Mid-West University

Examinations Management Office

Semester End Examination 2081

Bachelor level/ B. Sc. (CSIT)/ 5th Semester **Full Marks: 60**

Time: 3 hours **Pass Marks: 30**

Subject: Design and Analysis of Algorithms (COM453)

Candidates are required to give their answers in their own words as far as practicable. Figures in the margins indicate marks.

Group A

Very short answer questions (Attempt *All*). **[8x2 = 16]**

1. Write an advantage and disadvantage of algorithm.
2. What is recursive function?
3. Define characteristic of linear data structure.
4. Write any two operations of array.
5. How many ways to represent Graph? Explain.
6. Write any four application of divide and conquer approach.
7. What is Breadth First Search (BFS)?
8. Write a component of Graph.

Group B

Short answer questions (Attempt *Any Five*). **[5x4 = 20]**

9. Suppose that a message contains alphabet frequencies as given below and find the Huffman code for each alphabet.

Symbol	Frequency
A	45
B	13
C	12
D	16
E	9
F	5

10. Write difference between Dynamic programming and Greedy method.
11. Define quick sort algorithms and time complexity.
12. What is Fractional Knapsack Problem? Consider 3 items along with their weights and values respectively.

    I1 w1 = 10 v1 = 60

    I2 w2 = 20 v2 = 100

    I3 w3 = 30 v3 = 120

    The knapsack has capacity W= 50, then find optimal profit earned by using fractional knapsack.
13. Define and draw simple polygon, convex polygon.
14. Explain P and NP classes problems.

Group C

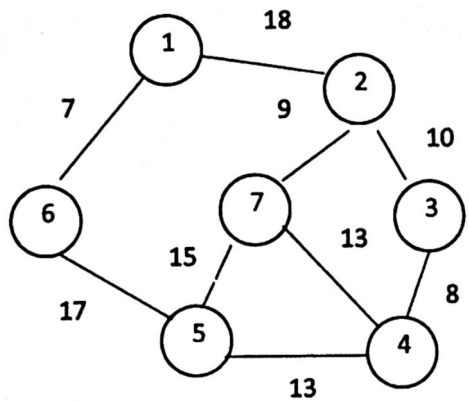
Long answer questions (Attempt *Any Three*). **[3x8 = 24]**

15. Define asymptomatic notation. Explain its types with examples.

16. What is Recurrence Relation? Find the big -O of following recurrence using recurrence tree and Substitution method.

$$T(n) = \sum_{2T(n-1)+1}^{\perp} \quad \begin{matrix} n=0 \\ n>0 \end{matrix}$$

17. Write down the advantage of dynamic programming over greedy method. Given, four matrices A, B, C, and D with shapes (4,5), (5,3), (3,10), and (10,2) respectively, how would you use the matrix chain multiplication method to calculate the multiplication of these matrices?
18. What is Minimum spanning tree? Explain algorithm of Kruskal's algorithm and find the MST following graph using Kruskal's algorithms.



The End