



B TECH
(SEM IV) THEORY EXAMINATION 2018-19
DATA STRUCTURES

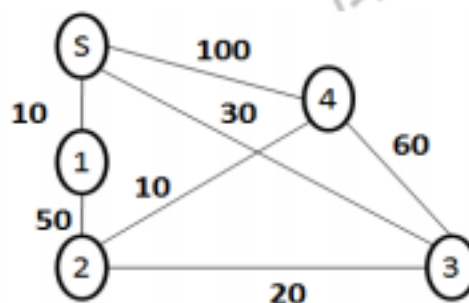
Time: 3 Hours**Total Marks: 70****Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**
- What is asymptotic notation? Explain Big Oh notation?
 - Given a 2D array A [-100:100,-5:50]. Find the address of element A [99, 49] considering base address 10 and each element requires 4 bytes for storage. Follow row major order?
 - If the in order traversal of a binary tree is D, J, G, B, A, E, H, C, F, I and its pre order traversal is A, B, D, G, J, C, E, H, F, I Determine the binary tree?
 - Evaluate postfix expression $8\ 2 -\ 4 +\ 5\ 6\ 7 -\ +\ \times$
 - Explain collision resolution strategies used in hashing?
 - Write a recursive solution to solve Tower of Hanoi problem.
 - Define complete binary tree and full binary tree.

SECTION B

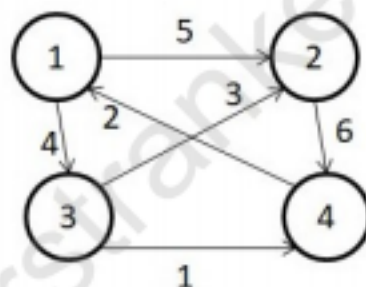
2. Attempt any *three* of the following: **7 x 3 = 21**
- Consider the following infix expression and convert it into postfix using stack
 $A + (B * C - (D/E - F) * G) * H$
 - What is doubly linked list? Write an algorithm to insert a node at begin in single linked list.
 - Construct a Huffman tree for given characters A, B, C, D, E, F, G, H having frequencies 22, 5, 11, 19, 2, 11, 25, 5 respectively. What will be the code of HEAD in binary?
 - Find the shortest path from S to all remaining vertices of graph using Dijkstra Algorithm



- e. Use Heap sort algorithm to sort the following sequence {8, 5, 45, 24, 36, 11, 43, and 21}.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7
- What do you understand by time space trade off? How to analysis the time complexity of the algorithm in three different cases.
 - What is circular linked list? Write an algorithm to delete a node from begin in single linked list.
4. Attempt any *one* part of the following: 7 x 1 = 7
- What do you mean by priority queue? Explain the types to maintain the priority queue in memory?
 - Write an algorithm for conversion of an infix expression into prefix expression using stack?
5. Attempt any *one* part of the following: 7 x 1 = 7
- Draw a binary tree with following traversals:
Preorder: **A B C D E F G H I J K L**
Postorder: **C F E G D B K J L I H A**
 - What is threaded binary tree? Explain two-way in order threading with suitable example?
6. Attempt any *one* part of the following: 7 x 1 = 7
- Implement Floyd Warshall algorithm on the following graph.



- What is transitive closure? What are the steps to obtain the transitive closure of a Graph?
7. Attempt any *one* part of the following: 7 x 1 = 7
- Describe an AVL tree. Construct an AVL tree by inserting the following elements in the order of their occurrence {60, 2, 15, 20, 12, 115, 90 and 88}.
 - Show the results of inserting the keys F, S, Q, K, C, L, H, T, V, W, M, R, N, P, A, B in order into a empty B-Tree of order 5.