

MASTER OF COMPUTER APPLICATION
SECOND SEMESTER
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 Sor
 - Dijkstra's shortest path algorithm
 - Bellman-Ford algorithm
 - Kruskal's algorithm for minimum spanning tree
- Which of the following is a dynamic programming problem?
 - Longest Common Subsequence
 - Binary Search
 - Depth First Search
 - Breadth First Search
- Which of the following algorithms is used to find the shortest path between two vertices in a graph?
 - Depth First Search
 - Dijkstra's shortest path algorithm
 - Breadth First Search
 - Bellman-Ford algorithm
- Consider a complete graph G with 4 vertices. The graph G has ____ spanning 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
- What is the result of the recurrences which fall under the extended second case of Master's theorem (let the recurrence be given by $T(n) = aT(n/b) + f(n)$ and $f(n) = n^c (\log n)^k$)?
 - $T(n) = O(n \log_b n)$
 - $T(n) = O(n^c \log n)$
 - $T(n) = O(n^c (\log n)^{k+1})$
 - $T(n) = O(n^2)$
- 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
- The basic operation of the _____ algorithm is the comparison between the element and the array given.
 - Binary search
 - Greedy
 - Brute force
 - Insertion sort

10. _____ is a concept wherein larger solutions for problems are found based upon the solution of a number of smaller problems.
- a. Decrease and conquer
 - b. Divide and conquer
 - c. Branch and bound
 - d. Backtracking

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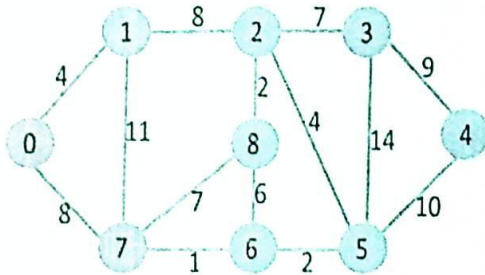
(Descriptive)

Time : 1 hr. 15 mins.

Marks : 25

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

1. Solve the recurrence relation 5
 $T(n)=2T(n/2)+n$, $T(1)=1$
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 5
using master theorem.
 $T(n) = 4T(n/2)+n$
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 10
the algorithm using best case, worst case and average case.
5. a) Implement Dijkstra's algorithm and find out shortest path of the 5+5=10
given bellow graph.



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

