DAA

2-mark

1. How an algorithm's time efficiency is measured.
2. Give expressions for Space and Time analysis of algorithms
3. List the basic steps involved in the Divide-and Conquer strategy.
4. Write the control abstraction of Divide and Conquer strategy.
5. Find the optimal solution and maximum profit of the knapsack problem
6. What is a feasible solution and an optimal solution ?
7. How does dynamic programming differ from divide and conquer?
8. What do you mean by Principle of Optimality?
9. How two queens in a chess board checked for not being in the same diagonal?
10. Give an algorithm for BFS of graph.

1. Define Data Structures.
2. Define Array.
3. What is Stack? Write its Operations
4. What do you mean by Recursion?
5. Name the three fields of doubly linked list.
6. Define Polynomial?
7. What are the various types of tree traversing?
8. What is Graph?
9. Define Algorithm.
10. What is a Quick Sort?

1. Define: Data Structure.
2. Define: Two Dimensional arrays.
3. Explain enqueue operation with example.
4. Implement Push, Pop Operations using arrays.
5. List out the advantages of Doubly Linked List.
6. Define: Circular Linked List.
7. Define: Binary Search Tree.
8. Define: Graph Traversal.
9. What is Hashing? Explain.
10. Distinguish between Sequential Search and Binary Search

1. What do you mean by Amortized Analysis?

2. Give the two major phases of performance evaluation.
3. Give computing time for binary search?
4. What is Merge sort? Is insertion sort better than the merge sort?
5. Write the control abstraction for greedy method.
6. Specify the algorithms used for constructing Minimum cost spanning tree.
7. What are the drawbacks of dynamic programming?
8. State the time efficiency of floyd's algorithm.
9. Define state space of the problem.
10. Define chromatic number of the graph.

1. What is an algorithm?
2. What is randomized algorithm?
3. Give computing time for binary search?
4. What is the use of Stassen's matrix multiplication?
5. State the general principle of greedy algorithm.
6. What is meant by Tree vertex splitting?
7. What are the drawbacks of dynamic programming?
8. State the time efficiency of floyd's algorithm.
9. Define state space of the problem.
10. Define chromatic number of the graph

1. Define time complexity and space complexity.
2. How will you specify an algorithm?
3. State the general principle of divide and conquer.
4. What is Selection Sort?
5. Define Job sequencing.
6. What is Optimal Merge Pattern?
7. What is Knapsack Problem?
8. Write the use of dynamic programming.
9. List out the techniques used in Graph.
10. What is binary tree?

1. What is an Algorithm?
2. Define the term 'Space Complexity'.
3. Define divide-and-conquer strategy.
4. What is the worst case complexity of Merge sort?
5. What is an optimal assignment?
6. What are weighted trees?
7. What is dynamic programming?
8. Define the term principle of optimality.
9. Define Binary Tree.

10. Define Solution state.

1. Differentiate time complexity and space complexity.
2. How does randomized algorithm differ from normal algorithm
3. What is binary search problem?
4. Why is it necessary to have the auxiliary array *b [low: high]* in function Merge?
5. Find an optimal solution to the Knapsack instance n=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10).
6. State optimal merge pattern problem with its greedy selection.
7. Give an expression that finds shortest path between two vertices i and j passing through index K having highest index of a graph.
8. Give the recurrence equation that find the minimum cost edit sequence one string to another.
9. Give pseudo code for BFS and DFS of a graph.
10. Define Backtracking? What are its constraints? List the applications of Backtracking.

1. Write the use of an algorithm.
2. Define Time and Space complexity.
3. Specify the Time complexity of binary search.
4. List the usage of Merge sort.
5. What is Greedy algorithm?
6. Define Spanning Tree.
7. List the use of dynamic programming.
8. What are the different types of graphs?
9. Define Hamiltonian cycle.
10. What is meant by Graph coloring strategy?

1. Define Algorithm.
2. Define the term 'Time Complexity'
3. What is substitution method?
4. What is the worst case complexity of Quick Sort algorithm.
5. Define feasible assignment.
6. What are weighted trees?
7. What are the advantages of backtracking method?
8. Define multistage graph.
9. Define Graph.
10. Define the term 'Answer state'.

5-mark

11. a. Write short notes on Pseudocode conventions with examples.
(Or)
b. Explain the advantages and disadvantages of Randomized algorithms.
12.a. Explain Binary search algorithm with an example.
(Or)
b.Expain about Selection sort algorithm with examples.
13.a. Explain about Kruskal's algorithm with an example.
(Or)
b. Explain about Optimal merge patterns.
14.a. Explain about All-Pairs Shortest Path algorithm.
(Or)
b. Explain how to use dynamic programming to solve a problem with a
multiplicative optimization function.
15.a. Explain the 8-queens problem with an example .
(Or)
b. Write short notes on sum of subsets problem with an example.

11. (a)If S is a set of n elements, the powerset of S is the set of all
possible subsets of S. For example, if S = (a, b, c), then powerset(S) =
{( ), (a), (b), (c), (a, b), (a, c), (b, c), (a, b, c)}. Write a recursive algorithm
to compute powerset(S).
(Or)
(b)Given a 2-sided coin. Using this coin, how will you simulate an n-sided
com
(i) when n is a power of 2? (ii) when n is not a power of 2?
12. (a)Show how divide and conquer technique can be used to compute
the product of two n-digit integers. If *n* is a power of 2, obtain a
recurrence relation for *M(n),* the number of multiplications and solve
It. (Or)
(b)Briefly discuss the procedure used in Strassen multiplication and
analyze its efficiency. Use Strassen's algorithm to compute the matrix
product
13. (a) Compute the minimum cost spanning tree for the following graph
using (i) Prim's (ii) Kruskal's algorithm.
(Or)
(b)Write the Kruskal's algorithm to find the minimum cost spanning tree.
Also trace the algorithm for the graph
.
14. (a)Find in multistage graph given below the minimum cost path from s
to t and its minimum cost

(b)Explain reliability design problem with suitable example.
15. (a)Give backtracking algorithm for N-queen problem
(Or)
(b)State the subset – sum problem and complete state – space tree of
backtracking algorithm applied to the instance A= {3,5,6,7} and
d=15 of the subset – sum problem

11. a. Explain the distinct areas of study of an algorithm.
Or
b. Write a Recursive algorithm to generate Fibonacci series.
12. a. Explain Binary search algorithm with an example.
Or
b. Explain about straightforward algorithm to find maximum and minimum items in a set of 'n' elements.
13. a. Explain about Prim's minimum-cost spanning tree algorithm with an example.
Or
b. Write short notes on Optimal storage on tapes.
14. a. Write short notes on Multistage graphs.
Or
b. Write short notes on string editing.
15. a. Explain about Hamiltonian cycles.
Or
b. Write short notes on graph coloring.

11. (a)What is an algorithm? Write a detailed note on randomized algorithm.
(Or)
(b) Define the following,
i) Best Case ii Worst Case iii) Average Case
12. (a) Explain in detail about Stassen's matrix multiplication with an example.
(Or)
(b)Write an algorithm for binary search and provide an example.
13. (a) Apply Prim's algorithm and find the minimum spanning tree?
10 7 32
9 23
(Or)
(b) Explain in detail about Tree vertex splitting
14. (a) What is multistage graph? Give an example.
(Or)
(b) Explain about string editing.
15. (a) What is Graph Coloring problem? Give an example.
(Or)
(b) Explain the following terms,
i) sum of subsets ii) Hamiltonian cycles.

11. (a) Explain in detail about Performance Analysis.
(Or)
(b) Briefly explain about algorithm Specification.

12. (a) Explain divide and conquer design technique.
(Or)
(b) Explain in detail about Quick Sort with an example.
13. (a) Write Dijikstra algorithm
(Or)
(b) Explain about Optimal Storage on Tapes.
14. (a) For the following graph having 4 nodes represented by the matrix given below determine the all pairs shortest path
1 ∞ 3 ∞
2 0 ∞ ∞
∞ 7 0 1
6 ∞ ∞ 0
(Or)
(b) Write a note on reliability design.
15. For the following graph determine the Hamiltonian Cycle
(Or)
(b) Write an algorithm for breath-first search.

11. (a) Define an algorithm. What are the characteristics of an algorithm?
(OR)
(b) Analyze the time complexity of the following segment
for (i=0;i<n;i++)
for(j=0;j<n;j++)
Sum=sum+1;
12. (a) Explain divide and conquer design technique.
(OR)
(b) If $T(n)=T(n/2)+b$, then prove that $T(n) = O(\log_2 n)$
13. (a) Explain optimal storage on tapes. Give an example.
(OR)
(b) Write Dijikstra algorithm.
14. (a) Write an algorithm for multistage graph using forward approach.
(OR)
(b) Explain all pairs shortest path problem.
15. (a) Write an algorithm for breath-first search.
(OR)
(b) Explain how backtracking is used to solve sum of subsets problem.

11. (a) Write on specifications of Algorithm.
(OR)
(b) Describe Randomized algorithms
12. (a) Write an algorithm based on D and Q to find maximum and minimum of numbers in an array. Find its best, worst and average

case complexities
(OR)
(b) Write an algorithm based on D and Q to Quick sort numbers in an array. Find its best, worst and average case complexities

13. (a) Given n sorted files write an algorithm to merge them into a single sorted file, such that record movement is minimised.

(b) Given a directed, weighted graph G write an algorithm identify the shortest path from a given source vertex to remaining vertices of the graph.

14. (a) Cost of insertion is 1,deletion is 1, change is 2 find the minimum cost of edit sequence convert X into Y
(Or)
(b) Find minimum cost tour from vertex 1 of the following graph

15. (a) What is m-colourability problem . Draw state space tree for a 4 node graph with 3 colours.
(Or)
(b) Bring out basic traversal techniques for a tree

11
.
(a) Differentiate Primitive Vs Composite Data types
(OR)
(b) Give brief notes on Records.

12
.
(a) Explain infix to postfix conversion with an example.
(OR)
(b) Explain the operations of Stack with example.

13
.
(a) How will represent a polynomial? Explain.
(OR)
(b) Discuss the various operations on Linked list.

14
.
(a) How will you represent binary trees in memory?
(OR)
(b) Explain the concepts of Dijkstras Algorithm.

15
.
(a) Write short notes on Divide and Conquer.

(OR)

(b) Explain Hashing.

11. (a) What is an Array? What are the possible operations of an Array? Illustrate them.

(OR)

(b) Explain the three levels of data structure with array concepts.

12. (a) Explain Link Representation of Stack operations with algorithm.

(OR)

(b) How to implement a circular queue operation? Explain it with example.

13. (a) Explain the implementation a list operation using Array.

(OR)

(b) What is the need for a doubly linked list? Explain how it is implemented?

14. (a) Explain with example, Dijkstras Shortest Path Algorithm.

(OR)

(b) Briefly explain with algorithm and example of Depth first search.

15. (a) Write the Concept of Binary Search.

(OR)

(b) Explain with example the Heap sort algorithm

10-mark

16. Explain in detail about performance measurement of a particular algorithm.

17. Explain the Quick Sort procedure with an example.

18. Write a detailed note on Tree Vertex Splitting Problem with an example.

19. How will you solve Travelling Salesman Problem? Explain the procedure involved in it.

20. Explain in detail about the techniques for Graphs with examples

16. Explain in detail about Randomized algorithms with an example.

17. Explain Merge Sort with an example

18. Explain the steps to solve the Knapsack problem using Greedy algorithm.

19. How will you solve Travelling Salesman Problem? Explain the

procedure involved in it.
20. Explain the 8-queens problem with an example. Also develop an algorithm for the same.

16. List out the steps for specifying an algorithm.
17. What is Sorting? Briefly explain about quick sort algorithm with an example.
18. Explain in detail about single source shortest path.
19. Solve the all pair shortest path
3
11
a
c d
b
e
1 2
4 8 4
7
20. Explain the following technique in graphs
i)DFS ii)BFS
4

16. Explain asymptotic notations in detail with suitable examples
17. (a) Write an algorithm to perform binary search on a sorted array. Find its best, worst and average case complexities
(b)Write an algorithm to multiply two square matrices with reduced operations.
18. Explain the greedy based algorithm for the fractional knapsack problem, and prove that this algorithm always yields the optimal solution.
19. Give an algorithm to find shortest path from a source vertex s to sink vertex t in a multistaged graph G and hence solve the following graph

16. Explain the concept of array and its operations with an example.
17. Discuss in detail about the operations on Queue. Give brief notes on Circular Queue.
18. What is Polynomial? Explain the Polynomial addition with source code.
19. Explain the Graph traversal with program.
20. Write an algorithm for merge sort and explain it with an example.

16. Explain in detail the One Dimensional Array and Two Dimensional Array Concepts.

17. Derive an algorithm to convert an infix expression into Postfix Expression using Stack Operations.

18. Describe the Data Structure for Representing a Polynomial Equation of a Variable and write an algorithm to add two Polynomials.

19. Explain with example the binary tree traversal operations using recursion.

20. Write quick sort algorithm. Using Quick sort algorithm sort the array of ten elements.
A = $\{20, -15, 35, 0, 15, 7, -4, 40, 3, 12\}$.

16. Write an algorithm to find the greatest number among the group. Explain its time and space complexity.

17. Write Quick sort algorithm using divide and conquer design technique and analyze its time complexity.

18. Explain Job Sequencing with deadlines with example..

19. Solve the following knapsack problem in dynamic programming.
M=4, n=3, P=$(31, 47, 14)$, W=$(2, 3, 1)$

20. What is Hamiltonian cycle? Develop an algorithm for finding minimum cost Hamiltonian cycle using backtracking principle.

16. Briefly explain the time complexity & space complexity estimation.

17. Distinguish between Quick Sort and Merge Sort and arrange the following numbers in increasing order using Merge Sort.

18. Define spanning tree. Discuss the design steps in Kruskal algorithm to construct minimum spanning tree with example?
A
C
D E
F
B

19. Solve the following knapsack problem in dynamic programming.
M=4, n=3, P=$(31, 47, 14)$, W=$(2, 3, 1)$

20. How backtracking works on the 8 Queen problem with suitable

16.Explain how algorithms are specified with pseudocode conventions

17. Explain the problem of finding the maximum and minimum items in a set of n elements.

18. (a). Explain Prim's Minimum cost spanning tree algorithm and hence find MCST of the graph below.

(b). Explain Prim's Minimum cost spanning tree algorithm and hence

find MCST of the graph below.

19.Give an algorithm for All Pairs Shortest Path problem and hence find shortest path between any two vertices of the following graph

20. State and explain m-coloring problem with its algorithm .Solve it for a 4 node 3 color graph with its state space tree

16. Write note to the following: (i) Steps followed in an algorithm specifications (ii) The Characteristics of Randomized algorithms.

17. Discuss the procedure used for Strassen's matrix multiplications.

18. Explain in detail about Job sequencing with deadlines.

19. Discusses about all pair shortest path with example.

20. Explain the 8-Queens problems with example.