BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B.TECH / BARCH **SEMESTER: IV**
BRANCH: BT/CHEMICAL/EEE/ECE/MECH/PROD/ARCH **SESSION: SP/2023**

SUBJECT: CS275/CS261 FUNDAMENTALS OF DATA STRUCTURES

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	What is the difference between linear and non-linear data structures? Elaborate various asymptotic notations used to evaluate the efficiency of the algorithm?	[5]	CO1, CO3	BL4
Q.1(b)	Apply array to represent two polynomials and write an algorithm to add the polynomials using array?	[5]	CO2	BL3
Q.2(a)	How does linked stack differ from a linear stack? Convert the given infix expression into its equivalent postfix expression (use algorithm to convert infix notation to postfix): A – (B / C + (D % E * F) / G) * H	[5]	CO1, CO2	BL1 BL3
Q.2(b)	Explain the concept of a circular queue? How is it better than a linear queue?	[5]	CO1 CO3	BL4
Q.3(a)	What is the difference between linked list and linear array? Explain why is a doubly linked list more useful than a singly linked list?	[5]	CO2 CO3	BL2
Q.3(b)	Give the advantages and uses of a circular linked list? Write an algorithm to delete the last node from a singly linked list?	[5]	CO3	BL4
Q.4(a)	How does the height of a binary search tree effect its performance? Construct a heap (H) from the given set of numbers: 45, 36, 54, 27, 63, 72, 61, and 18. Also, while constructing, draw the memory representation of the heap?	[5]	CO2 CO4	BL5
Q.4(b)	Consider a graph shown in Figure-1, Use a Depth First Search (DFS) and Breath First Search (BFS) traversals to construct a DFS spanning tree and a BFS spanning tree for the provided graph.	[5]	CO4	BL4

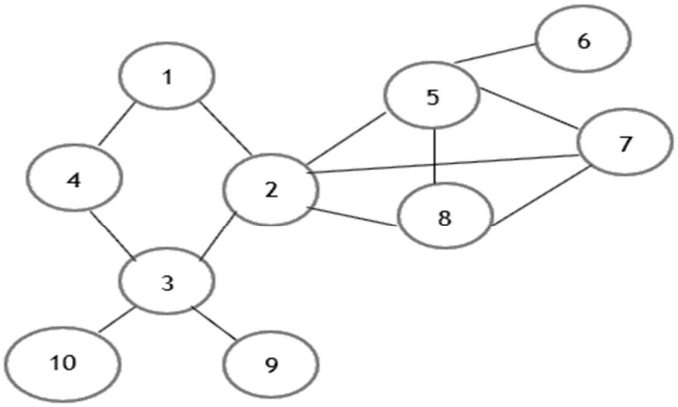

Figure-1

Q.5(a)	Why is quick sort algorithm better for arrays? Determine the time complexities of quicksort in best and worst case?	[5]	CO3 CO4	BL4
Q.5(b)	Describe the working of binary search algorithm with an example. Also discuss its time complexity.	[5]	CO4 CO5	BL3

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