

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT
(An Autonomous College U/s UGC Act 1956)

IMSc-IT SEMESTER-II, SEMESTER END EXAMINATION – SUMMER 2025

Subject Code: 1BS203**Date: 15-05-2025****Subject Name: DATA STRUCTURE****Time: 11:00AM TO 1:30PM****Total Marks: 70****Instructions**

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

	Marks	BL	CO
Q.1 Multiple-Choice Questions	[05]		
(a) Which of the following is NOT a common operation in a queue data structure?	1	R	2
(i) Enqueue (ii) Dequeue (iii) Peek (iv) Shuffle			
(b) Convert the following infix expressions into its equivalent postfix expressions. $(A + B \wedge D)/(E - F) + G$	1	A	2
(i) $(A B D \wedge + E F - / G +)$ (ii) $(A B D + \wedge E F - / G +)$ (iii) $(A B D \wedge + E F / - G +)$ (iv) $(A B D E F + \wedge / - G +)$			
(c) A connected planar graph having 6 vertices, 7 edges contains _____ regions.	1	U	4
(i) 15 (ii) 3 (iii) 1 (iv) 11			
(d) What is the maximum number of edges in a bipartite graph having 10 vertices?	1	U	4
(i) 24 (ii) 21 (iii) 25 (iv) 16			

(e) Which of the following is the name of the node having child nodes?		1	R	4
(i) Brother		(ii) Sister		
(iii) Mother		(iv) Parent		
Q.2	Attempt Any Two	[10]		
(a)	Explain stack in detail. Implement push pop and display functions.	5	A	2
(b)	Differentiate between stacks and Queues.	5	U	2
(c)	Convert following expression $X+(Y * Z)-((N * M +O) /Q)$ in to post fix form.	5	A	2
Q.3	Attempt Any Two	[10]		
(a)	What is Queue? Explain different types of operations performed on queues.	5	U	2
(b)	Explain the Double ended queue in detail with example.	5	A	2
(c)	Write an algorithm for Enqueue & Dequeue in .	5	A	2
Q.4	Attempt Any Two	[10]		
(a)	What is terminology of tree? Explain it in details.	5	U	4
(b)	What is a binary search tree?	5	U	4
(c)	Define tree and graph.	5	U	4

SECTION B

	Marks	BL	CO
Q.5 Multiple-Choice Questions	[05]		
(a) Which of the following is a linear data structure?	1	R	1
(i) Array (ii) AVL Trees (iii) Binary Trees (iv) Graphs			
(b) Which of the following are applications of linked lists?	1	U	3
(i) Implementing file system (ii) Chaining in hash tables (iii) Binary Trees implementation (iv) All of the above			
(c) A linear collection of data elements where the linear node is given by means of pointer is called?	1	R	3
(i) Linked List (ii) Node List (iii) Primitive List (iv) Unordered list			
(d) Which of the following searching algorithm is used with exponential sort after finding the appropriate range?	1	R	5
(i) Jump search (ii) Fibonacci Search (iii) Linear search (iv) Binary search			
(e) In C, what are the basic loops required to perform an insertion sort?	1	U	5
(i) do- while (ii) if else (iii) for and while (iv) for and if			
Q.6 Attempt Any Two	[10]		
(a) Explain the basic terminologies of data structure.	5	R	1
(b) What is data structure? Explain the advantages of data structure.	5	U	1
(c) What are the basic operations performed in data structure?	5	U	1
Q.7 Attempt Any Two	[10]		
(a) what is Node in link list? Explain in details.	5	R	3

(b) what are the applications of Linked Lists?	5	R	3
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(c) what is the difference between Doubly Linked List and Doubly Circular Linked List?	5	U	3
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Q.8 Attempt Any Two	[10]		
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(a) Write a short note on binary search.	5	R	5
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(b) Implement bubble sort on given array {45, 34, 47, 20, 44, 18, 50, 38, 14, 27}	5	A	5
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(c) Explain characteristics of searching.	5	U	5
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