

22317

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) State any two differences between linear search and binary search.
- (b) Define term pointer and null pointer.
- (c) Define the terms : linear data structure and non-linear data structure.
- (d) List any four applications of queue.
- (e) Write any four operations that can be performed on data structure.
- (f) Convert the following infix expression to its postfix form using stack :
 $A + B - C * D / E + F$
- (g) Describe given two types of graphs : Directed graph and Undirected graph.

2. Attempt any THREE of the following :

12

- (a) Describe working of selection sort method with suitable example.
- (b) Write algorithm to delete an intermediate node from a singly linked list.
- (c) Differentiate between tree and graph w.r.t. any four parameters.
- (d) Convert the given infix expression to postfix expression using stack and the details of stack at each step of conversion.

Expression : $A * B \uparrow C - D / E + [F / G]$

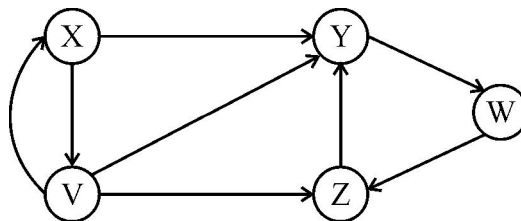


3. Attempt any THREE of the following :**12**

- (a) Explain complexity of following algorithms in terms of time and space :
- Binary search
 - Bubble sort
- (b) Draw an expression tree for the following expression :
- $$(a + 3b - 7c)^3 * (6d - 8e)^7$$
- (c) Describe working of bubble sort with example.
- (d) Show the effect of PUSH and POP operation on the stack of size 10. The stack contains 10, 20, 25, 15, 30 & 40 with 40 being at top of stack. Show diagrammatically the effect of
- PUSH (45)
 - PUSH (50)
 - POP
 - PUSH (55)

4. Attempt any THREE of the following :**12**

- (a) Create singly linked list using data fields 10, 20, 30, 40, 50 and show step-by-step procedure with the help of diagram from start to end.
- (b) Describe advantages of circular link list over linear link list with example.
- (c) Explain the working of Radix sort method with an example.
- (d) Write an algorithm to count no. of nodes in singly linked list.
- (e) Consider the graph 'G' in the following figure :



- Find all simple path from X & Z.
- Find indegree and outdegree of node Y and Z.
- Find adjacency matrix A for the above graph.
- Give adjacency list representation of above graph.

5. Attempt any TWO of the following : 12

- (a) Define the term tree traversal. Construct the Binary Search Tree (BST) of following :
85, 90, 45, 60, 25, 35, 10, 20, 75, 95 and traverse the above BST in inorder, preorder & postorder.
- (b) Explain operation on singly linked list.
- (c) Implement a 'C' program to insert element into the queue and delete the element from the queue.

6. Attempt any TWO of the following : 12

- (a) Find out prefix equivalent of the expression :
 - (i) $[(A + B) + C] * D$
 - (ii) $A[(B * C) + D]$
 - (b) Sort the following number in ascending order using bubble sort. Given numbers as follows : 475, 15, 513, 6753, 45, 118.
 - (c) Describe circular linked list with suitable diagram. State advantages of circular linked list over linear linked list.
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