19SSP32B

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc(SS) DEGREE EXAMINATION MAY 2023
(Fifth Semester)

Branch –**SOFTWARE SYSTEMS**
(Five year integrated)

DISCIPLINE SPECIFIC ELECTIVE – I:
DESIGN AND ANALYSIS OF ALGORITHMS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1. Recursion is similar to which of the following?
   (i) Switch Case (ii) Loop (iii) If-else (iv) if elif else

2. What is the auxiliary space complexity of merge sort?
   (i) O(1) (ii) O(log n) (iii) O(n) (iv) O(n log n)

3. Which of the following sorting algorithms is the fastest?
   (i) Merge sort (ii) Quick sort (iii) Insertion sort (iv) Shell sort

4. Which data structure is most suitable for implementing best first branch and bound strategy?
   (i) priority queue (ii) queue (iii) stack (iv) linked list

5. Consider a complete graph G with 4 vertices. The graph G has ____ spanning trees.
   (i) 15 (ii) 8 (iii) 13 (iv) 16

6. How many unique colors will be required for proper vertex coloring of a bipartite graph having n vertices?
   (i) 0 (ii) 1 (iii) 2 (iv) n

7. What is the objective of the knapsack problem?
   (i) To get maximum total value in the knapsack
   (ii) To get minimum total value in the knapsack
   (iii) To get maximum weight in the knapsack
   (iv) To get minimum weight in the knapsack

8. Which of the following is an NP complete problem?
   (i) Hamiltonian cycle
   (ii) Travelling salesman problem
   (iii) Calculating chromatic number of graph
   (iv) Finding maximum element in an array

9. In Huffman coding, data in a tree always occur?
   (i) roots (ii) leaves (iii) left sub trees (iv) right sub trees

10. The problem of placing n queens in a chessboard such that no two queens attack each other is called as?
    (i) n-queen problem (ii) eight queens puzzle
    (iii) four queens puzzle (iv) 1-queen problem

Cont...

SECTION - B (25 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 5 = 25)

11 a) Explain about recurrences in detail.
OR
b) Discuss on Randomized algorithm.

12 a) Sketch about Brute Force method.
OR
b) Evaluate travelling salesman problem.

13 a) Illustrate Binary search in detail.
OR
b) Explain about Huffman code.

14 a) Discuss about the Backtracking.
OR
b) State Graph coloring problem and explain it.

15 a) Discuss about Polynomial time.
OR
b) Explain about Hamiltonian cycle in NP complete.

SECTION -C (40 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 8 = 40)
Question no. 16 is compulsory

16 Analyze about Substitution method in detail.

17 a) Elucidate on closest-pair and convex-hull problem.
OR
b) Assess the knapsack problem.

18 a) Criticize merge sort with necessary theory.
OR
b) Interpret minimum cost spanning tree with suitable example.

19 a) Evaluate all pairs shortest path algorithm in detail.
OR
b) Analyze eight Queen's problem with necessary theory.

20 a) Elucidate in detail about NP completeness.
OR
b) Assess about travelling salesman problem in NP complete.

Z-Z-Z END