



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL

BCA Honours 6th Semester Examination, 2022

CC14-BACHELOR OF COMPUTER APPLICATION (62)

DESIGN AND ANALYSIS OF ALGORITHMS

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
All symbols are of usual significance.*

GROUP-A

Answer any five of the following

1×5 = 5

1. What is an algorithm?
2. Define big Oh.
3. What are NP class problems?
4. What do you mean by minimal spanning tree?
5. What is a deterministic algorithm?
6. What is asymptotic notation?
7. Define strongly connected components in a graph.
8. Define shortest path problem.

GROUP-B

Answer any three of the following

5×3 = 15

9. What is the relationship between P and NP? Explain.
10. What do you analyze in an algorithm? What is the basis of analysis? Explain.
11. Explain topological sort with an example.

12. What is branch and bound algorithm? How it is different from backtracking?
13. Write the functional difference of divide and conquer and greedy algorithm.

GROUP-C

Answer any two of the following

10×2 = 20

14. Write a program for recursive binary search to find the given element within array. For what data binary search is not applicable? 8+2 = 10
15. A max heap is given with n elements and its height is log (n). Write an efficient algorithm to find minimum element in heap. Also calculate the time and space complexity. 5+5 = 10
16. What are the steps used to show a given problem is NP complete? Write notes on polynomial time reducibility. Give examples. 5+5 = 10
17. Give the solution for knapsack with branch and bound. The capacity of knapsack is $m = 12$. There are 5 objects with profit $(P_1, P_2, P_3, P_4, P_5) = (10, 15, 6, 8, 4)$ and weights $(W_1, W_2, W_3, W_4, W_5) = (4, 6, 3, 4, 2)$. 10

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