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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.	With diagrams, explain the RAM structure of 8051 microcontroller.	8	L2	CO1	
	b.	With necessary sketches, explain: (i) Flags and program status word (ii) Stack operation.	8	L2	CO1	
	c.	Write a note on Embedded Microcontrollers.	4	L1	CO1	
OR						
Q.2	a.	With a neat diagram, explain the block diagram of 8051 microcontroller.	8	L2	CO1	
	b.	Write an interfacing diagram of 8051 microcontroller interfaced to 16K bytes of RAM.	8	L2	CO1	
	c.	Compare CISC and RISC architecture.	4	L2	CO1	
Module - 2						
Q.3	a.	Write a program segment to copy the value 55 H into RAM memory locations 40 H to 44 H using, (i) Direct addressing mode, (ii) Register indirect addressing mode without a loop (iii) and with a loop.	6	L2	CO2	
	b.	Explain the following instructions with examples: (i) Move A, @A + DPTR (ii) RRC A (iii) DA A.	6	L2	CO2	
	c.	Briefly explain the arithmetics instructions of 8051 microcontroller.	8	L2	CO2	
OR						
Q.4	a.	Write an assembly language program to multiply the number present in external memory location 800 AH and 8050 H. Store the lower byte of result obtained in R0 and higher byte in R1.	8	L3	CO2	
	b.	Explain the role of CALL and subroutines in 8051 microcontroller programming. Give an example.	4	L2	CO2	
	c.	If the number A6H is placed in external RAM between locations 0100H and 0200H. Write an assembly language program to find the address of that location and place that address in R5 and R7 registers.	8	L3	CO2	
Module - 3						
Q.5	a.	Explain the functions of each bit in the TMOD register.	6	L2	CO3	
	b.	Explain MODE-1 programming of timers in 8051.	6	L2	CO3	
	c.	Write a 8051 C program to transmit the message 'ECE' using serial communication port of 8051. Use baud rate 4800.	8	L2	CO3	

OR					
Q.6	a.	Explain the importance of TI flag and RI flag.	6	L2	CO3
	b.	Write the steps required for programming 8051 to transmit and receive the data serially.	6	L2	CO3
	c.	Explain how timers are used as counters and also explain the counters operation using a code snippet.	8	L2	CO3
Module – 4					
Q.7	a.	Explain the following : (i) Interrupt (ii) Interrupt Service Routine (ISR) (iii) Interrupt Vector Table (IVT)	8	L2	CO4
	b.	Write the instructions to : (i) Enable the serial interrupt, timer 0 interrupt and external hardware interrupt. (ii) Disable the timer 0 interrupt. (iii) Disable all interrupts with a single instruction. Use bit manipulation instructions for all the cases.	6	L2	CO4
	c.	Explain the bit contents of IE register.	6	L2	CO4
OR					
Q.8	a.	List the steps involved in executing interrupts in 8051 microcontroller.	6	L2	CO4
	b.	Assume XTAL = 11.0592 MHz. Use timer 0 to create the square wave. Write an assembly program that continuously gets a 8 bit of data from P(0) and sends it to P(1). While simultaneously creating square wave of 200 μ s period on P2.5.	8	L3	CO4
	c.	Write the interrupt priority upon reset in 8051. Also explain how the priority of the interrupts can be set using IP register.	6	L2	CO4
Module – 5					
Q.9	a.	With neat diagram, write an assembly language program to interface stepper motor to 8051 microcontroller.	10	L3	CO5
	b.	Explain DAC interface with diagram and also write program to generate triangular waveform.	10	L3	CO5
OR					
Q.10	a.	With neat diagram, write an assembly language program to interface LCD to 8051 microcontroller.	10	L3	CO5
	b.	A door sensor is connected to the P1.1 pin and a buzzer is connected to P1.7. Write 8051 C program to monitor the door sensor and when it opens, sound the buzzer. The buzzer can be sound by sending a square wave of a few hundred Hz.	10	L2	CO5
