

Time : 3 Hours]

[Max. Marks : 80

- Instructions : (1) All questions carry equal marks.
(2) Attempt any three questions from each section.
(3) Tie both the section separately.

Q1A Attempt following:

1. Explain memory representation of two dimension array. 2
2. Explain classification of classic data structure. 2
3. What is Link list? Write an algorithm to split singly link list into two lists. 3

Or

Q1A Attempt following:

1. What is abstract data type? Explain with example. 2
2. What is array? Explain sparse matrix with example. 2
3. Explain different types of linked list with proper diagram. 3

Q1B Attempt following:

1. Write an algorithm for Bubble sort and trace following data using bubble sort.
45 33 67 54 3
2. Write an algorithm for binary search method, what is the prerequisite condition for binary search method? 4

Or

Q1B Attempt following:

1. Create min heap for following data using heap sort method
5 12 9 2 20 21 3
2. Write an algorithm for sequential search method and trace following data using binary search method.
12 56 7 4 9 66 4

Q2A Answer the following:

1. Evaluate following postfix expression. 2
 $6\ 2\ 3\ +\ -\ 3\ 8\ 2\ /\ +\ * \ 2\ 3\ +$
2. Convert following expression to reverse polish notation 2
a) $a + b * c - d$ b) $(a + b) / (c - d)$
3. Draw the status of circular queue at each stage, assume initially the circular queue is empty and queue size is 5. 3
a) Insert P, Q, R, S, T
b) Apply delete one time.
c) Insert U
d) Insert V

Or

Q2A Answer the following:

1. Write an algorithm for push operation using singly link list. 2
2. What is queue? Explain different operation of queue. 2
3. Convert following expression to postfix operation. 3
a) $a - b * f^j$ b) $a \% b \wedge c \wedge d$ c) $(a + b + c \% d) / e$

Q2B Answer the following:

1. Give the difference between stack and queue. 3
2. Write an algorithm for followings. 4
a) Push b) Pop c) Display

Or

Q2B Answer the following:

1. Explain Different types of queue. 3
2. Write an algorithm for queue operations. 4

Q3A Answer the following:

1. Draw the expression tree for following expression; also find its all three traversal.
 $A + B * C * (D - E)$ 4
2. What is tree? Explain link and sequential representation of binary tree. 3

Or

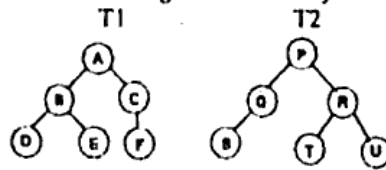
Q3A Answer the following:

1. Write a sort note on inorder threaded binary tree. 4
2. Draw binary tree for following: 3
Preorder : A B D E C F G
Inorder : D B E A F C G

Q3B Answer the following:

1. Convert following tree into binary tree.

3



2. Write a short note on AVL tree.

4

Or

Q3B Answer the following:

1. Explain fully binary tree, complete binary tree with proper tree diagram.
2. Write a short note on B tree.

3

4

Q4A. Answer the following questions

1. What is graph? Compare BFS and DFS technique.
2. Write a short note on PERT method.

4

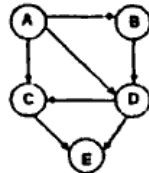
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Or

Q4A. Answer the following questions

1. Give matrix representation for following graph.

4



2. Explain prim's algorithm with example.

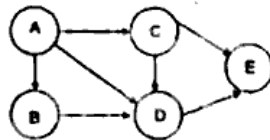
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Q4B. Answer the following questions

1. Explain different graph operations.
2. Describe in-degree and out-degree of all elements of following graph

4

3



Or

Q4B. Answer the following questions

1. Define following terms.
a) loop b) complete graph c) Edge simple path d) Isolate node
2. Explain kruskal's algorithm.

4

3

Q5. Do as directed: (Attempt Fourteen)

14

1. Define user define data type.
2. What is data structure.
3. What is static memory allocation?
4. What is data?
5. What are the applications of stack?
6. Difference between simple queue and circular queue.
7. Give polynomial representation using link list for following expression.
 $5X^3 + 45X^2Y^2 + XZ + 1$
8. What are the applications for link list?
9. Polish notation of expression is also termed as _____.
10. Explain similar tree using example.
11. Give difference between general tree and binary tree.
12. What is forest?
13. Define malloc().
14. Give two example of queue.
15. Full form of BFS.
16. Define spanning tree.