

### MCSE/MSE-102

M.E./M.Tech., I Semester Examination, June 2020

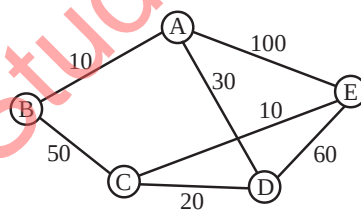
### Advanced Data Structure and Algorithm

Time : Three Hours

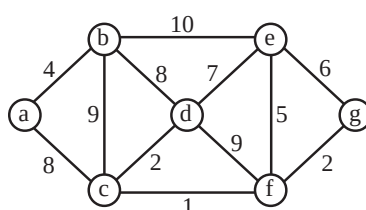
Maximum Marks : 70

- Note:** i) Attempt any five questions.  
 ii) All questions carry equal marks.  
 iii) Figures to the right indicate full marks.

1. a) What do you mean by asymptotic notations? Why is it used? Explain any two asymptotic notations. 7  
 b) Provide pointer implementation of ADT circular linked list. 7
2. a) Explain inorder, preorder and postorder traversal operations on binary tree with example. 7  
 b) What are AVL trees? Insert the following sequence of elements into an AVL tree, starting with an empty tree: 10, 20, 15, 25, 30, 16, 18, 19. 7
3. a) What do you mean by priority queue? Explain the types to maintain the priority queue in memory. 7  
 b) Write an algorithm for conversion of an infix expression into prefix expression using stack. 7
4. a) Explain garbage collection algorithms for equal sized blocks. 7  
 b) What are the advantages of buddy systems? How does they work? Explain with example. 7
5. a) Use quick sort algorithm to sort 15, 22, 30, 10, 15, 64, 1, 3, 9, 2. Is it a stable sorting algorithm? Justify your answer. 7  
 b) Write Dijkstra's algorithm for finding shortest path. Describe its working for the graph given below. 7



6. a) Explain Floyd Warshall's algorithm with the help of an example. 7  
 b) Find the minimum spanning tree in the following graph using Kruskal's algorithm. 7



[2]

7. a) 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 an empty B-tree of order 5. 7
- b) What is transitive closure? What are the steps to obtain the transitive closure of a graph? 7
8. a) Write merge sort algorithm. Explain how it works. Sort the following sequences of keys by using merge sort: 38, 27, 43, 14, 19, 82, 10, 35, 28, 55, 17, 44, 5, 38. 7
- b) What are the various algorithm design techniques? Illustrate the difference between dynamic programming and greedy algorithm by using examples. 7

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