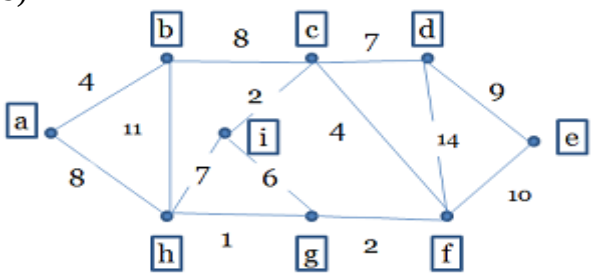
1	a) A King's garden has thousands of flowerpots which are very expensive and require careful handling. One day king's princess says that she wants to watch the flowerpots arranged in the order of number of flowers in each pot. Garden supervisor orders his subordinates to move the flowerpots in such a way so that there is minimum movement in terms of the total distance moved from the current position and final position of all the flowerpots. This is required to minimize the damage that may be done to the delicate flowerpots due to heavy movements. If the supervisor takes advice from you, what kind of sorting mechanism and data structure you will suggest so as to minimize the total movement of the flowerpots. Suppose supervisor provides you with the pot number and the number of flowers in each pot. Justify your answer. b) Prove that the randomized Quick Sort has the Expected Worst case time of O(nlgn) and it also alleviates the problem of adversary input to overcome any security threats related to that. Discuss with the help of proper example and diagram.	4+4
2	a) Most popular complexity functions are lgn, n, nlgn, n^2, 2^n . What are the repercussions of these complexity functions. For what kind of input these can be used. Give one example for each of these complexity functions. What are the limitations of these complexity functions, if any. b) Use the 8,45,37,32,88,98,54,21,42,56 series and apply Linear Probing, quadratic probing and double hashing techniques on these values. Also Comment on various positive and negative aspects of these techniques.	4+4
3	a) Write a proof for the Interval Scheduling algorithm, which proves that the solution will be always optimal using a particular hypothesis of Greedy programming. Prove using stay ahead technique. b) Write algorithm for Searching, Insertion and deletion in a Skip List. Also take appropriate example to iterate through the algorithm.	4+4
4	a) B-Trees are being used extensively in the Industry. Discuss the reasons. What are the properties of the B-Tree. What are the cases of Underflow and Overflow at the time of Deletion and Insertion Operations. Draw these cases and solve the problem of overflow and underflow. b)  Solve the above Graph Using Kruskal Approach for Minimum Spanning Tree Using Disjoint Set (Union-Find) Data Structure.	4+4
5	a) How the splay trees fulfil Working Set Property and Dynamic Finger Property.How it is beneficial. b) We need to find ith item in the list of numbers. Make your case to use Augmented Red-Black Tree Data Structure. What Additional Information you will use and how it will fit in the overall complexity.	4+4