Important Question's

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BLOCK 1

Ques. 1 What are algorithms? Explain the meaning of the time and space complexity of algorithms ?

Ques. 2 Write any four characteristics of greedy algorithms ?

Ques. 3 By applying the induction method, show that for all positive integers ?
oP(n)= 1^2+ 2^2+.....n^2= n(n+1) (n+2)/6

Ques. 4 Find the complexity of the following code ?

```
for ( i=1, i <= nj,i++ ) {
 for ( j=1, j <= nj, j++ )
{ ifA[j]>B[i] Print A[j]; }}
```

Ques. 5 Order the following functions in increasing order of O() notation: ?
3^n, n, n!, n^2+5, 2n^2+3, 5n+2
O (log n), O (n^3), O (5^n), O (n log n)

Ques. 6 Define O (big Oh) notation and prove or disprove the following using the basic definition of O(big oh) ?
2n^3+n^2+10= O (n^3).

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BLOCK 1

Ques. 7 Explain the big omega notation? Using the definition of big Omega (Ω) ? 6n^2 +20n ≠ Ω (n^3).

Ques. 8 Write linear search algorithms and explain best, average, and worst-case time complexity ?

BLOCK 2

Ques. 1 Find the optimal solution to the knapsack (fractional) problem n= 5 and m= 10 ?

oProfit and weight of each object are given below:

o(P1, P2, P3, P4, P5)= (10, 30, 35, 20, 40).

o(W1, W2, W3, W4, W5)= (3, 5, 2, 6, 1).

Ques. 2 Define the minimum cost spanning tree and use Krushal's algorithms to find the minimum cost spanning tree with the help of an example ?

Ques. 3 Write the Prim's algorithms to find the minimum cost spanning tree ?

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BLOCK 2

Ques. 4 Write an algorithm to search an element (say x) using Binary Search. Analyze time complexity in the worst case ?

Ques. 5 Apply QuickSort to sort the following array. Show all the steps ?
15,5,10,8,7,2,20,30
What are the worst case and best case in QuickSort algorithms

Ques. 6 Differentiate between Depth-First-Search (DFS) VS Breadth -First-Search (BFS) and calculate its time complexity ?

Some important topics

Explain the terms :

- Asymptotic Notations
- Spanning Tree
- Recurrence Relation
- Adjacency Matrix