



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::PUTTUR
(AUTONOMOUS)
QUESTION BANK (DESCRIPTIVE)**

Subject with Code: ADVANCED ALGORITHMS (19CS5003) Course & Branch: M.Tech - CSE

Year & Sem: I M.Tech & II Sem

Regulation: R19

UNIT-I

SORTING & GRAPHS

1. What is Topological sorting? Illustrate topological sorting with algorithm [12M]
2. Discuss any two exchange sorting techniques with algorithm [12M]
3. Differentiate graph traversing techniques with algorithm [12M]
4. What is minimum cost spanning tree? Write algorithm for kruskals technique with
Illustration [12M]
5. write sequence of steps to find shortest path using Dijkstra's technique with an example [12M]
6. Illustrate below graph traversing techniques with algorithm
 - a) Breadth first search [6M]
 - b) Depth first search [6M]
7. Narrate sorting techniques using "divide and conquer approach [12M]
8. Describe about Asymptotic notations [12M]
9. Write about following
 - a) Diminishing increment sort [6M]
 - b) sorting using linked list [6M]
10. Compare and Illustrate different "minimum cost spanning tree" finding algorithms [12M]

UNIT-II
MATROIDS & GRAPH MATCHING

1. What is matroid? Illustrate any two greedy algorithm techniques [12M]
2. Write algorithm to compute maximum weight and minimal independent set [12M]
3. Illustrate prims technique with algorithm [12M]
4. Write an algorithm to find out maximum matching in graphs [12M]
5. What is augmenting path? How it is computed with Edmonds Blossom Algorithm [12M]
6. Narrate few applications of spanning trees with example [12M]
7. write about following
 - a) warshall's technique [6M]
 - b) Graph colouring problem [6M]
8. Narrate following in detail
 - a) Huffman coding and compression [6M]
 - b) Travelling sales person problem [6M]
9. Illustrate any three graph applications with algorithms [12M]
10. Discuss the difference between following
 - a) Chromatic numbers in scheduling [6M]
 - b) Directed acyclic graphs in planning activities [6M]

UNIT – III**FLOW NETWORKS & MATRIX**

1. Explain following
 - a) Maxflow-mincut theorem [6M]
 - b) Ford-Fulkerson Method [6M]
2. Narrate Edmond-Karp maximum-flow algorithm [12M]
3. Illustrate strassen's algorithm with an example. [12M]
4. Explain how you use "divide and conquer" in matrix computations [12M]
5. Describe the relation between time complexities of basic matrix operations [12M]
6. Illustrate LUP-Decomposition in detail [12M]
7. Differentiate following techniques
 - a) maximum flows and minimum cuts in a graph [6M]
 - b) Max flow equals min cut [6M]
8. Narrate following in nut shell
 - a) pre-flow push maximum algorithm [6M]
 - b) Bipartite matching problem [6M]
9. Discuss in detail about "Airlines scheduling" algorithm [12M]
10. Pictorially narrate below techniques
 - a) Image segmentation [6M]
 - b) Base ball elimination [6M]

UNIT – IV**GRAPHS & DFT**

1. Explain How to find out path matrix with warshall algorithm [12M]
2. Differentiate Floyd and warshall algorithms [12M]
3. Write algorithms for following
 - a) Travelling sales person problem [6M]
 - b) Towers of Hanoi [6M]
4. Explain interpolation problem in detail [12M]
5. Narrate conversion between Base and Modulo Representation [12M]
6. Narrate Schonhage-Strassen Integer Multiplication algorithm [12M]
7. Explain following
 - a) Chinese Remainder Theorem [6M]
 - b) Fast Fourier theorem [6M]
8. Compare and contrast following
 - a) The FFT using bit operations [6M]
 - b) Products of polynomials [6M]
9. Illustrate polynomial multiplication and division algorithms [12M]
10. Define finite Automata? Discuss Chinese remaindering and interpolation of polynomials [12M]

UNIT – V**LINEAR PROGRAMMING**

1. Illustrate Geometry of the feasibility region and Simplex algorithm [12M]
2. Describe proof of NP-hardness and NP-completeness [12M]
3. Discuss any Randomized algorithms [12M]
4. Explain any 2 Approximation algorithms [12M]
5. Write in detail about Interior point Method [12M]
6. Illustrate advanced number theoretic Algorithm [12M]
7. Describe following
 - a) Polynomial-space-bounded problems [6M]
 - b) Nondeterministic Turing machines [6M]
8. Differentiate following
 - a) row-oriented lower bound on multiplications [6M]
 - b) column-oriented lower bound on multiplications [6M]
9. Narrate how we can implement Dictionaries randomly with algorithm [12M]
10. Compare “Randomized catching” and “chernoff bounds” in detail [12M]