U.S.N.										

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

Autonomous Institute Affiliated to VTU

October 2023 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

1	a)	Compare 16 bit and 32-bit microcontrollers.		**06**
	b)	What are the different buses present in a microcontroller? Explain bus structure with a neat diagram.		**08**
	c)	Explain the 8051 oscillator circuit with timing diagram.		**06**

UNIT - II

2	a)	Illustrate with examples the various addressing modes of 8051		**08**
	b)	Write a program to move a block of 10 data from external RAM to internal RAM		**06**
	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) PUSH ACC (vi)MOV R1, @R0		**06**

OR

3	a)	Explain the following Jump instructions with suitable examples. i) JC radd (ii) CJNE A,add,radd (iii) DJNZ add,radd (iv) JNZ radd		**08**
	b)	WAP to sort an array stored in the internal RAM using subroutine instructions. Illustrate with an example.		**07**
	c)	Illustrate PUSH and POP operations in 8051 micro controller with an example each.		**05**

UNIT - III

4	a)	Explain the bit configuration of TMOD register.		**08**
	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.		**06**
	c)	Write an 8051 C program to generate a square wave of 2 kHz frequency on pin P1.5		**06**

OR

5	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	**06**
	b)	With the block diagram explain the mode 2 operation of the timer. Give an example to show the auto reload operation of the timer in mode 2.	**06**
	c)	Explain the various interrupts that can occur in a 8051 Microcontroller	**08**

UNIT - IV

6	a)	With a neat connection diagram. Explain the design of 8031 based system with 8K bytes of program ROM and 8K bytes of data ROM	**08**
	b)	The word "MICRO" has been burned in the external data ROM locations starting from 4100h. Write a program to read this data into data RAM locations of an 8031 (which does not have on-chip ROM) starting from 80h.	**06**
	c)	An external ROM uses the 8051 data space to store the look-table (starting at 1000h) for DAC data. Write a C program to read 30 bytes of table data and send it to P1.	**06**

UNIT - V

7	a)	Write an embedded C program to rotate a stepper motor in the clockwise and anti clockwise directions. Write the connection diagram.	**10**
	b)	Write an ALP to generate a square wave using DAC. Show the 8051 connection to DAC.	**10**

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