

B.Sc. (Honours) Semester-II Examination 2017
Computer Science (Allied)
Course : BCSA-21
Data Structures and Algorithms

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any four** questions

1. (a) Explain array with a suitable example.
(b) Compare and contrast static array and dynamic array.
(c) Explain the advantage of linked list over array with a suitable example. 3+3+4=10
2. (a) Explain with suitable examples –
(i) Single linked list
(ii) doubly linked list
(iii) Circular linked list
(b) Indicate the steps to insert a node in a doubly linked list. (3×2)+4=10
3. (a) What do you mean by a queue? Explain with a suitable example.
(b) Explain stack with its associated operations.
(c) Justify with due explanation whether it is possible to implement a queue using two stacks. (2+1)+4+3=10
4. (a) Define a binary tree.
(b) Determine the maximum and minimum height of a binary tree with n nodes.
(c) Explain when the postorder and inorder traversal of a binary tree are identical. In that case what will be the effect of preorder traversal? 2+(2+2)+(3+1)=10
5. (a) If the postorder traversal of a binary tree is the reverse sequence of its preorder traversal, what can be said about the binary tree? Is it possible to deduce the inorder traversal – justify.
(b) Define binary search tree. What will be the characteristic of the inorder traversal of a binary search tree?
(c) Convert the following –
(i) $a+b+c*$ into corresponding postfix
(ii) $abcd + - *$ into corresponding infix
(iii) $abc+*$ into corresponding prefix (2+2)+(2+1)+(1×3)=10
6. (a) Define a graph.
(b) Explain with a suitable example how a graph is represented using adjacency matrix and adjacency list.
(c) Explain :
(i) Complete graph (ii) Bipartite graph (iii) Cycle (iv) Path 2+(2+2)+4=10