

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

MSc(SS) DEGREE EXAMINATION DECEMBER 2024  
(Second Semester)

Branch - SOFTWARE SYSTEMS (Five Years Integrated)

DATA STRUCTURES AND ALGORITHMS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

| Module No. | Question No. | Question                                                                                                                                                                                                               | K Level | CO  |
|------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|
| 1          | 1            | A _____ is a set of domains.<br>a) Profile                      b) Algorithm<br>c) Code                         d) Data Structure                                                                                      | K1      | CO2 |
|            | 2            | The data structure which reflects relationship among elements is called a rooted tree graph or simply a _____.<br>a) graph      b) list      c) tree      d) stack                                                     | K2      | CO1 |
| 2          | 3            | _____ is combining the records in two different sorted files in to a single sorted file.<br>a) Sorting                      b) Searching<br>c) Listing                       d) Merging                                | K1      | CO3 |
|            | 4            | Arranging records in some logical order is called _____.<br>a) Sorting                      b) Merging<br>c) Searching                   d) Listing                                                                    | K2      | CO3 |
| 3          | 5            | Deletion in queue take place at one end called _____.<br>a) start                      b) front                      c) rear                      d) mid                                                               | K1      | CO4 |
|            | 6            | Which of the following data structure is linear data structure?<br>a) Tree                              b) Graph<br>c) Array                             d) Linked list                                                | K2      | CO4 |
| 4          | 7            | A binary tree whose every node has either zero or two children is called _____.<br>a) complete binary tree                      b) binary search tree.<br>c) extended binary tree.                      d) binary tree | K1      | CO5 |
|            | 8            | A _____ is a collection of elements such that each element has been assigned a priority.<br>a) priority queue                      b) array<br>c) stack                                      d) queue                  | K2      | CO5 |
| 5          | 9            | A _____ tree of a graph is an undirected tree consisting of only those edges.<br>a) dense                              b) binary<br>c) spanning                              d) parse                                  | K1      | CO3 |
|            | 10           | A tree is a finite set of _____.<br>a) loops                              b) domains<br>c) functions                              d) nodes                                                                             | K2      | CO3 |

Cont...

**SECTION - B (35 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

| Module No. | Question No. | Question                                                                                              | K Level | CO  |
|------------|--------------|-------------------------------------------------------------------------------------------------------|---------|-----|
| 1          | 11.a.        | Analyze the implementation of multidimensional arrays.                                                | K4      | CO1 |
|            | (OR)         |                                                                                                       |         |     |
|            | 11.b.        | Determine the algorithm in an application program differs from an algorithm in an abstract data type. |         |     |
| 2          | 12.a.        | Explain the basic concept of recursion with example.                                                  | K5      | CO2 |
|            | (OR)         |                                                                                                       |         |     |
|            | 12.b.        | Illustrate the algorithm for linear queue.                                                            |         |     |
| 3          | 13.a.        | Show the various operations performed on a queue.                                                     | K6      | CO3 |
|            | (OR)         |                                                                                                       |         |     |
|            | 13.b.        | Evaluate the algorithm for preorder traversal of a binary tree.                                       |         |     |
| 4          | 14.a.        | Examine the representations using adjacency matrix.                                                   | K5      | CO4 |
|            | (OR)         |                                                                                                       |         |     |
|            | 14.b.        | Assume the breadth-first traversal of a graph.                                                        |         |     |
| 5          | 15.a.        | Demonstrate the algorithm for Radix sort with suitable example.                                       | K6      | CO5 |
|            | (OR)         |                                                                                                       |         |     |
|            | 15.b.        | Infer the algorithm for Selection sort.                                                               |         |     |

**SECTION - C (30 Marks)**

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

| Module No. | Question No. | Question                                                                                           | K Level | CO  |
|------------|--------------|----------------------------------------------------------------------------------------------------|---------|-----|
| 1          | 16           | Compare and construct best, worst and average case time complexities.                              | K6      | CO1 |
| 2          | 17           | Elucidate the implementation of circular queue with example.                                       | K6      | CO2 |
| 3          | 18           | Assess the algorithm to insert a node into a doubly linked list.                                   | K5      | CO4 |
| 4          | 19           | Develop an algorithm to delete a particular node from binary search tree.                          | K4      | CO4 |
| 5          | 20           | Sort the following list using Heap Sort technique, displaying each step. 20, 12, 25 6, 10, 15, 13. | K6      | CO5 |

Z-Z-Z

END