

22317

23242

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) Define Abstract Data Type (ADT).
- (b) Explain the term : Time Complexity.
- (c) List the operations that can be performed on data structure.
- (d) Define Searching. State two methods of Searching.
- (e) Define Stack with suitable example.
- (f) Define linked list with example.
- (g) Define the following terms with respect to tree :
 - (i) In-degree
 - (ii) Out-degree



2. Attempt any THREE of the following : 12

- (a) Describe working of Bubble sort with example.
- (b) Explain PUSH and POP operation on stack with suitable example.
- (c) Explain the concept of information, next, null pointer and empty list with respect to linked list.
- (d) Write an algorithm to insert a new node at the beginning in linear list.

3. Attempt any THREE of the following : 12

- (a) Write a program to implement linear search for 10 elements in an array.
- (b) Write a program to print a string in reverse order.
- (c) Explain the operations on a singly linked list.
- (d) Draw a binary search tree for the given numbers :
50, 33, 44, 22, 77, 35, 60, 40

4. Attempt any THREE of the following : 12

- (a) Explain linear data structure with any three types.
- (b) Write a 'C' program to implement selection sort.
- (c) Convert the following infix expression to postfix expression using stack and show the details of stack in each step :
$$((A + B) * C) ^ (D - E)$$
- (d) Implement a 'C' program to insert element into the queue and delete the element from the queue.
- (e) Compare linear list with circular list. (Any **four** points).

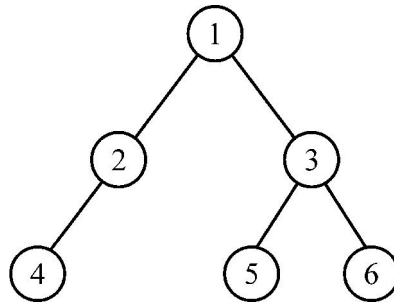
5. Attempt any TWO of the following :**12**

- (a) Evaluate the given infix expression to the postfix expression using stack :

$$((a / (b - c + d)) * (e - a) * c)$$

- (b) Create a singly linked list using data fields 15, 20, 22, 58, 60. Search a node 22 from the singly linked list and show procedure step-by-step with the help of diagram from start to end.

- (c) From the given tree, complete **six** answers :



- (i) Degree of tree
- (ii) Degree of node 3
- (iii) Level of node 5
- (iv) In-degree of node 3
- (v) Out-degree of node 3
- (vi) Height of tree

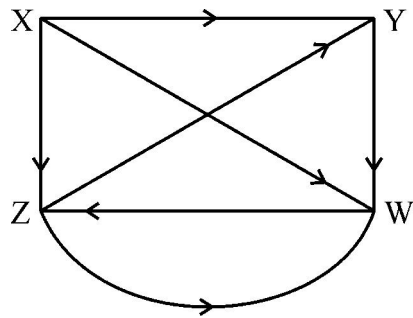
6. Attempt any TWO of the following :**12**

- (a) With a neat sketch explain working of priority queue.
- (b) Draw the tree for given expression :

$$(a - 2b + 5c)^2 * (4d - 6e)^5$$

P.T.O.

(c) Consider the graph G given below :



(i) Write adjacency matrix representation

(ii) Write adjacency list
