21·12·2022 (E)

SOMAIYA VIDYAVIHAR UNIVERSITY

Semester: August 2022 – December 2022		
Maximum Marks: 100 **Examination: ESE Examination**		**Duration:3 Hrs.**
Programme code: 04/02 **Programme:** B TECH	**Class:** SY	**Semester: III(SVU 2020)**
Name of the Constituent College: **K. J. Somaiya College of Engineering**	**Name of the department: Information Technology / Computer Engg**	
Course Code: 116U01C302	**Name of the Course: Data Structures**	
Instructions: 1)Draw neat diagrams 2) All questions are compulsory **3) Assume suitable data wherever necessary**		

Que. No.	Question	Max. Marks
Q1	Solve any **Four**	**20**
i)	Define abstract data type. Give example of abstract data type. What is the difference between in built data type and abstract data type?	5
ii)	What are the advantages and disadvantages of circular linked list?	5
iii)	Write applications of priority queue.	5
iv)	Differentiate between B tree and B+ tree.	5
v)	Explain counting sort. Also state the reason why counting sort is called stable sort?	5
vi)	Convert infix expression A*B - C/D + E into prefix.	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following	**10**
i)	What is static memory allocation? Give example of memory allocation. What are the advantages of memory allocation?	5
ii)	What is dynamic memory allocation? Give example of dynamic memory allocation. What are the advantages of dynamic memory allocation?	5
	OR	
Q2 A	What is data structure? How data structure varies from data type? Explain the classification of data structures? What are different types of data structure?	10
Q 2 B	Solve any **One**	**10**
i)	What is Hashing? Explain the different types of hashing. Which hashing method is better? Justify.	10
ii)	Explain SET as ADT with all operations. Also write application for the same.	10

Que. No.	Question	Max. Marks
Q3	Solve any **Two**	**20**
i)	What is doubly linked list? Explain working of doubly linked list. Give two real time application of doubly linked list.	10
ii)	Define Stack. Write pseudo code using array or linked list: a. Write a function to check a stack is an underflow b. Write a function to delete an element from stack c. Write a function to display the stack elements	10
iii)	What is Dequeue? Write the pseudo code for insertion at front end and insertion at rear end.	10

Que. No.	Question	Max. Marks
Q4	Solve any **Two**	**20**
i)	Explain the bubble Sort in detail with the help of algorithm. Also sort following numbers 10, 9,11,6,15,2,4,13 using bubble sort by illustrating each step.	10
ii)	Explain the insertion Sort in detail with the pseudo code. Also sort following numbers 23, 34, 2, 43, 15, 25, 65, 51, 44, 8, 21 using insertion sort by illustrating each step.	10
iii)	Explain linear search and binary search with example. Show all the steps.	10

Que. No.	Question	Max. Marks
Q5	Write any **four**	**20**
i)	For web page navigation in forward and backward which data structure will be useful? Justify your answer.	5
ii)	Explain the types of binary tree.	5
iii)	Differentiate between DFS and BFS.	5
iv)	Define MAP ADT and its application.	5
v)	State which data structure is used for BFS traversal and show BFS traversal with an small example	5
vi)	Why linked list is better than array? List different types of linked list?	5