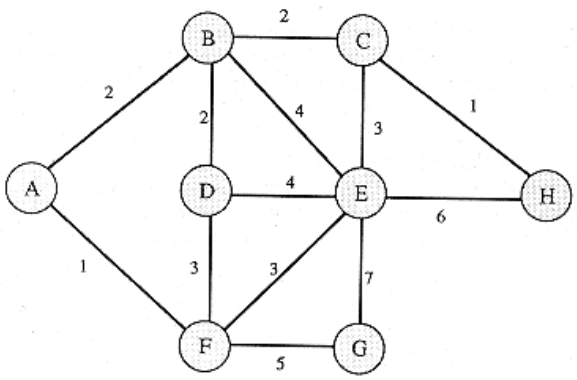
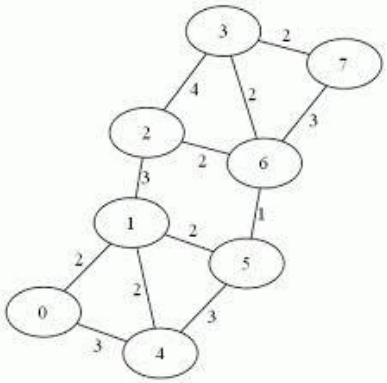
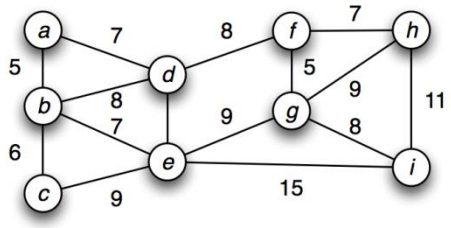
BE Semester-__VIII__ (Information Technology) Question Bank

(Design and analysis of algorithm)

All questions carry equal marks(10 marks)

1.	Explain insertion sort and simulate it for following data sequence: 11 66 88 44 22 33 99 77
2.	Define the term minimum spanning tree. Apply prim's algorithm to find MST for following graph 
3.	Solve the binary knapsack using greedy approach for given data: I = <I1, I2, I3, I4, I5>, w = <1, 3, 4, 6, 7>, v= <2, 4, 7, 10, 13>, Knapsack capacity W = 25
4.	Solve the activity selection problem using greedy approach for followings set of activities: Set of activities, A = <A1, A2, A3, A4, A5, A6, A7> Start time S = <1, 2, 3, 4, 5, 6, 7> Finish time F = <3, 6, 2, 5, 8, 7, 10>
5.	Differentiate: • Greedy method v/s Divide and conquer • Greedy method v/s Dynamic Programming • Dynamic Programming v/s Divide and conquer • Merge sort v/s Quick sort
6.	Using DYNAMIC PROGRAMMING, find minimum number of coins require to solve make a change problem for given data: Set of denominations, D = <1, 3, 4>, Amount N = 6
7.	Find Longest common sub sequence for given strings and trace back the solution: X = a b c a a b c b a

	Y = a c b a b c b
8.	Explain the terms with suitable examples: • Amortized analysis • Asymptotic notation
9.	Find the best and worst case analysis of quick sort
10.	Write pseudo code of binary search. Explain it with suitable example
11.	Derive the best case and worst case time complexity of Insertion sort
12.	Find the DFS and BFS traversal sequence for given graph. 
13.	Explain and apply krushkal's algorithm to find minimum spanning tree of following graph 
14.	Explain in detail: Insertion sort
15.	Explain following terms: Big oh, Big omega, Big theta, Little omega, Little oh
16.	Multiply following two numbers using divide and conquer method: 1234 X 4567
17.	Write traveling salesman problem.
18.	Write a short note on Greedy Method.
19.	Using dynamic programming, solve longest common subsequence problem.
20.	Differentiate (i) surjective and bijective function

	(ii) P and NP problem
21.	Write Dijkstra's algorithm.
22.	Explain with example greedy procedure and dynamic programming.
23.	Explain Rabin Karp algorithm with example.
24.	Define and Give an example of relation that is reflexive, transitive and symmetric.
25.	Write a procedure to insert and delete an element in binary search tree.
26.	Write master theorem and give example.
27.	Write Bellman-Ford algorithm.
28.	How can you solve recurrence equation? Explain with suitable example substitution method.
29.	Explain naïve string matching for string (1,1,1,1,0) and pattern (1,1,0).
30.	Write algorithm for MATRIX-CHAIN multiplication.
31.	Explain (i) Valid and invalid shift in pattern matching (ii) Prefix and suffix of string (iii) Abstract problem and decision problem (iv) Domain and codomain of function.
32.	Define big-Oh and Ω notation (i) 2^{300} show big – Oh notation. (ii) 3logn+loglogn show Ω notation.
33.	Use master theorem to give tight asymptotic bounds for the following recurrences. (i) $T(n)=4T(n/2)+n$ (ii) $T(n)=4T(n/2)+n^2$
34.	Explain the String matching with finite automata.
35.	Show the construction of recursion tree for the recurrence $T(n)=2T(n/2)+cn$.
36.	Explain the term equivalence relation and equivalence class. Explain the term cardinality and singleton.
37.	Give examples of relations that are a. Reflexive and symmetric but not transitive. b. Reflexive and transitive but not symmetric.
38.	Define directed graph, undirected graph, out-degree, in-degree of graph.
39.	What is a binary search tree? Explain preorder tree walk and postorder tree walk.
40.	Write an algorithm to add 2 numbers and find worst case analysis.