Section A

Multiple Choice Questions (30*1=30)

1. Which of the following is not an ADT?
    a. Stack
    b. Queue
    c. Array
    d. Priority Queue
2. Inserting an item to the stack is called …….. operation
    a. Push
    b. Pop
    c. Insert
    d. Delete
3. *for(int i = 0; i < n; i++) {*
   printf(i);
   }
   What is the worst case time complexity of above program?
    a. $O(n^2)$
    b. O(n)
    c. O(logn)
    d. O(nlogn)
4. Which of the following data structure can't store non-homogenous data elements?
    a. Records
    b. Array
    c. Pointers
    d. Stacks
5. Which of the following is not an Atomic data?
    a. Int
    b. Char
    c. Float
    d. Tuple
6. What is a hash function?
    a. A function has allocated memory to keys
    b. A function that computes the location of the key in the array
    c. A function that creates an array
    d. A function that computes the location of the values in the array
7. A binary search tree whose left sub-tree and right sub-tree differ in height by at most 1 unit is called ……
    a. AVL tree
    b. Red-black tree
    c. Lemma tree
    d. None of the above
8. In recursion the condition for which the function will stop calling itself is

a. Base Case
b. Best case
c. Worst Case
d. There is no such condition

9. Recursion is a method in which the solution of a problem depends on:
    a. Larger instances of the different problems
    b. Smaller instances of the same problems
    c. Larger instances of the same problems
    d. Smaller instances of different problems
10. A linear collection of data, where element is given by means of a pointer, is called
    a. Linked list
    b. Primitive list
    c. Code list
    d. None of these
11. If several elements are competing for the same bucket in the hash table, what is it called
    a. Diffusion
    b. Replication
    c. Collision
    d. Duplication
12. What is the number of moves required to solve Tower of Hanoi problem for k disks?
    a. $2k - 1$
    b. $2k + 1$
    c. $2^k + 1$
    d. $2^k - 1$
13. Two main measures for the efficiency of an algorithm are
    a. Complexity and capacity
    b. Time and space
    c. Processor and Memory
    d. Data and space
14. This type of linked list doesn't have start and end:
    a. Singly Linked List
    b. Doubly Linked List
    c. Circular Linked List
    d. Linear Linked List
15. The total number of edges from root node to a particular node is called as:
    a. Height
    b. Degree
    c. Level

d. Depth

16. _____ is the process of arranging the elements of a particular data structure in some logical order?
    a. Merging
    b. Insertion
    c. traversing
    d. Sorting
17. If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed?
    a. ABCD
    b. DCBA
    c. DCAB
    d. ABDC
18. Convert the infix to postfix for A-(B+C)*(D/E)
    a. ABC-DE/*-
    b. ABC-DE*/-
    c. ABC+DE/*-
    d. All of above
19. Two main measures for the efficiency of an algorithm are
    a) Complexity and capacity
    b) Time and space
    c) Processor and Memory
    d) Data and space
20. Which of the following algorithm is not stable?
    a. Bubble sort
    b. Quick sort
    c. Merge Sort
    d. Insertion sort
21. Tower of Hanoi is an example of _____.
    a. Iteration
    b. Recursion
    c. Binary Search
    d. None of the above
22. Which of the following is not the part of ADT description
    a. Data
    b. Operation
    c. Both a and b
    d. None of the above
23. Choose the correct option about abstract data type (ADT).
    a) An abstract data type is a model of a certain kind of data structure
    b) ADT is user defined type.

c) In abstract data type we know what a specific data type can do, but how it actually does it is hidden.
d) All of the above

24. Data structures that contain a relationship between a pair of elements, this is not necessarily hierarchical in nature.
    a. Tree
    b. String
    c. Graph
    d. Array
25. Which of the following operations accesses each records exactly once so that certain items may be processed?
    a. Traversing
    b. Inserting
    c. Deleting
    d. Searching

26. Which is not the type of Linked list?
    a. Singly Linked List
    b. Doubly Linked List
    c. Linear Linked List
    d. Circular Linked list
27. What happens when we insert an element in a stack of size 5 which already has 5 elements?
    a. Stack Full
    b. Stack Empty
    c. Stack Overflow
    d. Stack Underflow

28. Which of the following data structure can be useful to perform undo operation?
    a. Tree
    b. Stack
    c. Queue
    d. Graph

29. Which of the following is also called LIFO system?
    a. Tree
    b. Stack
    c. Queue
    d. Graph
30. The time complexity of bubble sort algorithm is –
    a. O(n)
    b. O(1)
    c. O(log n)

d. $O(n^2)$

SECTION B

Short Answer Questions

Attempt any five (5) questions out of eight (8) questions (5*6=30)

1. What is ADT? Explain characteristics of algorithm.(1+5)
2. Explain different types of queues with suitable example(6)
3. What is Recursion? Compare it with iteration with suitable example. (2+4)
4. Trace bubble sort for following data: 42, 23, 74, 11, 65, 58, 94, 86. (6)
5. Define AVL tree. Construct AVL tree for 1,2,3,4,5,6,7,8.(2+4)
6. What are the benefits of Linked List over Array? Explain different types of Linked List.(2+4)
7. Explain some of the ways to represent graphs.(6)
8. What is a tree traversal? Explain different type of tree traversal. (6)
9. What is an AVL tree? Describe some of the rotation operation used to make the tree balanced. (6)

SECTION C

Long Answer Questions

Attempt any two (2) questions out of three (3) questions (2*20=40)

1. What is stack? Explain different types of Stack Operation. Trace out Infix to postfix conversion algorithm with given Infix expression with the help of stack operation. A + (((B-C) * (D-E) + F)/G) .Mention some of the applications of Stack(2+4+8+6)
2. What is a graph traversal? Explain dijkstra's algorithm for shortest path along with examples? What are different applications of graph?[2+14+4]
3. Explain hashing with suitable example. What you mean by collision resolution. Discuss different collision techniques with suitable example(4+1+15)