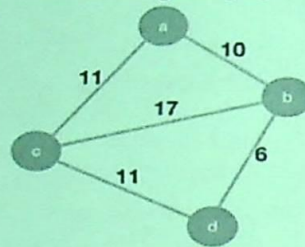




11. Which of the following is false in the case of a spanning tree of a graph  $G$ ?
  - a. It is tree that spans  $G$
  - b. It is a subgraph of the  $G$
  - c. It includes every vertex of the  $G$
  - d. It can be either cyclic or acyclic
12. If a 2-regular graph contains 6 vertices then each of the vertices degree are:
  - a. 6
  - b. 8
  - c. 12
  - d. 2
13. Which of the following is false?
  - a. The spanning trees do not have any cycles
  - b. MST have  $n - 1$  edges if the graph has  $n$  edges
  - c. Edge  $e$  belonging to a cut of the graph if has the weight smaller than any other edge in the same cut, then the edge  $e$  is present in all the MSTs of the graph
  - d. Removing one edge from the spanning tree will not make the graph disconnected
14. Which of the following is true?
  - a. Prim's algorithm initialises with a vertex
  - b. Prim's algorithm initialises with a edge
  - c. Prim's algorithm initialises with a vertex which has smallest edge
  - d. Prim's algorithm initialises with a forest
15. Consider the given graph



- What is the weight of minimum spanning tree using the Prim's algorithm, starting from vertex  $a$ ?
- a. 23
  - b. 28
  - c. 27
  - d. 11
16. Which of the following is false about Prim's algorithm?
    - a. It is a greedy algorithm
    - b. It constructs MST by selecting edges in increasing order of their weights
    - c. It never accepts cycles in the MST
    - d. It can be implemented using the Fibonacci heap
  17. Floyd Warshall Algorithm can be used for finding.....
    - a. Transitive closure
    - b. Minimum spanning tree
    - c. Topological sort
    - d. Single source shortest path
  18. What approach is being followed in Floyd Warshall Algorithm?
    - a. Linear Programming
    - b. Backtracking
    - c. Greedy technique
    - d. Dynamic Programming
  19. Which of the following is an advantage of recursive bubble sort over its iterative version?
    - a. It has better time complexity
    - b. It has better space complexity
    - c. It is easy to implement
    - d. It has no significant advantage
  20. Which of the following sorting algorithm is stable?
    - a. Selection sort
    - b. Quick sort
    - c. Bubble sort
    - d. Heap sort

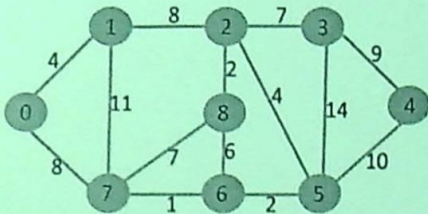
**( Descriptive )**

Time : 2 hr. 30 mins.

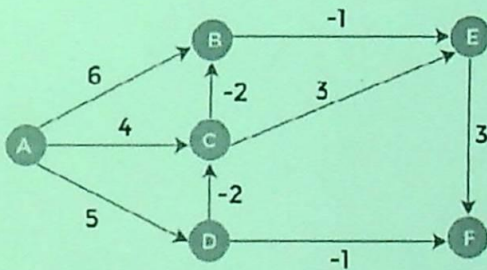
Marks : 50

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

1. What is Time Complexity and Space Complexity? What are the different factors of time complexity? Explain different Asymptotic notations in terms of Time Complexity. 2+2+6=10
2. a) What is tree method? Solve the recurrence relation. 1+4=5  
 $T(n)=3T(n/4) + cn^2$  using tree method.  
b) Analysis the time complexity of merge sort. 5
3. a) What is Master theorem? Solve the following recurrence relation using master theorem. 5  
 $T(n) = 4T(n/2) + n$   
b) Find the complexity of the following recurrence relation. 5  
 $T(n) = 9T(n/3) + n$
4. Write the algorithm of Quick sort and analysis the time complexity of the algorithm using best case, worst case and average case. 10
5. a) Implement Dijkstra's algorithm and find out shortest path of the given bellow graph. 5+5=10



- b) Implement Bellman-Ford Algorithm to find out the shortest path of the given bellow graph.



6. a) Solve the recurrence relation. 5+5=10  
 $T(n)=2T(n/2)+n$  ,  $T(1)=1$   
b) Write the algorithm of linear search algorithm.

7. Analysis of Time Complexity of Binary Search Algorithm using Average case and also write the algorithm. 10
8. Explain forward and backward substitution methods with example. 10

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