CBCS SCHEME

USN | Y2 | 3E | E | 0 | 1 | 3 | BEE403

ACHARYA INSTITUTE OF TECHNOLOGY MCA Library Date ..... BANGALORE

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2025
Microcontrollers

Time: 3 hrs. 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	M	L	C
Q.1	a.	Differentiate between a microprocessor and a microcontroller.	06	L4	CO1
	b.	With the neat block diagram, explain the architecture of 8051 microcontroller.	08	L2	CO1
	c.	Explain PSW register of 8051 microcontroller.	06	L2	CO1
		OR			
Q.2	a.	Write a short note on stack memory.	05	L2	CO1
	b.	Explain the internal memory organization of 8051 microcontroller with a neat memory map.	08	L2	CO1
	c.	What are addressing modes? Mention different addressing modes used in 8051 microcontroller and explain any two in detail with example.	07	L1 L2	CO2
		Module – 2			
Q.3	a.	Explain the following instructions with an example: (i) XCHD A, @R_p (ii) MOVC A, @A+DPTR (iii) RRC A (iv) AJMP absolute address (v) DA A	10	L2	CO2
	b.	Write an assembly program to add two 16 bit numbers stored in memory 20H, 21H, 22H, 23H and store result in 30H, 31H, carry on 32H.	05	L2	CO2
	c.	Explain PUSH and POP instructions with example.	05	L2	CO2
		OR			
Q.4	a.	Explain any four assembler directives used in 8051 microcontroller with example.	06	L2	CO2
	b.	Write an assembly program to transfer 5 bytes from one memory to another memory within internal RAM.	06	L3	CO2
	c.	Explain any four arithmetic instructions and logical instructions.	08	L2	CO2
		Module – 3			
Q.5	a.	Explain various C-data types used in 8051 microcontroller.	06	L2	CO3
	b.	Explain TMOD and TCON with its bit pattern.	08	L2	CO3
	c.	Write 8051 C program to send – 4 to +4 to port 0.	06	L3	CO3

		OR			
Q.6	a.	Write 8051 assembly program to toggle all bits of P_2 continuously 500 ms. Use timer1, 16-bit-mode to generate delay f = 11.0592 MHz.	06	L3	CO3
	b.	Explain mode 2 programming of 8051 time. Describe the different steps to program in mode 2.	06	L2	CO3
	c.	Write 8051 program to generate square wave with t_{ON} = 3 ms and t_{OFF}=7 ms on all pins of port 0. System clock is 22 MHz. Use timer 0 in mode 1.	08	L3	CO3
		Module – 4			
Q.7	a.	Define the following terms with respect to communication: (i) Serial communication (ii) Parallel communication (iii) Simplex communication (iv) Half duplex communication (v) Full duplex communication	05	L2	CO4
	b.	Explain all handshaking signals of RS-232 communication standard.	07	L2	CO4
	c.	Write the steps required by 8051 microcontroller to receive and send data serially.	08	L2	CO4
		OR			
Q.8	a.	Mention different interrupts used in 8051 microcontroller with their interrupt vector table.	05	L2	CO4
	b.	Write an ALP that continuously gets 8-bit data from P_0 and sends it to P_1. While simultaneously creating a square wave of 200 μs on $P_{2.1}$. Use timer 0. XTAL = 11.0592 MHz.	07	L3	CO4
	c.	Explain the bit contents of SCON and PCON registers.	08	L2	CO4
		Module – 5			
Q.9	a.	Interface a stepper motor to 8051 and rotate it by checking the status of a simple toggle switch connected to $P_{2.7}$ as follows : (i) If switch is open rotate the motor clockwise (ii) If switch is closed, rotate the motor counter clockwise directions.	08	L3	CO5
	b.	Explain the salient features of ADC 0804. What are the signals importance while interfacing such as ADC to a 8051 controller.	08	L3	CO5
	c.	Write 8051 program to generate a ramp signal.	04	L3	CO5
		OR			
Q.10	a.	Explain the functional block diagram of 8255.	08	L2	CO5
	b.	Write an ALP to display the message "DONE".	08	L3	CO5
	c.	Draw the block diagram to show how 8051 is connected to DAC 0808 at port P_1 using output buffer for DAC.	04	L1	CO5

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