

Data Structure & Program Design Paper – II

P. Pages : 3

Time : Three Hours

**KNT/KW/16/7294**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.

1. a) How to decide performance of an algorithm? Explain big O notation in brief. 5
- b) Suppose 'A' array contains 10 elements as follows : 7
10,23,44,11,2,66,3,9,7,63. Sort array 'A' using Quick Sort.
- c) Explain in brief Abstract Data Type. 2

OR

2. a) Write short notes on.
 - i) Flowchart and its symbols. 6
 - ii) Omega Notation.
- b) Write a function to implement heap sort. 4
- c) What do you mean by Divide and conquer strategy? Give Suitable example with uses this strategy. 4
3. a) Write an algorithm for addition of two polynomials. 5
- b) Discuss dynamic memory allocation. State advantages and disadvantage of it. 4
- c) Write "C" function to perform the operation to traverse in singly linked list. 4

OR

4. a) Given a polynomial of a single variable, a represent as a link-list. Write a function to differentiate the polynomial. Do not create another list. 7
- b) What is Doubly linked List? Write an algorithm to reverse the links of doubly Linked list? 6
5. a) Give the tabular representation of steps to convert the following infix notation to postfix using stack. 6
 $A + (B * C - (D / E^F) * G) * H.$

b) Write short notes on **any two**.

7

i) Multiple stacks.

ii) Circular Queue.

iii) Evaluation of postfix expression.

OR

6. a) Write algorithm for POSH and POP operation on stack.

5

b) A binary number is stored in singly. Link-list, with each node used to store one bit of a number. Write a function to find decimal equivalent of a binary number.

8

7. a) What is binary Search Tree? If we delete a node from BST and then insert the node again in BST, is the resulting BST necessarily the same as before. Justify your answer with a suitable example.

7

b) Write an algorithm for postorder traversal of Binary Tree (Non-recursive).

6

OR

8. a) Draw the tree, represented for the following prefix expression.

6

i) $*a - b * c - de$

ii) $*a + *b - cde$

iii) $*+abc / df$.

b) Write short notes on.

i) AVL Trees.

3

ii) Threaded Binary Tree.

4

9. a) Differentiate between DFS and BFS techniques of graph traversal.

4

b) Define the following.

10

i) Complete graph.

ii) Degree of a graph.

iii) Path of a graph.

iv) Strongly connected component.

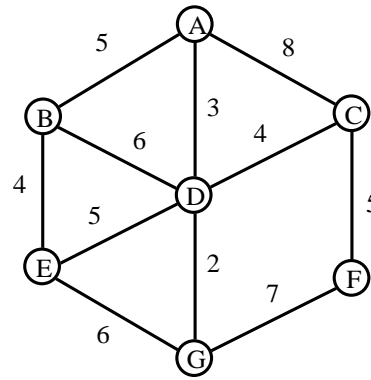
v) Hamiltonian path.

vi) Isolated Vertex.

Explain each term with a suitable example.

OR

10. a) Construct the minimum cost spanning Tree (MST) for given graph using Kruskal's algorithm. 8



- b) Write non-recursive algorithm for Breadth-First search. 4
- c) What are the advantages of adjacency list representation of a graph over the adjacency matrix representation? 2
11. a) Insert the integers 64, 36, 21, 8, 34, 19, 13 into initially empty hash tables using hash function $h(x) = x \bmod y$. 7
- i) Using Linear resolution of collision.
- ii) Using Linear resolution of collision with slip size 3.
- b) What is hashing? Explain division method of hashing to store the following values in hash table. 3
- 45, 96, 102, 101, 162, 25, 197, 201
- c) What is Static hash table? 3

OR

12. a) What are the different collision handling mechanisms? Explain each with suitable example. 7
- b) Explain with suitable example implementation of open hash table and closed hash table? 6

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