

Fourth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Microcontrollers

Time: 3 hrs.

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Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module. 2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	Μ	L	C
Q.1	a.	What are the differences between microcontroller and microprocessor?	05	L1	C01
	b.	Draw the programming model of 8051 microcontroller and explain the	10	L2	C01
		following: (i) Program counter and data pointer			
		(ii) Accumulator A, Register B and CPU Registers			
		(iii) Stack and stack-pointer			
	c .	Draw the status of PSW register. What is the status of AC and CY flags	05	L2	CO1
		after adding 52H with 74H.			
0.0			10	x 4	COL
Q.2	a.	Define addressing mode. Explain the following types of addressing modes	10	L1	C01
		with examples:			
		(i) Immediate addressing mode			
		(ii) Register addressing mode(iii) Register indirect addressing mode			
		(iv) Indexed addressing mode			
	b.	Calculate the memory capacity for following cases:	05	L2	C01
	0.	(i) 512 bytes of RAM (ii) 8 KB RAM	0.5		COI
	c.	Explain the functions of following pins:	05	L1	C01
		(i) External Access Input (EA) (ii) Program Store Enable (PSEN)	00		001
		(i) External Access input (EA) (ii) Hogram Store Enable (FSEN) Module – 2			
Q.3	a.	Define assembler directive. Use assembler directive to place constants	05	L3	CO2
Q.3	a.	0FFH, 07H, 82H, 31D and character string 'VTU' in program memory	05	13	002
	•	starting from 0080H. Explain the content of each location.			
	b.	Explain port 0 as input port and output port. What is the dual role of port 0?	05	L1	CO2
	c.	Explain the working of DAA instruction. Write a program to add the	10	L3	CO2
		following 6, BCD numbers from the location 90H onwards. Save the carry			001
	in register R5 and sum in register R4. Data : 10, 20, 30, 40, 50, 60.				
	1	OR			
Q.4	a.	Explain the working of SUBB instruction, when $Borrow = 0$ and	10	L3	CO2
		Borrow = 1. Write a program to subtract 2 numbers using 2's complement			
		arithmetic.			
	b.	Check the following instructions to be valid or invalid. Justify with reasons:	05	L3	CO2
		i) MOV P2, #0FFH ii) MOV R3, R4 iii) SETB PCON-7			
		iv) MOV A, @R2 v) PUSH R7			
	c.	Explain the working of RLCA and RLA instructions with examples.	05	L1	CO2
		Module – 3			
Q.5	a.	State the advantages of programming 8051 in 'C'.	05	L1	CO3
	b.	Explain the differences between sbit, bit and str declarations in 8051 'C'	05	L2	CO3
		program.			
	c.	Write 8051 C program to:	10	L3	CO3
		(i) Convert packed BCD to ACSII and display bytes on port P0 and P1			
		(ii) Convert ASCII digits to packed BCD and display it on port P2.			
		1 of 2			

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OR 26 a. Explain the characteristics and operations of mode-1 timer in 8031. Also to calculate initial count for given delay. 10 1.2 CO3 b. Write a program to generate square wave of frequency 1 kHz on bit 3 of to calculate inter-0 in mode-2. Show thitial count and TMOD endedle 1. Consider timer-0 in mode-2. Show thitial count and TMOD to the calculations in detail. Assume XTAL = 22 MHZ. 05 L2 CO4 2.7 a. Explain the bit status of SCON register. 05 L2 CO4 b. Write a program to transfer the message GOOD' serially at 9600 band for table 2.4 05 L2 CO4 c. Explain the steps to program 80 bit. Show TH1, TMOD and SCON register. 05 L2 CO4 c. Explain the steps to program 80 bit or port-0 and sends it to port P2 10 L4 CO4 c. Explain the steps to program 80 bit with polling method. 05 L2 CO4 b. Write a program to real data from port-0 and sends it to port P2 10 L4 CO4 c. Assume that after RESET, the interrupt priority register IP is set by MOV of table acculations. Use timer-0 interrupt. Explain the working of program. 13 CO4 b. Write a program to real data from port-0 and sequence of interrupts the interface generate sine-2.5 show the 100 L4 CO4 14 CO4 c. Assume that a							
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b. Write a program to real data from poro the original program. continuously, creating a square wave of 200 µs on P2.5. Use timer-0, XTAL = 11.0592 MHz, in mode-2. Show TMOD, THO and IE calculations. Use timer-0 interrupt. Explain the working of program. c. Assume that after RESET, the interrupt priority register IP is set by MOV IP, # 0000100 B. Discuss the default sequence and sequence of interrupts that are serviced. 05 L2 CO4 Q.9 a. Calculate the address range of: (i) 40 × 2 LCD (ii) 16 × 2 LCD 05 L2 CO5 b. Draw the interfacing circuit of DAC 0808 with 8051 microcontroller. Write a program to generate sinewave. Assume 30° interval between each steps. Show the look-up table calculations 05 L2 CO2 c. Draw the control word fall the ports are output ports? is the control word fall the ports are output ports? 05 L2 CO3 c. Draw the construction and working of stepper motor. Define step angle and steps per revolution. 04 L2 CO3 b. Write a program to rotate stepper motor 68° clock wise. Assume step angle = 2°. Use 4 step sequence. c. Wat is an optoisolator? Draw the interfacing eircuit of optoisolater with 8051 microcontroller. 05 L1 CO3			UN		05	L2	- P.
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