REV-01
MCA/01/04

2023/08

SET A

MASTER OF COMPUTER APPLICATION
FIRST SEMESTER (SPECIAL REPEAT)
DATA STRUCTURE
MCA-105

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. Graphs are represented using:
   a. Adjacency tree
   b. Adjacency linked list
   c. Adjacency graph
   d. Adjacency queue

2. A graph is a collection of nodes called _____ and line segments called arcs or _____ that connects pair of nodes.
   a. Vertices, Edges
   b. Edges, Vertices
   c. Vertices, Paths
   d. None of the above

3. If we access a file one record after another from the beginning to end, then it is known as _____ access.
   a. Random
   b. Heap
   c. Sequential
   d. None of the above

4. Sectors are often grouped together to form _____
   a. Tracks
   b. Clusters
   c. Cylinders
   d. None of the above

5. An organized logical sequence of records is called:
   a. Files
   b. Organization
   c. Sequencing
   d. None of the above

6. Files are logically partitioned storage units of fixed length known as:
   a. Sectors
   b. Tracks
   c. Segments
   d. Blocks

7. What is an internal sorting algorithm?
   a. Algorithm that uses tape or disk during the sort
   b. Algorithm that uses main memory during the sort
   c. Algorithm that involves swapping
   d. Algorithm that are considered 'in place'

8. The given array is arr = {1, 2, 4, 3}. Bubble sort is used to sort the array elements. How many iterations will be done to sort the array?
   a. 4
   b. 2
   c. 3
   d. None of the above

9. Which of the following algorithm design technique is used in the quick sort algorithm?
   a. Dynamic programming
   b. Backtracking
   c. Divide-and-conquer
   d. None of the above

10. In____ type of search the list should be on sorted order.
    a. Sequential search
    b. Binary search
    c. Both a and b
    d. None of the above

11. _____is a directed tree in which out-degree of each node is less than or equal to two.
    a. Binary Tree
    b. Unary Tree
    c. Dinary Tree
    d. None of the above

12. The postfix form of the expression (A+ B)*(C*D- E)*F / G is?
    a. AB+ CD*E - FG /**
    b. AB + CD* E - F **G /
    c. AB + CD* E - *F *G /
    d. None of the above

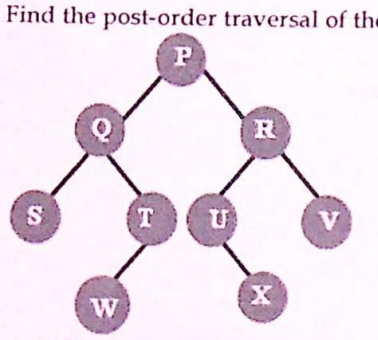
13. In linked list each node contain minimum of two fields. One field is data field to store the data second field is?
    a. Pointer to character
    b. Pointer to node
    c. Pointer to integer
    d. None of the above

14. Which of the following is false about Binary Search tree?
    a. The left child is always lesser than its parents
    b. The right child is always greater than its parents
    c. The left and right sub tree should also be binary search tree
    d. None of the above

15. Linked list is considered as an example of_____ type of memory allocation.
    a. Dynamic
    b. Static
    c. Compile time
    d. Heap

16. What is the value of the postfix expression 6 3 2 4 + - * ?
    a. 40
    b. 24
    c. None of the above
    d. 75

17. Find the post-order traversal of the binary tree shown below.



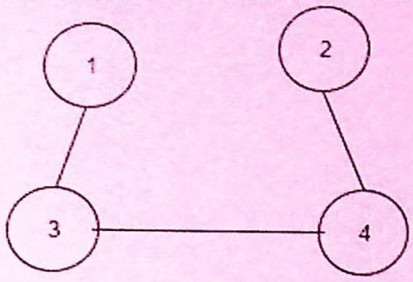
    a. P Q R S T U V W X
    b. W R S Q P V T U X
    c. S W T Q X U V R P
    d. S T W U X V Q R P

18. A normal queue, if implemented using an array of size MAX_SIZE, gets full when:
    a. Rear = MAX_SIZE - 1
    b. Front = (rear + 1)mod MAX_SIZE
    c. Front = rear + 1
    d. Rear = front

19. The preorder and postorder traversal of a binary tree generates the same output. The tree can have maximum:

a. One node
b. Two node
c. Three node
d. Any number of node

20. What would be the number of zeros in the adjacency matrix of the given graph?



a. 10
b. 6
c. 16
d. 0

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Define Binary Tree, Binary Search Tree and skewed Tree. Write algorithm to delete a node from binary search tree. 5+5=10
2. Explain Prim's algorithm with suitable example for finding the minimum spanning tree of a graph. 10
3. a) What is spanning tree? Explain spanning tree with an example. 6+4=10
   b) What are the types of file operations?
4. a) Write algorithm to insert a node in linked list in a given position. 5+5=10
   b) Write algorithm to insert node in queue using rear and front pointer.
5. What is pivot element? Explain Quick sort with proper example. 2+8=10
6. What is Internal and External sorting? Explain insertion sort with example. 4+6=10
7. What are fields, records and files? Explain sequential access file organization with their advantages and disadvantages. 3+7=10
8. Define asymptotic notation. Write about the different types of asymptotic notation. Explain the Big-O notation for linear search method. 10

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