

**MASTER OF COMPUTER APPLICATION
SECOND SEMESTER (REPEAT)
ALGORITHM ANALYSIS
MCA-204**

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 1hr. 30 mins.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

Choose the correct answer from the following:

1 × 10 = 10

- Which of the following algorithms is an example of a greedy algorithm?
 - Quick Sort
 - Dijkstra's shortest path algorithm
 - Bellman-Ford algorithm
 - Kruskal's algorithm for minimum spanning tree
- Consider a complete graph G with 4 vertices. The graph G hasspanning trees.
 - 15
 - 8
 - 16
 - 13
- Identify the best case time complexity of selection sort.
 - $O(n \log n)$
 - $O(n^2)$
 - $O(n)$
 - $O(1)$
- Hamiltonian path problem is:
 - NP problem
 - NP complete problem
 - P class problem
 - N class problem
- Which one of the following helps in calculating the longest amount of time taken for the completion of the algorithm?
 - Theta notation
 - Big-Oh notation
 - Time Complexity
 - Omega notation
- Which of the following is false in the case of a spanning tree of a graph G?
 - It is tree that spans G
 - It is a subgraph of the G
 - It includes every vertex of the G
 - It can be either cyclic or acyclic
- Which of the following is false?
 - The spanning trees do not have any cycles
 - MST have $n - 1$ edges if the graph has n edges
 - 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
 - Removing one edge from the spanning tree will not make the graph disconnected
- Which of the following is false about Prim's algorithm?
 - It is a greedy algorithm
 - It constructs MST by selecting edges in increasing order of their weights
 - It never accepts cycles in the MST
 - It can be implemented using the Fibonacci heap

9. 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
10. Which of the following sorting algorithm is stable?
- a. Selection sort
 - b. Quick sort
 - c. Bubble sort
 - d. Heap sort

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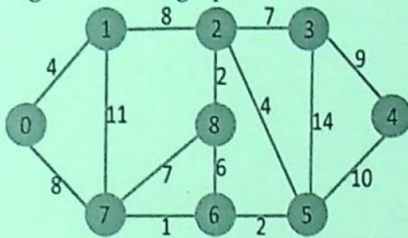
(Descriptive)

Time : 1 hr. 15 mins.

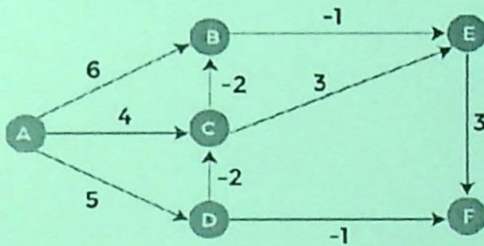
Marks : 25

[Answer question no.1 & any two (2) from the rest]

1. What is Time Complexity and Space Complexity? Explain different Asymptotic notations in terms of Time Complexity. 5
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



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