17330

16117

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) Use of Non-programmable Electronic Pocket Calculator is ***permissible****.*

Marks

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

1) Define Big 'O' Notation.
2) Define data structure and give its classification.
3) Define searching. Give its type.
4) Define Recursion. State any two application where recursion used.
5) Define following W.V.T. tree
   a) Ancestor
   b) Descendant nodes
6) Define following W.V.T. tree
   a) In-degree
   b) Out-degree
7) State any four sorting technique.
8) List any four application of graph.

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

1) What is complexity of an algorithm ? Describe time complexity and space complexity.
2) Describe binary search algorithm. Give example to search an element using binary search algorithm.
3) Describe circular queue. Give its advantage.

P.T.O.

Marks

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

a) Describe working of inserting sort. Demonstrate working of insertion sort algorithm to sort 6 elements.

b) Find out prefit equivalent of the following expression :

i) [(A + B) + C] * D ii) A [(B * C) + D]

c) Write an algorithm to insert a new node as the last of a singly linked list. Give example.

d) Describe concept of Binary tree. State its application.

e) Write a program to insert element in queue.

f) Write a program to search an element in an array. Display position of element.

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

a) Describe PUSH and POP operation on state using array representation.

b) What is priority queue ? Describe working of priority queue with suitable example.

c) Describe working of doubly linked list. Write syntage used for double linked list in program.

d) Write algorithm for morder traversal for Binary tree. Demonstrate with suitable example.

e) Draw tree structure for following expression.
[3A + 7B] – [(6D – 4E) ^ 6C]

f) What is collision resolution techniques ? State its types.

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

a) Compare Top-down approach v/s Bottom-up approach [any four points].

b) How stack is used in Recursion ? Describe with suitable example.

c) Write a code delete an element in queue.

d) Define following terms :

i) Node ii) Null pointer

iii) Empty list iv) Information

e) Write an algorithm to traverse a singly linked list.

f) Describe general tree and binary tree.

Marks

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

a) Sort following elements by Radix sort algorithm

87.3, 2.34, 7.29, 3.59, 45.8, 3.79, 3.20, 422.

b) Convert the given infit expression to postpix expression using stack and the details of stock at each step of conversion.

EXPRESSION P * Q ↑ R – S/T + [U/V]

c) Describe DFS with suitable examples.

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

a) How stack TS useful in reversing a list ? Write a C program to reverse a list using stack.

b) Write a program to calculate number node in binary search tree.

c) Consider the graph 'G' in fig.

i) Find all simple paths from C – A.

ii) Find all simple paths from D-B.

iii) Find indeg [B] and outdeg [C].

iv) Find the adjacency matrix A for graph.

v) Give adjacency list representation of graph.