



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 4th Semester Examination, 2023

CC8-COMPUTER SCIENCE (41)

DESIGN AND ANALYSIS OF ALGORITHMS

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Answer all questions with internal choices.*

GROUP-A

Answer any five questions

1×5 = 5

1. What is an algorithm?
2. Define asymptotic notation.
3. What is a minimal spanning tree?
4. What are the graph traversal techniques?
5. Give the complexity of heapsort.
6. What is the time complexity of Merge sort?
7. What is decision tree?
8. What do you understand by worst case time complexity?

GROUP-B

Answer any three questions

5×3 = 15

9. Compute and explain the time complexity of bubble sort.
10. Write a short note on Divide and Conquer technique.
11. Derive and explain the time complexities of pre-processing stage and matching stage of Knuth-Morris-Pratt string matching algorithm.
12. What would be the running time of radix sort on an array of n integers in the range $0 \dots n^5 - 1$ when base-10 representation is used?
13. What is dynamic programming? How is this approach different from recursion? Explain.

GROUP-C

Answer any two questions

10×2 = 20

14. Describe and write quick sort algorithm. Show how quick sort sorts the following sequence of keys 310, 285, 179, 652, 351, 423, 861, 254, 450, 520. Analyze time complexity of the algorithm.
15. Define spanning tree. Write Kruskal's algorithm for finding minimum cost spanning tree. Describe how Kruskal's algorithm is different from Prim's algorithm for finding minimum cost spanning tree.
16. Explain the greedy strategy with example to solve a problem.
17. Explain the DFS and BFS graph traversal algorithm with suitable example.

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