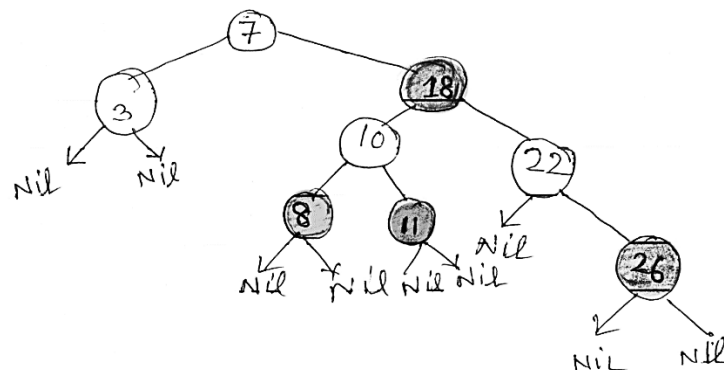


SH-IV/Com.Sc./401/C-8/19

B.Sc. 4th Semester (Honours) Examination, 2019**COMPUTER SCIENCE****(Analysis and Design of Algorithms)****Paper : 401/C-8****Course ID : 41511****Time: 1 Hour 15 Minutes****Full Marks: 25***The figures in the right hand side margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**The figures in the right hand side margin indicate marks.**The questions are of equal value.*

1. Answer *any five* the following: 1×5=5
 - (a) Write difference between θ notation and O notation.
 - (b) Write the worst case time complexity of insertion sort and heap sort.
 - (c) What is meant by amortized analysis?
 - (d) For what type of problems dynamic programming algorithms are useful?
 - (e) What is meant by Greedy algorithm?
 - (f) Define Red-Black tree.
 - (g) What is the basic difference between Red-Black tree and Binary Search tree?
 - (h) What is the basic principle of counting sort?
2. Answer *any two* of the following: 5×2=10
 - (a) Compare between dynamic programming approach and divide and conquer approach. Write the basic steps to develop a dynamic programming algorithm. Write the name of a problem that can be solved using dynamic programming algorithm. 2+2+1=5
 - (b) Calculate the time complexities of quick sort in case of worst case partitioning and best case partitioning. What is the best case running time of merge sort? 2+2+1=5
 - (c) Write the properties of a red-black tree. Insert 2, 6, 13 in the following red-black tree. [Shaded nodes are red] 2+3=5

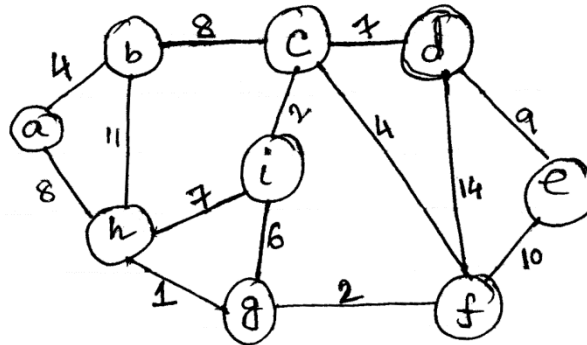


- (d) What is heap? Write an algorithm to construct a heap from an array of data elements. 1+4=5

3. Answer any one:

10×1=10

- (a) Write Prim's algorithm. Construct a minimum spanning tree for the following graph using Prim's algorithm.



What is the minimum weight of your spanning tree? Is there any other MST with same weight?

3+4+1+2=10

- (b) Compare between breadth first search and depth first search. Write pseudo code for BFS. Explain your pseudo-code with suitable example.

2+5+3=10
