

- Note:**
1. All questions are compulsory with Internal choice.
 2. Draw neat diagrams wherever necessary.
 3. Figures to the right indicate full marks.

Q.1 Answer the following (any FOUR) (20)

- (a) What is an algorithm? And explain its characteristics.
- (b) Evaluate postfix expression from given expression.
1) $A+(B * C + D) / E$ 2) $A * B - (C + D) + E$
- (c) Write a short note on Big-O Notation, Theta-Θ Notation.
- (d) Explain advantages and disadvantages of any two data structure
a) array b) stack c) link list
- (e) Explain estimating running time / number of steps of executions on paper.
- (f) What is data structure? And explain types of data structure

Q.2 Answer the following (any FOUR) (20)

- (a) Sort a given list using bubble sort.
1) 20,9,6,3,1 2) 3,4,5,1,2
- (b) Write a note on recursion.
- (c) Explain factorial of a given number using recursive and iterative method.
- (d) Explain Tower of Hanoi problem with an example.
- (e) Difference between 1) Recursion and Iteration 2) Linear and binary search.
- (f) Write a note on basic sorting technique.

Q.3 Answer the following (any FOUR) (20)

- (a) Explain divide and conquer technique with its advantages and disadvantages.
- (b) Determine the Longest common subsequence of $x = \text{abaaba}$ and $y = \text{babab}$
- (c) Explain Dynamic Programming Concept with its advantages and disadvantages.
- (d) Explain greedy technique with its application.
- (e) Explain classification of algorithm using Implementation and Design Method.
- (f) Find an optimal merge pattern for files whose length are
46 13 20 10 5 6

Q.4 Answer the following (any FIVE) (15)

- (a) Evaluate addition and multiplication for the following polynomial representation.
1) $3x^2 + 2x + 1$ 2) $5x^2 - x + 2$
- (b) Explain estimating running time / number of steps of executions on paper.
- (c) Explain Fibonacci of a given number using recursive and iterative method.
- (d) Sort a given list using Insertion sort.
1) 6,5,3,1,8,7,2,4 2) 54,26,93,17,77,31,44,55,20
- (e) Explain greedy technique with its advantages and disadvantages.
- (f) Sort a given list using merge sort.
15, 5, 24,8,1,3,16,10,20

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