School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - R1UC404B - E2UC403B - BTCS2402 Analysis and Design of Algorithms

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	List the applications of the Huffman coding algorithm	K1(2)
2)	Discuss the general way of analyzing efficiency of Non recursive & Recursive algorithms	K2(4)
3)	A machine needs a minimum of 200 milliseconds to sort 1000 elements by Quick sort. What is the minimum and maximum time needed to sort 200 elements?	K2(6)
4)	Obtain solution to the Knapsack problem by Dynamic Programming method n = 6, (p1, p2,...p6) = (500, 200, 20, 60, 84, 45) , (w1,w2,...w6) = (100,50,20,10,7,3) and m =165.	K3(9)
5)	Find the solution of the following recurrances using iteration method: i. $T(n)=2T(n/2) + n$ ii. $T(n) = 3T(n/4) + n^2$ (Note:- n^2 is n square)	K3(9)
6)	Solve 2138 × 4967 by applying the Divide and Conquer method.	K5(10)
7)	Write the pseudocode for max-heapify and derive its recurrence relation $T(n)$	K4(12)
8)	Sketch an algorithm to find the minimum and maximum elements from a set of n distinct elements. Your algorithm should not take more than $(3n/2) – 2$ number of comparisons, where n is an exact power of 2.	K5(15)
9)	Explain and analyse the n queens problem using backtracking	K5(15)
10)	Consider the problem of counting the number of substrings that starts with an A and ends with a B in a string. For example, there are four such substrings in CABAAXBYA. Design an efficient algorithm to do this job, other than brute force method.	K6(18)