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**Question Paper Code: 44824**

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

- Which of the following is not a type of constructor?
  - Copy constructor
  - Friend constructor
  - Default constructor
  - parameterized constructor
- Which of the following concepts means determining at runtime what method to invoke?
  - Data hiding
  - Dynamic Typing
  - Dynamic Binding
  - Dynamic Loading
- Reference is not same as pointer because
  - a reference can never be null
  - a reference once established cannot be changed
  - reference doesn't need an explicit dereferencing mechanism
  - all the above
- Pick out the correct statement in function template
  - One function will work with many different types
  - it will take a long time to execute
  - duplicate code is increased
  - None of these
- A mathematical-model with a collection of operations defined on that model is called
  - Data Structure
  - Abstract Data Type
  - Primitive Data Type
  - Algorithm

6. Which is not the term used for Stack?  
(a) Pop (b) Rear (c) Push (d) Top
7. Which algorithm is based on divide-and-conquer programming approach?  
(a) bubble sort (b) selection sort  
(c) merge sort (d) shell sort
8. Deletion from one end and insertion from other end is  
(a) stack (b) branch (c) tree (d) queue
9. Spanning tree has how many edges?  
(a) n (b) n+1 (c) n-1 (d) n+2
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. Define token.
12. Define virtual functions with example.
13. What are the applications of queue?
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) Explain in detail (i) Tokens (ii) Functions in C++ and (iii) basic concepts in OOP. (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) Explain exception handing in detail with example programs. (16)

18. (a) (i) Let  $P$  be a pointer to a singly linked list. Show how this list may be used as a stack. That is, write algorithms to push and pop elements. Specify the value of  $P$  when the stack is empty. (8)

(ii) Define Hashing. How do collisions happen during hashing? Explain the different techniques resolving of collision. (8)

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) Discuss topological sorting in detail. (8)

(ii) Explain Minimum spanning tree. (8)

20. (a) (i) Show the various passes of bubble sort on an unsorted list 11, 15, 2, 13, 6. (6)

(ii) Sort the following list using heap sort 66, 33, 40, 20, 50, 88, 60, 11, 77, 30, 45, 65. (10)

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)

