

Time: 40 Min

Max. Marks: 40

- 1] All questions are Compulsory
2] Assume suitable data wherever required

MCQ_SECTION

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which of the following can be used to solve the recursive equation of the form $T(n) = a.T(n/b) + f(n)$?
Option A:	Master Theorem
Option B:	Tree Method
Option C:	Binary Method
Option D:	Heap Method
2.	What is the time complexity of Binary Search Algorithm in worst Case?
Option A:	$T(n) = O(1)$
Option B:	$T(n) = O(n^2)$
Option C:	$T(n) = O(\log n)$
Option D:	$T(n) = O(n \log n)$
3.	Master's theorem is used for?
Option A:	Solving recurrences
Option B:	Solving iterative relations
Option C:	Analysing loops
Option D:	Calculating the time complexity of any code
4.	This is a tree based data structure in which the tree is a complete binary tree
Option A:	Heap

Option B:	AVL tree
Option C:	Red Black Tree
Option D:	Binary Search Tree
5.	In Huffman coding, data in a tree always occur?
Option A:	roots
Option B:	Leaves
Option C:	left sub trees
Option D:	right sub trees
6.	Which of the following algorithm design technique used to design Binary Search?
Option A:	Dynamic programming
Option B:	Brute Force technique
Option C:	Greedy algorithm
Option D:	Divide and conquer
7.	Which of the following array elements represents a min heap
Option A:	12 10 8 25 14 17
Option B:	8 10 12 25 14 17
Option C:	25 17 14 12 10 8
Option D:	14 17 25 10 12 8
8.	Apply Quick sort on a given sequence 8 10 13 6 9 4 3 12. What is the sequence after first phase, pivot is first element?
Option A:	6 3 4 8 9 13 10 12
Option B:	6 4 3 8 10 9 13 12
Option C:	8 6 13 10 9 4 3 12
Option D:	8 6 4 3 9 13 10 12
9.	In which of the following graph Topological Sort can be implemented
Option A:	Directed Acyclic Graphs
Option B:	Undirected Cyclic Graphs

Option C:	Directed Cyclic Graphs
Option D:	Undirected Acyclic Graphs
10.	Which of the following algorithms is the best approach for solving Huffman codes?
Option A:	exhaustive search
Option B:	greedy algorithm
Option C:	brute force algorithm
Option D:	divide and conquer algorithm
11.	Which of the following algorithm is not dynamic programming algorithm?
Option A:	Floyd Warshall algorithm
Option B:	Dijkstra's Algorithm
Option C:	Floyd's algorithm
Option D:	Both Floyd's and Floyd-Warshall algorithm
12.	Strassen's algorithm comes under which type of algorithm
Option A:	Accurate
Option B:	Approximation
Option C:	Recursive
Option D:	Non- recursive
13.	Kadane algorithm is used to find?
Option A:	Maximum sum subsequence in an array
Option B:	Maximum sum subarray in an array
Option C:	Maximum product subsequence in an array
Option D:	Maximum product subarray in an array
14.	Running merge sort on an array of size n which is already sorted is
Option A:	$O(n)$

Option B:	$O(n \log n)$
Option C:	$O(n^2)$
Option D:	$O(\log n)$
15.	Which of the following is true?
Option A:	The divide and conquer approach requires division of the problems so does dynamic programming.
Option B:	In the divide and conquer approach, sub-problems are independent
Option C:	In the dynamic approach, the problems are not independent.
Option D:	In dynamic programming, In the dynamic approach, the problems are not independent but sub-problems are independent. It requires division of the problem.
16.	Given a text of length 'n' and a pattern of length 'm', the size of the prefix table is equal to
Option A:	n
Option B:	m
Option C:	nm
Option D:	n+m
17.	Which data structure is commonly needed to solve the Optimal Merge Pattern Problem.
Option A:	Stack
Option B:	Linked List
Option C:	Binary Tree
Option D:	Graph
18.	What is the longest common subsequence of "LEMON" and "LMONP"?
Option A:	LEMON
Option B:	EMON
Option C:	MO
Option D:	LMON
19.	Which of the following is not an operator in genetic algorithms?
Option A:	Crossover

Option B:	Reproduction
Option C:	Reincarnation
Option D:	Mutation
20.	Which of the following is false?
Option A:	Substring is a continuous sequence of characters within a string.
Option B:	Subsequence is a sequence of characters within a string which is not necessarily continuous.
Option C:	Every substring is a subsequence.
Option D:	Every subsequence is a substring.

DESCRIPTIVE_SECTION

Time: 1.20 Hrs.

Max. Marks: 40

Attempt all questions.

Q2.	Solve any Four	5 marks each
A)	Explain Genetic Algorithm	
B)	Explain Red and Black tree	
C)	Write an algorithm for finding minimum and maximum number from given set.	
D)	What are the different methods of solving recurrences? Explain with suitable example	
E)	Explain coin changing problem	

Q3.	Solve any Two	10 marks each
A)	Explain Huffman algorithm. Construct Huffman tree for MAHARASHTRA with its optimal code	
B)	Compare Greedy and Dynamic Programming approach for an algorithm design. Explain how both can be used to solve Knapsack problem.	
C)	Explain Travelling Salesman Problem with an example	