

BACHELOR OF COMPUTER APPLICATION
SECOND SEMESTER
DATA STRUCTURE THROUGH C
BCA-201

(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs.

Full Marks: 70

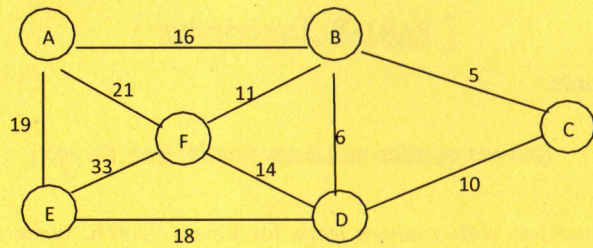
[**PART-A: Objective**]

Time: 20 min.

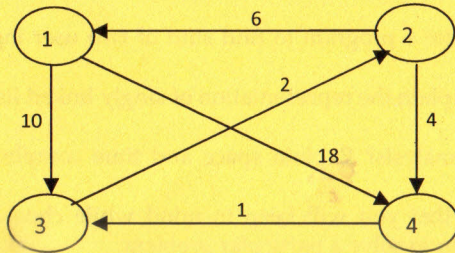
Marks: 20

Choose the correct answer from the following:

1X20=20



7. a. Explain the algorithm for Floyd-Warshall's algorithm to find shortest path. 2+8=10
b. Apply Floyd-Warshall's all pairs algorithm to get the shortest path [Source vertex is 1] in the graph below:



8. Explain the following terms: 3+3+4=10
a. Asymptotic analysis of an algorithm.
b. Disadvantages of ordinary queue, how we overcome over it.
c. Insert 14, 17, 11, 7, 53, 4, 13 and 8 into an empty AVL tree.

== *** ==

1. Which of the following data structure is linear data structure?

a. Tree	b. Graph
c. Array	d. All of the above
2. 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
3. Traversing a binary tree first right sub trees and then root node and finally the left sub trees is:

a. NLR	b. LRN
c. LNR	d. None of the Above
4. FIFO is used in

a. Stack	b. Queue
c. Linked List	d. Tree
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. 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
7. The situation when in a linked list START=NULL is

a. Underflow	b. Overflow
c. Saturated	d. All above condition may occur
8. The operation of processing each element in the list is known as

a. Sorting	b. Inserting
c. Traversing	d. Merging
9. Any node in the in path from the root to the node is called

- a. Successor Node
- c. Ancestor Node

- b. Internal Node
- d. Parent Node

10. 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, False
- b. False, True
- c. True, True
- d. False, False

11. Finding the location of the element with a given value is

- a. Traversal
- b. Search
- c. Sort
- d. Order

12. The complexity of binary search algorithm is

- a. $O(\log n)$
- b. $O(n \log n)$
- c. $O(n)$
- d. $O(n^2)$

13. Which notation is use to express the lower bound of an algorithm's running time?

- a. O Notation
- b. Ω notation
- c. Θ Notation
- d. μ notation

14. Which of the following algorithm design technique is used in the Prim's shortest path algorithm?

- a. Divide and Conquer
- b. Greedy Method
- c. Dynamic Programming
- d. Backtracking

15. The position in a queue from which an element is deleted is called as

- a. Top
- b. Rear
- c. Front
- d. Mid

16. Total number of nodes at the nth level of a binary tree can be given as

- a. 2^n
- b. n
- c. 2^{n+1}
- d. 2^{n-1}

17. Degree of a leaf node is

- a. 0
- b. 1
- c. 2
- d. n-1

18. Postfix form of the infix expression: $a-b/(c+d*e)$

- a. $ab-cd+e*/$
- b. $ab-cde+*/$
- c. $abc/de-+*$
- d. $abcde+*/-$

19. In breadth first search of graph, which of the following data structure is used?

- a. Stack
- b. Queue
- c. Linked List
- d. Tree

20. Which of the following data structure store the homogeneous data elements?

- a. Pointers
- b. List
- c. Records
- d. Array

(PART-B: Descriptive)

Time: 2 hrs. 40 min.

Marks: 50

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

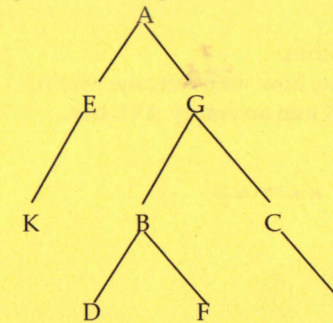
1. Write an algorithm with analysis steps for Linear Search. Write a 'C' program to search an Element from 'N' elements using binary search method. 10

2. a. What is Data Structure? 2+5+3=10
 b. Explain stack and queue operation.
 c. Find the result using stack operation: $(4+6)*(10*4)-7$

3. a. What is Pointer? Write a program to find sum of two user input no using pointer. 5+5=10
 b. Define linked list. Explain the representation of singly linked list.

4. a. What is algorithm analysis? Explain space and time complexity of algorithm. 5+5=10
 b. Explain the criteria that you will keep in mind while choosing an appropriate algorithm to solve a particular problem.

5. a. Define tree. Explain the concept of complete binary tree and almost complete binary tree with example. 6+4=10
 b. Find inorder, preorder and postorder of the following tree:



6. a. Define Graph? Explain Depth first and Breadth first Traversal algorithm with a suitable example. 4+6=10
 b. Explain the steps involved in Prim's algorithm to find minimum spanning tree of the following graph: (Assume "A" is the starting vertex)