structure of 8051 Microcontroller with a neat diagram. Also Analyze the use of the port for I/O Operations and for Address/Data Bus Operations.	*CO1*	*PO 1*	**10**
	b)		Describe the Internal Block diagram of a CPU, outlining the various functions of each part.	*CO 2*	*PO1*	**6**
	c)		What are the criteria for choosing a microcontroller?	*CO 1*	*PO1*	**4**
			OR			
2	a)		Explain internal RAM organization in 8051.	*CO1*	*PO1*	**7**
	b)		With a neat block diagram explain the internal bus structure of computer.	*CO1*	*PO1*	**7**
	c)		Explain the 8051 oscillatory circuit with timing diagram.	*CO1*	*PO1*	**6**
			UNIT - II			
3	a)		Distinguish between conditional jumps and Unconditional Jumps. Provide a complete assembly language example program for each.	*CO 2*	*PO1*	**6**
	b)		Write an assembly language program to find the largest of 10 numbers. The numbers are stored in memory location staring at 2000H.	*CO 2*	*PO1*	**8**

	c)		Analyze the program below, indicating the contents of registers/memory locations at each step. Assume that a data 'C8 H' is stored in memory location 52 H.
			What does the program do?
			ORG 00H
			MOV A,52H
			MOV 0F0H, #64H
			DIV AB
			MOV 60H, A
			MOV A, 0F0H
			MOV 0F0H, #0AH
			DIV AB
				CO 3	*PO2*	**6**

			MOV 61H, A
			MOV 62H, 0F0H
			END			

			OR			
	4	a)	Distinguish various ROTATE instructions. What is the effect on the Flags in each category? Provide a complete assembly language example for each.	***CO 2***	***PO1***	**8**
		b)	Write an assembly language program to exchange the content of FFh and FF00h	***CO 2***	***PO1***	**6**

		c)	Analyze the program below, showing the contents of registers/memory locations at each step.
			What does the program do?
			ORG 00H
			MOV DPTR,#2040H
			MOV A,#2BH
			MOV R0,#20H
			ADD A, DPL
			MOV DPL, A
			MOV A,R0
			ADDC A, DPH
			MOV DPH, A
			END
				CO 3	***PO2***	**6**

			UNIT - III			
	5	a)	Write an 8051 C Program to toggle all the bits of P0 and P2 continuously with delay of 250 ms (delay need not be accurate).	***CO 2***	***PO1***	**8**
		b)	Distinguish between the Interrupt and Polling Methods of serving devices from a Microcontroller.	***CO 1***	***PO1***	**4**
		c)	Write an 8051 program to generate a 5 KHz square wave from Port 3.5 using Timer 1, Mode 1. Oscillator = 11.0592 MHz.	***CO 2***	***PO1***	**8**
			OR			
	6	a)	Distinguish between Simplex, Half-Duplex and Full Duplex transfers.	***CO 1***	***PO1***	**4**
		b)	Write an 8051 C Program to get a byte of data from P1, wait 0.5 sec (need not be accurate) and then send it to P2.	***CO 2***	***PO1***	**8**
		c)	Write a 8051 program to generate a 1 KHz square wave on Port 1.1 using Timer 0, Mode 1. Oscillator frequency = 11.0592 MHz.	***CO 2***	***PO1***	**8**
			UNIT - IV			
	7	a)	Design an 8031-microcontroller system with 8K bytes of program ROM memory and 8K bytes of data ROM memory.Explain the various interfacing signals	***CO 4***	***PO3***	**7**

		b)	Develop a C program to store ASCII letters 'A' to 'E' in external RAM addresses starting at 0 and then get the same data from external RAM and send it to P2 one byte at a time.	***CO 4***	***PO3***	**7**
		c)	Briefly identify and describe the modes of operation of 8255 with a neat block diagram	***CO 1***	***PO1***	**6**
			OR			
	8	a)	The word "BMSCE" has been burned in the external data ROM locations starting from 4100h.Develop a program to read this data into data RAM locations of an 8031 (which does not have on-chip ROM) starting from 80h.	***CO4***	***PO3***	**07**
		b)	An external ROM uses the 8051 data space to store the look-table (starting at 1000h) for DAC data. Develop a C program to read 30 bytes of table data and send it to P1.	***CO4***	***PO3***	**07**
		c)	Differentiate absolute decoding from linear decoding.	***CO4***	***PO1***	**06**
			UNIT - V			
	9	a)	Describe program steps to interface LCD to 8051 microcontroller with neat diagram. Use a simple time delay method.	***CO 4***	***PO3***	**10**
		b)	Explain how ADC can be interfaced with 8051 microcontrollers with neat diagram and necessary 8051 program.	***CO 4***	***PO3***	**10**
			OR			
	10	a)	Write a neat block diagram showing the interfacing connections of a Digital to Analog Converter (DAC) to 8051 microcontrollers. Write an assembly language program to generate square wave using DAC	***CO 4***	***PO3***	**10**
		b)	Write a program to interface stepper motor to 8051 microcontrollers with a diagram. The stepper motor should be able to change the direction based on the position of a switch connected to P2.7.	***CO 4***	***PO3***	**10**

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