PVP 23

Code: 23CS5401

II B.Tech - II Semester – Minor Examinations - MAY 2025

COMPUTATIONAL THINKING

(MINOR in COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

BL – Blooms Level CO – Course Outcome

PART – A

		BL	CO
1.a)	What is the role of decomposition in computational problem-solving?	L1	CO1
1.b)	Draw the flowchart for swapping two variables without a temporary variable.	L2	CO1
1.c)	Draw a flowchart to find the square root of a number.	L2	CO1
1.d)	Find the smallest divisor of 91.	L1	CO1
1.e)	What is the most efficient way to reverse an array in-place without using extra space?	L1	CO1
1.f)	If given an array A = [12, 45, 23, 51, 19] determine the maximum element using only one traversal.	L2	CO1
1.g)	What is the key idea behind the two-way merge process in merging two sorted lists?	L1	CO1

1.h)	Why does Binary Search require a sorted array? Explain with an example.	L1	CO1
1.i)	What is the basic approach used in keyword searching within a text document?	L1	CO1
1.j)	What is the advantage of using a sub linear pattern search over a linear search in large text processing applications?	L1	CO1

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Explain how abstraction and pattern recognition help in designing efficient algorithms. Provide an example with a step-by-step problem-solving approach	L2	CO1	5 M
	b)	Write an algorithm and draw a flowchart to exchange the values of two variables using XOR operation. Discuss its computational advantages.	L3	CO2	5 M
OR					
3	a)	Implement an algorithm for computing the factorial of a number.	L3	CO2	5 M
	b)	Given an integer, develop an efficient algorithm to reverse its digits, ensuring it handles both positive and negative numbers.	L3	CO2	5 M

UNIT-II					
4	a)	Develop an optimized algorithm to compute the prime factors of a number.	L3	CO2	5 M
	b)	Implement Euclidean algorithm for computing the GCD of two numbers.	L3	CO2	5 M
OR					
5	a)	How does the Linear Congruential Generator (LCG) work? Implement an LCG-based random number generation algorithm.	L3	CO2	5 M
	b)	Design an algorithm to find square root of a number using trail division method.	L3	CO2	5 M
UNIT-III					
6	a)	Write an algorithm to generate a histogram for character frequency in a given string.	L3	CO3	5 M
	b)	Develop an algorithm to return both the maximum and second maximum values.	L3	CO3	5 M
OR					
7	a)	Explain duplicate removal algorithm with an example.	L2	CO3	5 M
	b)	Implement partitioning of an array algorithm.	L3	CO3	5 M
UNIT-IV					
8	a)	Analyze two-way Merge algorithm.	L4	CO4	5 M
	b)	Compare Linear Search with Binary Search.	L4	CO4	5 M
OR					
9	a)	Analyze sorting by insertion algorithm to	L4	CO4	5 M

		arrange given set of elements in an ascending order [14, 33, 27, 11, 35, 19].			
	b)	Compare Selection Sort with Bubble Sort in terms of efficiency.	L4	CO4	5 M
UNIT-V					
10	a)	Write an algorithm for finding occurrences of a keyword in a given text document.	L2	CO3	5 M
	b)	Explain the sub-linear pattern searching algorithm with an example.	L2	CO3	5 M
OR					
11	a)	Apply keyword searching algorithm so that it will terminate on finding the first complete word-match.	L3	CO3	5 M
	b)	Construct text-line editing algorithm and explain with an example.	L3	CO3	5 M