PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch – **MATHEMATICS WITH COMPUTER APPLICATIONS**

DATA STRUCTURES & 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	The last-in-first-out system is called a ___. a) array b) stack c) queue d) graph	K1	CO1
	2	Which of the following is a linear data structure? a) array b) AVL trees c) binary trees d) graph	K2	CO1
2	3	The data elements in a linked list are called ___ a) pointers b) nodes c) null d) variable	K1	CO2
	4	The worst case running time of the algorithm for searching a linked list when the list is unsorted is proportional to ____. a) n b) $n/2$ c) $1/n$ d) n^2	K2	CO2
3	5	Choose the correct prefix form of A +B*C a) A+(BC)* b) +AB* c) ABC+* d) +A*BC	K1	CO3
	6	An algorithm that calls itself directly or indirectly is called ___. a) function b) sorting c) recursion d) searching	K2	CO3
4	7	The nodes with no successors are called the ___ nodes. a) successor b) predecessor c) null d) terminal	K1	CO4
	8	Which one of the following is not used in binary tree traversal? a) randomized b) inorder c)preorder d) postorder	K2	CO4
5	9	What is the average case complexity of selection sort? a) $O(nlogn)$ b) $O(logn)$ c) $O(n)$ d) $O(n^2)$	K1	CO5
	10	The __ sort is not an in place sorting algorithm by default? a) merge b) selection c) insertion d) quick	K2	CO5

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.	Explain the operations of data structures.	K2	CO1
		(OR)		
	11.b.	Explain briefly the three types of conditional structures.		
2	12.a.	Develop the procedure for insertion at the beginning of a linked list.	K3	CO2
		(OR)		
	12.b.	Identify the steps to delete the node in a linked list with a given ITEM of information.		
3	13.a.	Construct the array representation of stacks with example.	K3	CO3
		(OR)		
	13.b.	Model the steps for representation of queue.		
4	14.a.	Infer about complete binary trees	K4	CO4
		(OR)		
	14.b.	Analyze the complexity of the searching algorithm in a binary search tree.		
5	15.a.	List the steps involved in the selection sort algorithm.	K4	CO4
		(OR)		
	15.b.	Conclude the algorithm for radix 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	Analyze about linear arrays and their representation in the memory.	K4	CO1
2	17	Explain binary search algorithm and analyze its complexity.	K4	CO2
3	18	List the steps involved in quick sort algorithm.	K4	CO3
4	19	What are binary search trees? How to search and insert in a binary search tree?-Inspect.	K4	CO4
5	20	Infer the procedure to sort using merge sort.	K4	CO5

Z-Z-Z END