17330

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : *(1)* ***All*** *questions are* ***compulsory****.*

(2) Illustrate your answers with neat sketches ***wherever*** *necessary.*

(3) Figures to the ***right*** *indicate* ***full*** *marks.*

(4) Assume suitable data, if ***necessary****.*

(5) Mobile Phone, Pager and any other Electronic Communication devices are ***not*** *permissible in Examination Hall.*

Marks

1. A) Attempt **any six**: **12**

a) Define complexity and classify it.

b) State limitations of the Big 'O' notation.

c) Define searching and enlist its types.

d) Stack is linear data structure. Yes/No ? Justify your answer.

e) Sketch representation of queue as an array.

f) Define linked list with example.

g) Differentiate between tree and graph (Min. 2 points).

h) What is indegree and outdegree of a node in graph ?

B) Attempt **any two**: **8**

a) Describe different approaches to design an algorithm.

b) Explain Binary Search Tree (BST) with example.

c) What are the applications of graph ? Explain any two with example.

Marks

2. Attempt **any four** : **16**

a) Write a program for Binary search.

b) Convert following expression into postfix form with illustration of all steps.

A + B ↑ C * (D/E) – F% G

Note : ↑ indicates exponent operator.

c) Differentiate between stack and Queue. (Min. 4 points).

d) Draw representation of linear linked list, circular linked list and doubly linked list.

e) Write algorithm for preorder traversal of binary tree.

f) Explain representation of graph in detail.

3. Attempt **any four** : **16**

a) Describe time and space trade off and time and space complexity with example of each.

b) Write a program for selection sort.

c) Explain operations on stack using array.

d) Describe priority queue with its advantages.

e) Write an algorithm for searching a node in linked list.

f) Draw a binary search tree for given sequence and write postorder traversal of tree.

10 5 8 9 7 6 2 15.

4. Attempt **any four** : **16**

a) Elaborate the steps for performing insertion sort for given elements of array.

30 10 40 50 20 45

b) Recursion is one of the application of stack-YES/NO ? Explain it for calculating the factorial of a number 5 using recursion.

Marks

c) Describe the stack as an abstract datatype.

d) Compare circular queue and double-ended queue. (Min. 4 points)

e) Define :

i) Sibling

ii) Depth of tree

iii) Complete binary tree

iv) Degree of tree.

f) Explain Hashing with its significance.

5. Attempt **any two** : **16**

a) Write a program for linear search. Find position of element 30 using linear search algorithm in given sequence.

10 5 20 25 8 30 40

b) Explain any three application of stack in detail with example.

c) Differentiate between linear linked list, circular linked list and doubly linked list. (Min. 4 points each).

6. Attempt **any two** : **16**

a) Write a program for insert and delete operation perform on queue. State any two application of queue.

b) Draw tree for given expression and find inorder, preorder and postorder traversal.

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

Marks

c) Consider the graph G in Fig. 1

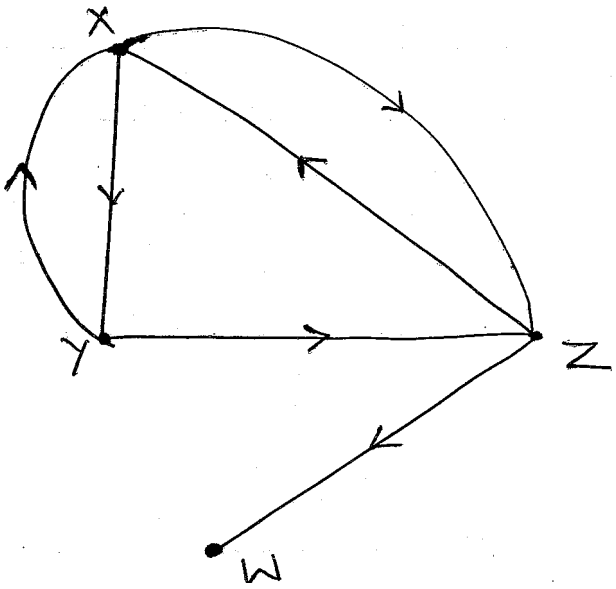

Figure – 1

i) Write Adjacency matrix representation.

ii) Depth first traversal sequence.

iii) Find all simple path from X to W.

iv) Find indegree (X) and outdegree (W).