

Reg. No.

Question Paper Code

11859

12 JUN 2023

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Third Semester

Information Technology

(Common to Sixth Semester - Electrical and Electronics Engineering)

20ITPC301 – DATA STRUCTURES

(Regulations 2020)

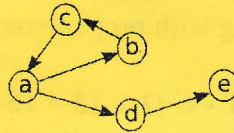
Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,</i><br><i>K-Level, CO</i> |
|--|-------------------------------------|
| 1. What is data structure?   | 2,K1,CO1                            |
| 2. Convert the infix expression to postfix expression: $a+b*c+(d*e)$ . | 2,K2,CO1                            |
| 3. List down the differences between arrays and linked lists.          | 2,K2,CO2                            |
| 4. Write the syntax to create a node in singly linked list.            | 2,K2,CO2                            |
| 5. Differentiate a binary tree and binary search tree.                 | 2,K2,CO3                            |
| 6. Define left skewed and right skewed tree.                           | 2,K1,CO3                            |
| 7. What is graph traversal? List out its types.                        | 2,K1,CO4                            |
| 8. Draw the adjacency matrix for the following graph.                  | 2,K2,CO4                            |



- |   |          |
|---|----------|
| 9. Write the routine for linear search. | 2,K2,CO6 |
| 10. Write the routine for Bubble sort.  | 2,K2,CO6 |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |   |           |
|---|-----------|
| 11. a) Explain how the following "infix" expression is evaluated with the help of Stack $8 * (10 + 7) - 16 / 2$ .   | 13,K2,CO1 |
| <b>OR</b>   |           |
| b) How will you evaluate a postfix expression? Convert the infix expression $a+b*c+(d*e+f)*g$ to its equivalent postfix expression and evaluate it ( $a=3, b=2, c=1, d=4, e=5, f=8, g=7$ ). | 13,K3,CO1 |
| 12. a) Define Singly Linked List. Write a routine for inserting a node at (start, end, middle) of Singly Linked List.   | 13,K2,CO2 |
| <b>OR</b>   |           |
| b) Define Circular Linked List. Write a routine for deleting a node at (start, end, middle) of Circular Linked List.  | 13,K2,CO2 |

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

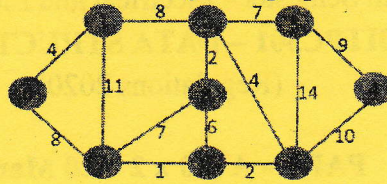
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13. a) Write the routine for BST insertion and form a BST for 13, K3, CO3  
67, 40, 35, 75, 68, 50, 69, 90, 38, 45

OR

- b) Write the routine for creating a min Heap. Create a min and max for 13, K3, CO3  
10, 9, 21, 8, 11, 14, 12, 7, 6.

14. a) Using Dijkstra's algorithm find the shortest path from the source 13, K3, CO4  
vertex to every other vertex in the given graph G.

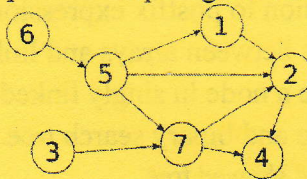


OR

- b) (i) Find the topological sorting of the vertices in the below given 7, K3, CO4  
Directed Acyclic Graph.

- (ii) Write the routine to perform topological sort for the same.

6, K3, CO4



15. a) Explain the various Hash functions with suitable examples.

13, K2, CO6

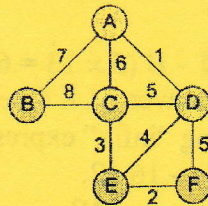
OR

- b) Explain Separate Chaining with proper example.

13, K2, CO6

**PART - C (1 × 15 = 15 Marks)**

16. a) What is minimum -cost spanning tree? Discuss Kruskal's algorithm 15, K3, CO5  
for below graph.



OR

- b) Write the routine for Depth First Search and traverse the graph below 15, K3, CO5  
figure.

