

**MASTER OF COMPUTER APPLICATION
SECOND SEMESTER [SPECIAL 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 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 $f(n) = n^c(\log n)^k$)?
 - $T(n) = O(n \log_b^k n)$
 - $T(n) = O(n^c \log n)$
 - $T(n) = O(n^c (\log n)^{k+1})$
 - $T(n) = O(n^2)$
- 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

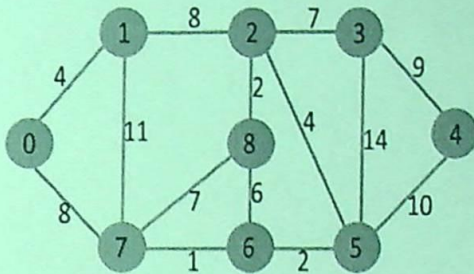
(Descriptive)

Time : 1 hr. 15 mins.

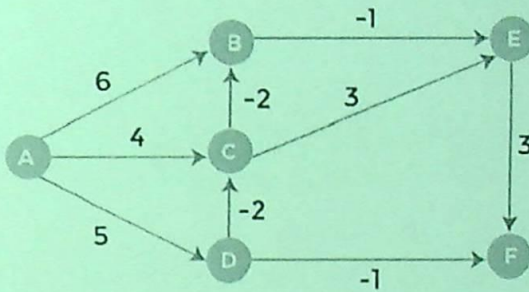
Marks : 25

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

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|--|--------|
| 1. Solve the recurrence relation | 5 |
| $T(n)=2T(n/2)+n$, $T(1)=1$ | |
| 2. 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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|--|-------|
| 3. 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 |
| 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) 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 |
| $T(n) = 9T(n/3) + n$ | |

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