PG – 513

II Semester M.C.A. Examination, November/December 2023
(CBCS) (2020 – 21 & Onwards)
COMPUTER SCIENCE
2MCA5 : The Design and Analysis of Algorithms

Time : 3 Hours Max. Marks : 70

Instructions : 1) Section – ***A*** : Answer ***any five*** questions.
2) Section – ***B*** : Answer ***any four*** questions.

SECTION – A

Answer **any five** questions. **Each** question carries **six** marks. **(5×6=30)**

1. Explain various steps involved in Algorithm Problem solving.
2. Explain different asymptotic notations in detail.
3. Discuss the Brute-Force string matching algorithm.
4. Present the steps used in Mathematical Analysis of non-recursive algorithm with example.
5. What is Hashing and Hash Function ? Explain various methods of choosing a Hash function.
6. Explain the Quick Sort Algorithm with its time complexity.
7. Compare and contrast Divide and Conquer Vs Dynamic Programming.
8. Explain the steps to solve sum of subsets problem using Backtracking.

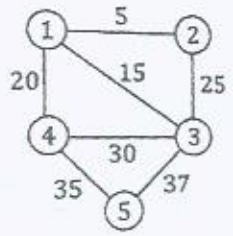
SECTION – B

Answer **any four** questions. **Each** question carries **10** marks. **(4×10=40)**

9. a) Explain Basic Efficiency Classes used in analysis of algorithm. **(4+6)**
   b) Apply Selection Sort technique to sort the given list of numbers : 45, 21, 52, 61, 9, 15.

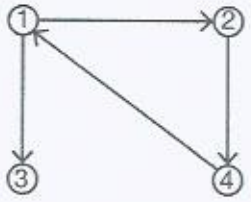
P.T.O.

10. a) Trace the Prim's Algorithm for the following graph. **(6+4)**



b) Give an account of Topological Sorting with the methods to achieve Topological sorting.

11. Given a Digraph, how do you arrive at its transitive closure ? Apply Warshall Algorithm to compute the transitive closure of the given graph. **10**



12. a) Explain the steps involved in Sorting by Counting. **(4+6)**

b) Apply Horspool's algorithm to search for pattern "BROWN" in the text "THATCOLOURISNOTBROWN".

13. Define N Queens problem. Explain 4-Queens problem and draw its solution space tree.

14. Write a short notes on : **(3+3+4)**

i) Breadth-First Search

ii) Traveling Salesman Problem

iii) Strassen's Matrix Multiplication.