

Mid-West University
Examinations Management Office
End Semester Examinations 2081

Bachelor level/ B.Sc / CSIT 5th Semester

Time: 3 hours

Subject: Design and Analysis of Algorithms (COM453)

Full Marks: 60

Pass Marks: 30

Candidates are required to give their answer in their own words as far as Practicable. The figures in the margin indicate full marks.

Group A

Very short answer questions attempt all the questions.

[8x2 = 16]

1. Write any two Characteristics of linear data Structure.
2. What do you mean by Hash table?
3. Define quick sort.
4. Write the type of array? Explain.
5. How many ways to represent Graph? explain.
6. Write any two advantages of dynamic programming over greedy method.
7. What is Breadth First Search (BFS)?
8. Write a component of Graph?

Group B

Short answer questions. Attempt any five questions.

[5x4 = 20]

9. What is Stack? Explain the operation of stack.
10. Define Minimum Spanning Tree. Explain Prims algorithm.
11. What is concept of Divide and Conquer? Explain the application of Divide and conquer.
12. Explain simple polygon, self-intersecting polygon and diagonal of a simple polygon with example.
13. Find the largest Common Sub Sequence (LCS) between Str1 = Stone and Str2 = Longest.
14. Explain P and NP classes problems.

Group C

Long answer questions. Attempt any three questions.

[3x8 = 24]

15. Explain the Big – Oh, Big Omega and Big Theta notation with suitable Example.
16. What is Recurrence Relation? Find the big -O of following recurrence using recurrence tree and Substitution and Master method.

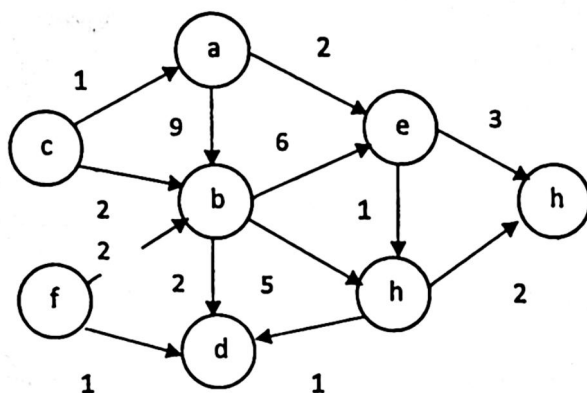
$$T(n) = \sum_{n \geq 0} T(n - 1) + 1$$

17. What is knapsack problem? Explain the types of knapsack problem. A thief is planning to rob a store and can carry a maximum weight of 8 units in their knapsack. There are 4 items available in the store, each with a specific profit and weight. The profit (p[]) and weights (w[]) of the items are as follows:

Item	I1	I2	I3	I4
profit	1	2	5	6
Weight	2	3	4	5

Find the maximum profit using 0/1 knapsack problem.

18. Explain the Directed Acyclic Graph (DAG). Find the shortest path from the vertex c to all other vertices in the following DAG.



The End