

**MASTER of COMPUTER APPLICATION
SECOND SEMESTER
DATA STRUCTURE & ALGORITHM
MCA - 201**

(Use Separate Answer Scripts for Objective & Descriptive)

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

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

1. Define Linked List, Array, Queue, Height Balanced Tree, Stack with examples. 10
2. What is Divide and Conquer method? Write algorithm for binary search method. 3+7=10
3. Write selection sort algorithm. Explain bubble sort method with suitable example. 5+5=10
4. a. Define Binary Search Tree. Explain preorder, post-order and in-order representation of a tree. 3+3+4=10
b. Make AVL tree with the following elements 23, 45, 56,12,78, 94, 24
5. What is Time and Space complexity of an algorithm? Explain all asymptotic notation. 4+6=10
6. What is spanning tree. Write Kruskal's algorithm for minimum spanning tree. Explain modified Warshall's algorithm for shortest path with example. 2+3+5=10
7. a. Define priority queue. Write algorithm to Delete an element from circular queue. 2+3+2+3=10
b. Write algorithm for Push operation and represent the following expression in postfix notation.
 $(a+b)*c-d/e$
8. Explain ISAM. What is collision and how can we resolve the collision. 4+6 = 10

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Duration : 3 hrs.

Full Marks : 70

(PART-A : Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1 × 20 = 20

1. Process of removing an element from stack is called _____
a. Create b. Push
c. Evaluation d. Pop
2. Which of the following applications may use a stack?
a. A parentheses balancing program. b. Tracking of local variables at run time.
c. Compiler Syntax Analyzer. d. All of the mentioned
3. 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. $AB + CDE * - * F * G /$
4. Which of the following is not the type of queue?
a. Ordinary queue b. Single ended queue
c. Circular queue d. Priority queue
5. 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. ABCD
6. 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 integer
c. Pointer to node d. Node
7. What kind of linked list is best to answer question like "What is the item at position n?"
a. Singly linked list b. Doubly linked list
c. Circular linked list d. Array implementation of linked list
8. What are the advantages of arrays?
a. Easier to store elements of same data type
b. Used to implement other data structures like stack and queue
c. Convenient way to represent matrices as a 2D array
d. All of the mentioned

9. Where is linear searching used?
- When the list has only a few elements
 - When performing a single search in an unordered list
 - Used all the time
 - Both a and b
10. Which of the following is false about a doubly linked list?
- We can navigate in both the directions
 - It requires more space than a singly linked list
 - The insertion and deletion of a node take a bit longer
 - None of the mentioned
11. A linear collection of data elements where the linear node is given by means of pointer is called?
- Linked List
 - Node List
 - Primitive List
 - None of the mentioned
12. What differentiates a circular linked list from a normal linked list?
- You cannot have the 'next' pointer point to null in a circular linked list
 - It is faster to traverse the circular linked list
 - You may or may not have the 'next' pointer point to null in a circular linked list
 - All of the mentioned
13. Which of the following application makes use of a circular linked list?
- Undo operation in a text editor
 - Recursive function calls
 - Allocating CPU to resources
 - All of the mentioned
14. What is an AVL tree?
- a tree which is balanced and is a height balanced tree
 - a tree which is unbalanced and is a height balanced tree
 - a tree with three children
 - a tree with atmost 3 children
15. Given an empty AVL tree, how would you construct AVL tree when a set of numbers are given without performing any rotations?
- just build the tree with the given input
 - find the median of the set of elements given, make it as root and construct the tree
 - use trial and error
 - use dynamic programming to build the tree
16. Which of the following properties does a simple graph not hold?
- Must be connected
 - Must be unweighted
 - Must have no loops or multiple edges
 - All of the mentioned
17. Which of the following is not a limitation of binary search algorithm?
- must use a sorted array
 - requirement of sorted array is expensive when a lot of insertion and deletions are needed
 - there must be a mechanism to access middle element directly
 - binary search algorithm is not efficient when the data elements more than 1500
18. If the number of records to be sorted is small, then sorting can be efficient.
- Merge
 - Heap
 - Selection
 - Bubble
19. Rather than build a subgraph one edge at a time builds a tree one vertex at a time.
- kruskal's algorithm
 - prim's algorithm
 - dijkstra algorithm
 - bellman ford algorithm
20. The kind of allocation in which the file blocks contain the pointer to the next blocks of file is classified as
- linked allocation
 - indexed allocation
 - header allocation
 - contiguous allocation