Reg. No. :

Question Paper Code: 43223

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Electronics and Communication Engineering

14UCS323 - DATA STRUCTURES AND ALGORITHM ANALYSIS

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A function can be defined outside the class using _____ operator.

    (a) ::   (b) .   (c) ->   (d) *

2. _____ constructor is called automatically when the copy of object is passed as its argument.

    (a) Default   (b) Parameterized   (c) Dynamic   (d) Copy

3. If you design a class that needs special initialization tasks, you want to design a(n) _____

    (a) Housekeeping routine   (b) Initializer
    (c) Constructor   (d) Compiler

4. _____ inheritance uses both multiple and multilevel inheritance

    (a) Hierarchial   (b) Hybrid   (c) Single   (d) Multipath

5. A heap is a _____.

    (a) Binary tree   (b) Full binary tree
    (c) Complete binary tree   (d) Binary search tree

6. A mathematical-model with a collection of operations defined on that model is called

    (a) Data Structure   (b) Algorithm

    (c) Primitive Data Type   (d) Abstract Data Type

7. Which of the following is a balanced tree?

    (a) Binary search tree   (b) Binary tree

    (c) AVL tree   (d) Expression tree

8. The data structure required for Breadth First Traversal on a graph is

    (a) queue   (b) stack   (c) array   (d) tree

9. The running time of the shell sort using hibbard increment

    (a) N^2 (b) $N^{3/2}$ (c) N^3 (d) N^N

10. Which of the following algorithm design technique is used for matrix multiplication?

    (a) Divide and Conquer   (b) Dynamic Programming

    (c) Greedy algorithm   (d) Backtracking

PART - B (5 x 2 = 10 Marks)

11. List the merits and demerits of the friend function.

12. Define virtual destructor.

13. What are the properties of the binary heaps?

14. Define minimum spanning tree.

15. Explain the performance analysis of the algorithm.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Discuss the various concepts of object oriented programming languages.   (10)

        (ii) Write a program to calculate the area of circle, triangle, and rectangle using function overloading.   (6)

Or

(b) Explain in detail about constructors and destructors. Write a C++ program to compute the area of square, circle and rectangle using constructors. (16)

17. (a) (i) Write a C++ program to concatenate two strings by operator overloading. (8)

(ii) Explain about function templates with multiple arguments. (8)

Or

(b) Explain how to handle multiple exceptions in C++ with an example. (16)

18. (a) Write suitable routines to perform the following operations in a doubly linked list ADT

(i) Insert 15, 67, 43, 21, 90 into a doubly linked list (6)

(ii) Delete 43 from the list. (6)

(iii) Find the position of an element 'X' in the doubly linked list. (4)

Or

(b) (i) Write a procedure to insert a new node in binary heaps. (6)

(ii) Given input {1, 64, 25, 16, 49, 4, 9.36, 81} and a hash function $h(x) = x \ (mod \ 10)$, show the resulting: (i) open hash table (ii) closed hash table using linear probing (iii) closed hash table using quadratic probing (iv) closed hash table with second hash function $h2(x) = 7 - (x \ mod7)$. (10)

19. (a) (i) Write a program to insert and delete the elements in a binary search tree. (10)

(ii) Discuss briefly about binary tree traversals. (6)

Or

(b) Explain AVL tree with suitable example. (16)

43223

20. (a) Explain in detail how the elements can be sorted using Quick sort? Sort the following elements 34, 67, 23, 15, 90, 82, 71, 59. (16)

Or

(b) (i) Which sorting algorithm is best suited for a partially sorted list? Give an example. (8)

(ii) How will you find the shortest path between every pair of vertices in a given graph? Give example. (8)