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

Question Paper Code: 53223

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Third Semester

Electronics and Communication Engineering

01UCS323 - DATA STRUCTURES AND ALGORITHM ANALYSIS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. How is member function of a class defined?
2. Define operator overloading.
3. State the use of pointer.
4. Write syntax for class template.
5. Define Linked List. List the types of Linked List.
6. Write brief note on properties of binary heap.
7. Prove that the maximum number of nodes in a binary tree of height h is $2^h - 1$.
8. Define Topological sort.
9. Write the steps involved in bucket sorting.
10. Define Divide and Conquer technique. Give an example.

PART - B (5 x 16 = 80 Marks)

11. (a) Design a matrix and vector classes with necessary properties. Write a *C++* program to multiply vector and matrix class objects using Friend function. (16)

Or

(b) (i) Discuss the various types of constructors with example. (8)

(ii) Design the time class with their properties seconds, minutes & hours. Write a *C++* program to overload the operators +, - with time objects. (8)

12. (a) Explain exception handling mechanism with an example. (16)

Or

(b) Write a *C++* program to design a template for generic queue with their necessary operations. (16)

13. (a) (i) Explain the various asymptotic notations used for calculating time and space complexities. (8)

(ii) Explain any two applications of stack. (8)

Or

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

14. (a) Briefly explain single rotation and double rotation of AVL tree with examples. (16)

Or

(b) (i) Explain prim's algorithm with appropriate example. (12)

(ii) What do you mean by network flow problem? (4)

15. (a) Write the procedure for quick sort. Show the stepwise result of sorting the following set of elements using quick sort: 23,12,45,21,67,81,19,22,56,41,33. (16)

Or

(b) Give the strategy behind divide and conquer technique. How does divide and conquer help in merge sorting. Consider your own set of unsorted '*n*' elements and apply the merge sorting to sort the elements you took. (16)
