KNT/KW/16/5309

Bachelor of Science (B.Sc. I.T.) Semester—III (C.B.S.) Examination

DATA STRUCTURES

Paper—II

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) **ALL** questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagram wherever necessary.

EITHER

1. (a) What is double linked list ? Explain memory representation of double linked list. 5

(b) Explain insertion operation in a sorted linked list. 5

OR

(c) Write an algorithm to insert a node at the beginning of a double linked list. 5

(d) Explain linked list representation of polynomial. 5

EITHER

2. (a) What is stack ? What are the different operations that can be performed on stack ? 5

(b) What is Recursion ? Let a and b denote positive integers. Suppose a function Q is defined recursively as follows :

$$Q(a,b)=\begin{cases}O & , \quad \text{if} \quad a<b \\ Q(a-b,b)+1, & \text{if } b\le a\end{cases}$$

find value of Q(2, 3) and Q(14, 3). 5

OR

(c) Consider the following arithmetic expression P, written in postfix notation :

P = 12, 7, 3, –, /, 2, 1, 5, +, *, +

Evaluate the postfix expression. 5

(d) Explain the Towers of Hanoi problem. 5

EITHER

3. (a) Explain Insertion sort with an example. 5

(b) What is priority queue ? Explain one way list representation of priority queue. 5

OR

(c) What is hashing function ? Explain any one hashing technique in detail. 5

(d) Explain Big O notation. Calculate the complexity of insertion sort. 5

EITHER

4. (a) What is a graph ? Explain the linked representation of graphs in memory. 5

(b) What is a heap ? Explain heapsort method. 5

OR

(c) Explain DFS traversing on graph with an example. 5

(d) Explain Inorder traversal with an example. 5

5. (a) Explain circular headers list. 2½

(b) Write the properties for recursion. 2½

(c) Explain Deques. 2½

(d) Explain weighted graphs with example. 2½