U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 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)		Explain internal RAM organization in 8051.	CO1	PO1	07
	b)		With a neat block diagram explain the internal bus structure of computer.	CO1	PO1	07
	c)		Explain the 8051 oscillatory circuit with timing diagram.	CO1	PO1	06
			OR			
2	a)		List differences between CISC and RISC processor with neat block diagram	CO1	PO1	10
	b)		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	PO1	10
			UNIT - II			
3	a)		Illustrate with examples the various addressing modes of 8051.	CO1	PO1	8
	b)		Write a program to move a block of 5 bytes of data from external RAM to internal RAM.	CO2	PO2	6
	c)		Indicate whether the following instructions of 8051 are valid? If not, correct the instruction i)ADD @R0, A ii) MOVC DPTR, #9000h iii) XCH A,@R1 iv) JMP @R0+DPTR (v) POP ACC (vi)MOV R1, @R0	CO2	PO2	6
			OR			
4	a)		Explain the following Jump instructions with suitable examples. i) CJNE A, add, radd (ii) DJNZ add, radd (iii) JNZ radd.	CO1	PO1	6
	b)		Write a program to sort an array stored in the internal RAM using subroutine instructions. Illustrate with an example.	CO2	PO2	8
	c)		Demonstrate the stack operation with a neat diagram to store and retrieve three data bytes.	CO1	PO1	6

			UNIT - III			
	5	a)	Explain the bit configuration of TMOD register.	***CO1***	***PO1***	**6**
		b)	What is data serialization? Write a C program to bring in a byte of data serially one bit at a time via P1.0. The MSB should come in first.	***CO3***	***PO2***	**8**
		c)	Explain the various interrupts that can occur in 8051 Microcontroller.	***CO1***	***PO1***	**6**
			OR			
	6	a)	Assume that a 1-Hz external clock is being fed into pin T1 (P3.5). Write a C program for counter 1 in mode 2 to count up and display the state of the TL1 count on P1. Start the count at 0H.	***CO3***	***PO2***	**7**
		b)	With the block diagram explain the mode 1 operation of the timer. Give an example to show the operation of the timer in mode 1.	***CO3***	***PO2***	**6**
		c)	Write an 8051 C program to generate a square wave of 2 kHz frequency on pin P1.5.	***CO3***	***PO2***	**7**
			UNIT - IV			
	7	a)	With a neat connection diagram, design an 8031 based system with 8K bytes of program ROM and 8K bytes of data RAM.	***CO4***	***PO3***	**6**
		b)	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***	**7**
		c)	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***	**7**
			OR			
	8	a)	The port addresses for 8255 are PA-A000H PB-A001H PC-A002H Control Word-A003H i) Design a circuit showing 8051 connections to 8255 for above addresses. ii) Find the control byte for PA=out, PB = in, PC= out and write a program to get data from PB and send it to PA and PC.	***CO 4***	***PO3***	**10**
		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***	**10**
			UNIT - V			
	9	a)	Develop an Assembly Language Program to generate a triangular wave using DAC. Show the 8051 connection to DAC.	***CO4***	***PO3***	**10**

		b)	Develop an embedded C program to rotate a stepper motor in the clockwise and anti-clockwise directions. Write the connection diagram.	***CO4***	***PO3***	**10**
			OR			
	10	a)	Describe program steps to interface LCD to 8051 microcontrollers with neat diagram. Use a simple time delay method.	***CO4***	***PO3***	**10**
		b)	Explain how ADC can be interfaced with 8051 microcontroller with neat diagram and necessary 8051 program.	***CO4***	***PO3***	**10**