

MASTER OF COMPUTER APPLICATION
Third Semester (Repeat)
DATA STRUCTURE
(MCA - 11)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

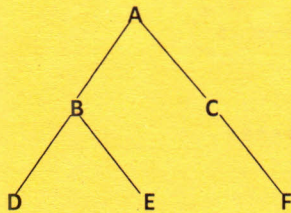
(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

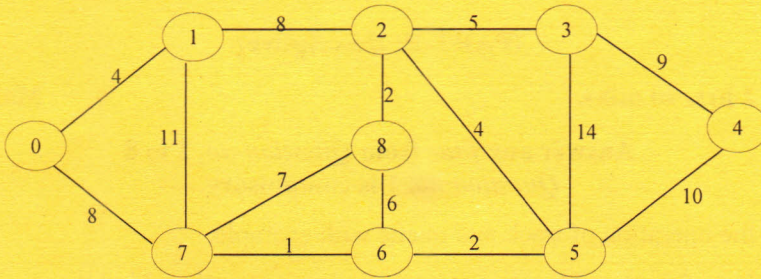
Answer any four from Question no. 2 to 8
Question no. 1 is compulsory.

1. Explain the operation of stack and queue with example. (10)
2. What is Data Structure? Explain stack and queue operation. Find the result using stack operation: $(19+5)/(6*2)-7$ (2+5+3=10)
3. What is linked list? Explain singly linked list representation with neat diagram. Explain the operation of insert and delete of a node from the singly linked list. (2+3+5=10)
4. What is a tree? Define strictly binary tree, complete binary tree and almost complete binary tree with example of each. Find inorder, preorder and postorder of the following tree: (2+3+5=10)

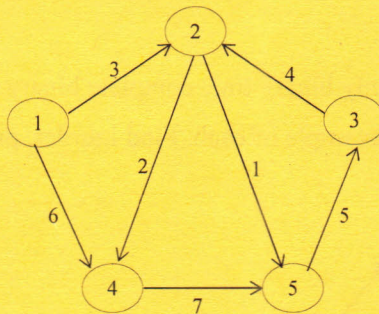


5. Explain what are the criteria to be used in evaluating a Sorting Algorithm? Write a 'C' program to sort 'N' numbers using selection Sort. (3+7=10)

6. Write an algorithm with analysis steps for Linear Search. Write a 'C' program to search an Element from 'N' elements using linear search method. (5+5=10)
7. Explain the Adjacency matrix with suitable example. Explain the Prim's algorithm to find minimum spanning tree of the following graph: (Assume 1 is the starting vertex) (2+8=10)



8. Explain the steps involved in Floyd-Warshall's algorithm to find shortest path in the following graph to any destination point: (10)



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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Tick (✓) the correct answer:

1×20=20

1. Traversing a binary tree first right sub trees and then root node and finally the left sub trees is
[A] Preorder Traversal [B] Inorder Traversal
[C] Postorder Traversal [D] None of the above
2. FIFO is used in?
[A] Stack [B] Queue
[C] Linked List [D] Tree
3. Arrays are best data structure
[A] For relatively permanent collection of data.
[B] For the size of the structure and the data in the structure are constantly changing.
[C] For both of above situation.
[D] For none of above situation.
4. In linear search algorithm the worst case occurs when
[A] The item is somewhere in the middle of the array.
[B] The item is not in the array at all.
[C] The item is the last element in the array.
[D] The item is the last element in the array or is not there at all.
5. The following sequence of operation is performed on stack:
Push(1),push(2),pop,push(1),push(2),pop,pop,pop,push(2),pop. The sequence of popped out values are
[A] 2,2,1,1,2 [B] 2,2,1,2,2
[C] 2,1,2,2,1 [D] 2,1,2,2,2
6. Which of the following data structure is linear data structure?
[A] Tree [B] Graph
[C] Arrays [D] None of the above
7. Two main measures for the efficiency of an algorithm are
[A] Processor and Memory [B] Complexity and Capacity
[C] Time and Space [D] Data and Space

8. Finding the location of the element with a given value is
 [A] Traversal [B] Search
 [C] Sort [D] All of the above
9. The complexity of binary search algorithm is
 [A] $O(n)$ [B] $O(\log n)$ [C] $O(n^2)$ [D] $O(n \log n)$
10. Which of the following algorithm design technique is used in the quick sort algorithm?
 [A] Divide and Conquer [B] Dynamic Programming
 [C] Backtracking [D] Greedy Method
11. The situation when in a linked list $START = NULL$ is
 [A] Underflow [B] Overflow
 [C] Houseful [D] Saturated
12. The memory address of the first element of an array is called
 [A] First Address [B] Base Address
 [C] Floor Address [D] Foundation Address
13. The operation of processing each element in the list is known as
 [A] Sorting [B] Inserting
 [C] Traversing [D] Merging
14. Which of the following is not the type of queue?
 [A] Ordinary Queue [B] Circular Queue
 [C] Priority Queue [D] None of the above
15. Postfix form of the infix expression: $a-b/(c+d*e)$
 [A] $ab-cd+e*/$ [B] $ab-cde+*/$ [C] $abc/de-+*$ [D] $abcde*+/-$
16. In breadth first search of graph, which of the following data structure is used?
 [A] Stack [B] Queue
 [C] Linked List [D] Array
17. In sequential representation of a tree $2i+1$ gives the position of the left child.
 [A] True [B] False
18. Any node in the in path from the root to the node is called
 [A] Successor node [B] Internal node
 [C] Ancestor node [D] None of the above
19. Which of the following data structure store the homogeneous data elements?
 [A] Arrays [B] Records [C] Pointers [D] Lists
20. State TRUE or FALSE.
 i. A node is a parent if it has successor nodes.
 ii. A node is child node if out degree is one.
 [A] True, True [B] True, False
 [C] False, True [D] False, False
