Reg. No. : | | | | | | | | | | |

Question Paper Code: 43223

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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. Format flags may be combined using

   (a) The bitwise OR (|) (b) The logical OR (||)
   (c) The bitwise AND (&) (d) The logical AND (&&)

2. The use of the break statement in a switch statement is

   (a) Optional (b) Compulsory
   (c) Not allowed (d) To check an error

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. In the following which is open addressing hashing mechanism?

(a) Separate chaining (b) Double hashing
(c) Rehashing (d) Extensible hashing

7. Binary tree has *N* number of nodes with two children. How many leaf nodes are available in a tree?

(a) *N+2* (b) *N!* (c) *N+1* (d) *logN*

8. The classic example for NP-complete problem is

(a) Dijikstra's algorithm (b) Floyds algorithm
(c) Travelling salesman problem (d) None of these

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. What are the ways in which a constructor can be called?

12. What is the purpose of virtual functions?

13. List the applications of a stack.

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) Define constructor. Explain types of constructor with example in C++. (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) (i) Write a program to implement the class template for Queue operations. (10)

(ii) What is meant by exceptions? How an exception is handled in C++? Explain with the help of an example. (6)

18. (a) Explain with an example the formation of heap data structure and the properties to be found in a heap. (16)

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) Write routines to implement the basic Binary search tree operations

(i) Insert 3, 1, 4, 6, 9, 2, 5, 7 into an initially empty Binary search tree (6)

(ii) Delete element '4' from the tree (6)

(iii) Return the greatest element in the tree. (4)

Or

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

20. (a) Write a program to explain bubble sort. Which type of technique does it belong? What is the worst case and best case time complexity of bubble sort? (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)