Reg. No. :

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The preprocessor directive #include is required if
   (a) Console output is used   (b) Console input is used
   (c) Both console input and output is used   (d) None of these

2. _____ operands are used for overloading of binary operator using member function.

   (a) 2   (b) 3   (c) 1   (d) 0

3. The void type is used for
   (a) Returning the value   (b) Creating generic pointers
   (c) Creating functions   (d) A void error

4. Pick out the correct statement in function template
   (a) One function will work with many different types
   (b) it will take a long time to execute
   (c) duplicate code is increased
   (d) None of these

5. A mathematical-model with a collection of operations defined on that model is called
   (a) Data Structure   (b) Abstract Data Type
   (c) Primitive Data Type   (d) Algorithm

6. What kind of initialization needs to be done for an open-address hash table?
   (a) None.
   (b) The key at each array location must be initialized
   (c) The head pointer of each chain must be set to NULL
   (d) Both B and C must be carried out

7. A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24. The number of nodes in the left sub-tree and right sub-tree of the root respectively is
   (a) (4,7)   (b (7,4)   (c) (8,3)   (d) (3,8)

8. Which algorithm is used for obtaining minimum spanning tree, were choosing the adjacent vertices of already selected vertices is not necessary
   (a) Prim's   (b) Kruskal
   (c) Dijikstra   (d) Topological sort

9. Spanning tree has how many edges?
   (a) n   (b) n+1   (c) n-1   (d) n+2

10. How many rotations are there in AVL tree
   (a) 3   (b) 4   (c) 5   (d) 6

PART - B (5 x 2 = 10 Marks)

11. Write a C++ code to create an array of 10 integers dynamically.

12. Write a C++ program to open and close the file.

13. Show how will you represent polynomial in linked representation.

14. How many nodes will be there in a minimum spanning Tree, if it is derived from a graph of *n* nodes? Justify your answer with a pictorial representation only.

15. Define Sorting. List out its types.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Write a program to input 5 nos. in array A[ ] and 5 nos. in array B[] and merge the elements of the array alternately into a third array C[] of size 10 and display all the three arrays. So if

   A[ ] = {10, 20, 30, 40, 50} and
   B[ ] = {11, 22, 33, 44, 55} then
   Resulting array C[ ] = {10, 11, 20, 22, 30, 33, 40, 44, 50, 55}   (8)

   (ii) What is a constructor? List the different types of constructor. With a suitable program explain how the dynamic constructor reduces memory wastage while creating objects?   (8)

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(b) What is dynamic initialization of objects? Why is it needed? How is it accomplished in C++? Illustrate. (16)

17. (a) (i) Assume that the test results of a batch of students are stored in three different classes, student, test and result. Write a program using multilevel inheritance to print the result of two students having two subject marks. (8)

(ii) Write a C ++ program to count and display the number of BLANK SPACES in an existing text file notes.txt. (8)

Or

(b) Explain exception handing in detail with example programs. (16)

18. (a) Explain about lists and types of list in detail with suitable diagrams and example code. (16)

Or

(b) Write an ADT to implement stack of size N using an array. The elements in the stack are integers. The operations to be supported are PUSH, POP and DISPLAY. Taken into account the exceptions of stack overflow and stack underflow. (16)

19. (a) Explain Binary tree and Binary Search tree in detail with example diagrams.(16)

(b) What is a Binary Search Tree (BST)? Make a BST for the following sequence of numbers.
    45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48
    Traverse the tree in Preorder, Inorder and Postorder. (16)

20. (a) Explain a sorting technique which follows divide and conquer mechanism with an example. (quick & merge sorts). (16)

Or

(b) (i) Sort the following sequence of keys using merge sort:
    66, 77, 11, 88, 99, 22, 33, 44, 55 (8)

(ii) Write an algorithm to sort a given list using quick sort method. Describe the behaviour of quick sort when input is already sorted. (8)

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