Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN										Course Code	2	1	E	E	5	3

Fifth Semester B.E. Degree Examinations, April/May 2024

MICROCONTROLLER

Duration: 3 hrs **Max. Marks: 100**

Note: *1. Answer any* **FIVE** *full questions choosing ONE full Question from each Module.*
2. Missing data, if any, may be suitably assumed.

Q. No		*Question*	*Marks*	*(RBTL:CO:PI)*
		Module-1		
1.	**a.**	Explain the criteria for choosing a microcontroller.	**06**	(2 :1: 1.3.1)
	b.	Explain the architecture of 8051 microcontroller with neat block diagram.	**08**	(2 :1: 1.3.1)
	c.	Explain stack memory and stack operation in 8051 μC with suitable example.	**06**	(2 :1: 1.3.1)
		(OR)		
2.	**a.**	Explain the function of the accumulator, program counter and data pointer in 8051 μC.	**06**	(2 :1: 1.3.1)
	b.	Explain RAM and SFR memory organization of 8051 μC with neat diagrams.	**08**	(2 :1: 1.3.1)
	c.	Distinguish between Harvard and Von-Neumann memory architecture.	**06**	(2 :1: 1.3.1)
		Module-2		
3.	**a.**	Explain the addressing modes in 8051 μC with examples.	**10**	(2 :2: 1.3.1)
	b.	Explain the steps in assembling and running 8051 program.	**05**	(2 :2: 1.3.1)
	c.	Illustrate an ALP to find the sum of 20 data bytes stored in an array of external RAM location starting with address 8000 H. Store the 16-bit sum at the end of array.	**05**	(3 :2: 2.1.2)
		(OR)		
4.	**a.**	Correct the following instructions, if found to have any wrong syntax. Explain the operation of corrected instructions and identify the addressing mode: (i) MOV #25, A (ii) DJNZ 8000h, addr (iii) DA #25h (iv) CJNE #50h,R0 (v) MOVX A,A+2500h	**10**	(2 :2: 1.3.1)
	b.	Explain unconditional jump instructions, with diagram and range.	**05**	(2 :2: 1.3.1)
	c.	Illustrate an assembly language program that convert hexadecimal to decimal number.	**05**	(3 :2: 2.1.2)
		Module-3		
5.	**a.**	Explain the advantages of using C program for 8051 μC.	**06**	(2 :3: 1.3.1)
	b.	Explain the checksum operation in ROM with an example.	**06**	(2 :3: 1.3.1)
	c.	A door sensor is connected to the P1.3 pin, and a buzzer is connected to P1.5. Illustrate an 8051C program to monitor the door sensor, and when it opens, sound the buzzer. You can sound the buzzer by sending a square wave of few hundred Hz.	**08**	(3 :3: 2.1.2)
		(OR)		
6.	**a.**	Explain the bit pattern of TMOD.	**06**	(2 :3: 1.3.1)
	b.	Explain the steps for timer in mode-1 programming, with instructions.	**06**	(2 :3: 1.3.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)

	c.	Illustrate an ALP program to toggle all the bits of port P2 continuously with 50 ms delay in between. Use timer-1, mode-1 to generate the delay.	**08**	(3 :3: 2.1.2)

Module-4

7.	**a.**	Explain programming steps to transfer data serially with instructions.	**06**	(2 :4: 1.3.1)
	b.	Explain the bit pattern of SCON register.	**06**	(2 :4: 1.3.1)
	c.	Assume a switch is connected to pin P0.2. Illustrate an ALP to monitor its status and send two messages to serial port continuously with 9600 baud rate, 8-bit data, 1-start and 1-stop bit If switch=0 send, Save Earth. If switch=1 send, Save Water.	**08**	(3 :4: 2.1.2)

(OR)

8.	**a.**	Explain the bit pattern of IE and IP registers.	**06**	(2 :4: 1.3.1)
	b.	Explain the steps the 8051 μC follows when interrupt is generated and list the interrupt vector table.	**06**	(2 :4: 1.3.1)
	c.	Illustrate an ALP using interrupts that continuously gets a data from P1 and sends it to P2, while simultaneously creating a square wave of 2 KHz frequency on P0.2 Use timer-0, mode-1 to create the square wave. Assume XTAL = 11.0592 MHz.	**08**	(3 :4: 2.1.2)

Module-5

9.	**a.**	Illustrate stepper motor interfacing with 8051, consider step angle of 1.8º with 8051 and write "8051C" program to rotate 3 times anticlockwise direction.	**10**	(3 :5: 2.1.2)
	b.	Illustrate 16×1 LCD Interfacing with 8051 and write an 8051C program to send "Save Water" to the LCD display.	**10**	(3 :5: 2.1.2)

(OR)

10.	**a.**	Illustrate DAC0808 interfacing with 8051 and write an 8051C program to generate sine waveform.	**10**	(3 :5: 2.1.2)
	b.	Illustrate of DC motor interfacing with 8051 with switch connected to pin P2.5, write an 8051C program to monitor the status of switch and perform: (i) If switch=0, the DC motor moves with 25% duty cycle pulse (ii) If switch=1, the DC motor moves with 75% duty cycle pulse. Using PWM technique.	**10**	(3 :5: 2.1.2)

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