NP – 1019

IV Semester B.C.A. Examination, June/July 2025
(NEP Scheme) (F+R)
COMPUTER APPLICATIONS
4.2 : Design and Analysis of Algorithm

Time : 2½ Hours Max. Marks : 60

***Instruction** : Answer **all** the Sections.*

SECTION – A

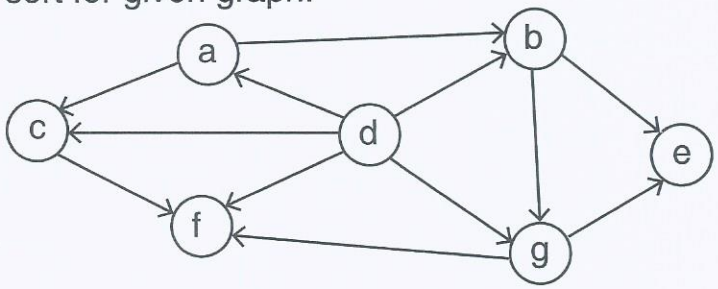
Answer **any four** questions. **Each** question carries **two** marks. **(4×2=8)**

1. What is complexity of an algorithm ? Define Big oh.
2. List any two differences between iterative and recursive algorithms.
3. What is Strassen's matrix multiplication ?
4. What is space and time trade-offs ?
5. What is Johnsons-Trottes algorithm ?
6. Define a Hamiltonian circuit.

SECTION – B

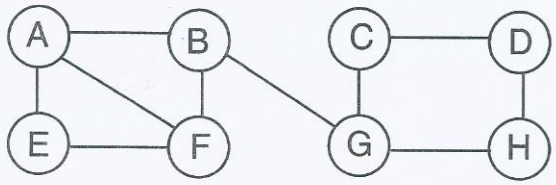
Answer **any four** questions. **Each** question carries **five** marks. **(4×5=20)**

7. Define an algorithm and explain the characteristics of an algorithm.
8. Apply quick sort algorithm to sort the list 7, 3, 9, 6, 1, 4, 2, 5 in ascending order. Justify that the given instance is an example for best case.
9. Define topological sorting. Apply source removal method to obtain topological sort for given graph.



P.T.O.

10. Traverse the following graph using depth first search method, write the order of traversal. (Assume B as the initial node).



11. Write a short note on N-queen problem.

12. What is Bayer Moore algorithm ? Explain its technique.

SECTION – C

Answer **any four** questions. **Each** question carries **eight** marks. **(4×8=32)**

13. a) What is data structure and mention its classifications ? **4**

    b) Discuss linear and non-linear data structures and explain its examples. **4**

14. Define Big oh, Big omega, Big theta and Small oh. Find complexity of finding factorial of a number.

15. a) Explain divide and conquer technique in detail. **4**

    b) Explain Floyd's algorithm to find all pairs of shortest path. **4**

16. a) Discuss sorting by counting. **4**

    b) Explain brute force string matching algorithm with an example. **4**

17. Explain hashing and how hashing improves execution time.

18. Find the optimal solution for Knapsack problem with M = 40, N = 4 {W1, W2, W3, W4} = {20, 25, 10, 15} and {P1, P2, P3, P4} = {20, 40, 35, 45}.
