32. a. Define Recursion? Explain the recursive algorithm for finding factorial of a given bumber's with an example.

**(OR)**

b. Write down the divide and conquer algorithm for matrix multiplication with example.

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**B.Tech. DEGREE EXAMINATION, MAY 2019**
First Semester

15CS252J – DATA STRUCTURES AND ALGORITHMS
*(For the candidates admitted during the academic year 2015 – 2016 to 2017 – 2018)*

**Note:**
(i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours Max. Marks: 100

**PART – A (20 × 1 = 20 Marks)**
Answer **ALL** Questions

1. Null pointer is used to tell about _____.
   (A) Underflow (B) End of linked list
   (C) Empty pointer field of a structure (D) Linked list is empty

2. In a queue, deletion can take place at_____.
   (A) Rear (B) Front
   (C) Top (D) Bottom

3. _____ is the term used to delete an element from a stack.
   (A) Pull (B) Push
   (C) Bottom (D) Pop

4. Which of the following is not the type of queue?
   (A) Priority queue (B) Circular queue
   (C) Single ended queue (D) Ordinary queue

5. Which one of the following is non-linear data structure?
   (A) Stack (B) Strings
   (C) Array (D) Trees

6. The complexity of quick sort algorithm is _____.
   (A) O (log(n)) (B) O ($n^2$)
   (C) O (n) (D) O (n log (n))

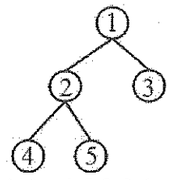
7. How do you initialize an array in C?
   (A) int arr[3] = (1,2,3); (B) int arr(3) = {1,2,3};
   (C) int arr[3] = {1,2,3}; (D) int arr[3] = (1,2,3};

8. Linear arrays are also called _____.
   (A) Single subscripted variable (B) Vertical array
   (C) Horizontal array (D) Double subscribed variable

9. Which data structure is used to store records _____.
   (A) Hash table (B) Graph
   (C) Tree (D) Queue

10. The prefix expression of $A+B*C$
(A) $+*ABC$ (B) $*BC+A$
(C) $+A*BC$ (D) $ABC+*$

11. In order traversal of the given tree is




(A) 4 5 2 3 1 (B) 4 2 5 3 1
(C) 1 2 4 5 3 (D) 4 2 5 1 3

12. Which is the most suitable data structure for a tree construction?
(A) Arrays (B) Stack
(C) Linked list (D) Queue

13. If every node U in G is adjacent to every other node V in G, then a graph is said to be _____.
(A) Isolated (B) Complete
(C) Finite (D) Strongly connected

14. _____ graphs are directed graph with no cycles.
(A) Directed acyclic (B) Bi-connected
(C) Complete (D) Binary

15. To represent hierarchical relationship between elements, which data structure is suitable?
(A) Graph (B) Dequeue
(C) Tree (D) Priority

16. In a expression $AB+C*D/$ is A = 2, B = 3, C = 4, D = 4 then result in a stack is
(A) 6 (B) 4
(C) 1/5 (D) 8

17. B-trees are generally
(A) Very deep and narrow (B) Cannot say about the structure
(C) Very deep and very wide (D) Very wide and shallow

18. Quick sort is solved using
(A) Greedy (B) Branch and bound
(C) Divide and conquer (D) Dynamic programming

19. Travelling salesman problem is an example of
(A) Dynamic algorithm (B) Greedy algorithm
(C) Recursive approach (D) Divide and conquer approach

20. An algorithm that calls itself is called _____.
(A) Recursion (B) Sub algorithm
(C) Polish notation (D) Traversal algorithm



**PART – B (5 × 4 = 20 Marks)**
Answer **ANY FIVE** Questions

21. Compare LIFO and FIFO.

22. Write down the applications of queues.

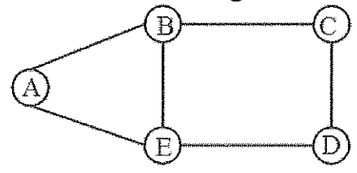
23. How deletion operation is performed in a Binary Tree?

24. Write short note on Hash functions.

25. What is the importance of Back tracking?

26. List the advantages and disadvantages of separate chaining.

27. Consider the graph given below and find out the degree of each node.




**PART – C (5 × 12 = 60 Marks)**
Answer **ALL** Questions

28. a. Write a C program to implement various array operations.

**(OR)**

b. Illustrate on Insert and delete operations of a queue using array.

29. a. Explain merge sort algorithm with an example.

**(OR)**

b. Write a recursive algorithm for binary tree traversal with an example.

30. a. Discuss about various hashing techniques with an example.

**(OR)**

b. Describe in detail about AVL trees.

31. a. Discuss about depth first traversal algorithm with suitable example.

**(OR)**

b. Apply Kruskal's algorithm and find the minimum spanning tree for the given graph.