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

Question Paper Code: 44824

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

Fourth Semester

Electrical and Electronics Engineering

14UIT424 - DATA STRUCTURES AND ALGORITHMS

(Common to EIE and ICE branches)

(Regulation 2014)

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. Which is not the term used for Stack?

(a) Pop (b) Rear (c) Push (d) Top

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. How many loops are there in Minimum Spanning Tree?

(a) One (b) Two (c) Many (d) None

9. The complexity of Bubble sort algorithm is

(a) O(n) (b) O(log n) (c) $O(n^2)$ (d) O(n log n)

10. Which of the following algorithm design technique is used in the quick sort algorithm?

(a) Dynamic programming (b) Backtracking
(c) Divide and conquer (d) Greedy method

PART - B (5 x 2 = 10 Marks)

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

12. Write the syntax of pure virtual function.

13. Define Algorithm. List the characteristics of an algorithm.

14. Show the result of inserting 5, 8, 9, 4, 2, 7, 3, 1 into an empty AVL tree.

15. Define Sorting. List out its types.

PART - C (5 x 16 = 80 Marks)

16. (a) Define classes and objects and write their syntax. Explain any three control structures with an example. (16)

Or

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

17. (a) Write a C ++ program to count and display the number of BLANK SPACES in an existing text file notes.txt. (16)

Or

(b) Define exception handling and list the keywords involved in it. Describe their usage with suitable examples. (16)

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

Or

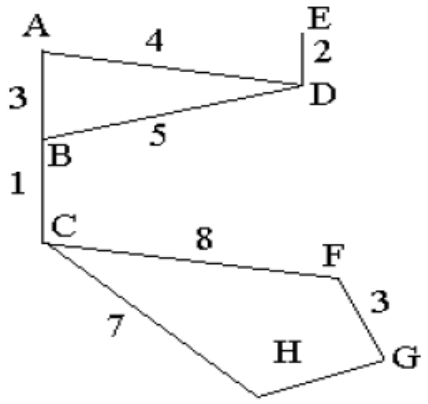
(b) Write an ADT to implement stack of size N using an array. The elements in the stack are integers. The operations to be supported are PUSH, POP and DISPLAY. Taken into account the exceptions of stack overflow and stack underflow. (16)

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

Or

(b) (i) 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. (8)

(ii) What is the difference between Prim's algorithm and Kruskal's algorithm for finding the minimum-spanning tree of a graph? Implement Prim's algorithms on the following graph. (8)



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)
