



B.E DEGREE EXAMINATIONS: MAY 2018
(Regulation 2015)
Fourth Semester
COMPUTER SCIENCE AND ENGINEERING
U15CST401 : Design and Analysis of Algorithms

COURSE OUTCOMES

- CO1: Explain the fundamentals of analysis of algorithm
 CO2: Explain mathematical analysis for recursive and non-recursive Algorithms
 CO3: Identify various algorithms design techniques for different problem
 CO4: Develop algorithms for real life problems using different design techniques
 CO5: Analyze algorithms and estimate their best-case, worst-case and average-case behavior
 CO6: Apply various design technique to solve the problem

Time: Three Hours**Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 1 = 10 Marks)

1. Match list 1 with list 2 and choose the correct answer using the codes given below CO3 [K2]

List 1	List 2
A. Backtracking algorithm	i. Strassen's Matrix Multiplication
B. Divide and Conquer Method	ii. N queen problem
C. Decrease and Conquer Method	iii. Presorting
D. Transform and Conquer Method	iv. Josephus Problem

- | | A | B | C | D |
|----|-----|----|----|-----|
| a) | iii | i | ii | iv |
| b) | ii | i | iv | iii |
| c) | ii | iv | i | iii |
| d) | iii | ii | i | iv |

2. Consider the divide-and-conquer algorithm: CO3 [K2]
- Solutions to the sub problems are combined to get a solution to the original problem
 - The sub problems are solved
 - A problem is divided into several sub problems of the same type

The correct sequence of the divide-and-conquer algorithm is

- | | |
|----------|----------|
| a) 1-2-3 | b) 2-3-1 |
| c) 3-2-1 | d) 1-3-2 |

3. Huffman codes are the applications of _____ with minimal weighted external path length obtained by an optimal set. CO5 [K2]
- | | |
|-----------------------|--------------------------|
| a) Binary Search Tree | b) Minimum Spanning Tree |
| c) Binary tree | d) Weighted Graph |

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

- | | | |
|---|-----|------|
| 11. Find gcd (500, 75) by applying Euclid's algorithm. | CO1 | [K2] |
| 12. State the L' Hospital rule and the Strilings formula. | CO1 | [K2] |
| 13. What is Empirical Analysis? | CO2 | [K1] |
| 14. Define static and dynamic algorithm visualization. | CO2 | [K2] |
| 15. Write about Convex-Hull Problem. | CO3 | [K2] |
| 16. List the three variations in transform and conquer. | CO3 | [K3] |
| 17. Define Floyd's algorithm. | CO4 | [K2] |
| 18. Mention the constraints applications for greedy method. | CO4 | [K3] |
| 19. What is state space tree? | CO5 | [K2] |
| 20. Compare backtracking and branch-and-bound. | CO5 | [K3] |

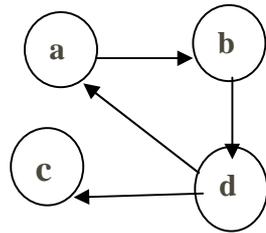
Answer any FIVE Questions: -
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

- | | | | |
|---|------|-----|------|
| 21. (i). Write an algorithm for OBST and obtain a OBST for following nodes {do, if, int, for} while following probabilities {0.1,0.2,0.4,0.3}. | [10] | CO4 | [K2] |
| (ii). Apply the Bubble Sort Algorithm for the following Example: 89, 45, 68, 90, 29 | [4] | CO3 | [K2] |
| 22. (i). Explain the fundamentals of algorithmic problem solving with appropriate diagram. | [7] | CO1 | [K2] |
| (ii). Compute the factorial function $F(n) = n!$ for an arbitrary non negative integer n using mathematical analysis of recursive algorithm. | [7] | CO2 | [K2] |
| 23. (i) Multiply two stressen's matrix multiplication algorithm | [7] | CO3 | [K3] |
| $\begin{vmatrix} 3 & 5 \\ 4 & 6 \end{vmatrix} * \begin{vmatrix} 2 & 7 \\ 8 & 3 \end{vmatrix}$ | | | |
| (ii). Describe string matching algorithm using brute force method for the following example NOBODY – NOTICE is the text and NOT is the pattern to be searched | [7] | CO3 | [K3] |
| 24. (i). Construct Huffman trees for the following character. | [7] | CO4 | [K3] |

Character	a	b	c	d	e	f
Probability	5	9	12	13	16	45

ii). Apply Warshall's algorithm to find the transitive closure of the digraph defined by the following adjacency matrix: [7] CO4 [K2]



25. (i). Explain 0/1 knapsack using dynamic programming with below example W=5 [10] CO6 [K3]

Item	Weight	Value
1	2	12\$
2	1	10\$
3	3	20\$
4	2	15\$

(ii). Describe the 4-Queen problem with neat sketch. [4] CO5 [K3]

26. (i) Explain the mathematical recursive analysis for solving Fibonacci numbers [7] CO2 [K2]

(ii) What are the important problem types? [7] CO1 [K2]

27. Find Travelling Salesman Problem using Branch and Bound Algorithm. CO5 [K3]

