

C0-R4.B3: DATA STRUCTURE THROUGH JAVA

NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Write a JAVA code to implement binary search.
- b) What is 'Encapsulation' concept in Object Oriented Programming? Write sample Java code that illustrates Encapsulation.
- c) Explain in brief on 'space and time complexity' of algorithm analysis with an example.
- d) Write Java code to implement a Stack.
- e) What is 'recursion'? Write merits and limitations of recursion over an iterative method.
- f) What is a 'Binary Search Tree'? Write its properties and draw a Binary Search Tree, in compliance with its properties.
- g) Write a Java code to implement a 'Bubble Sort'.

(7x4)

2.

- a) Draw a 'Binary tree' that spreads at least 3 levels and write its pre-order, in-order and post-order traversals.
- b) What is 'Polymorphism' concept in Object Oriented Programming? Write a Java code for a suitable example that illustrates 'method overloading' and 'method overriding'.
- c) Explain in brief on Xtreme Programming.

(6+9+3)

3.

- a) What is Asymptotic Algorithm notation? Explain with the help of an example.
- b) Write a Java program to implement a 'single linked list' for a list of names. The implementation should contain insertion, deletion and display operations too.

(6+12)

4.

- a) Write a Java program to convert an expression in infix notation to post fix notation using recursive method.
- b) What is a B-Tree? And write its properties.
- c) What is AVL Tree? Explain how a node can be inserted into an AVL tree with an example.

(9+3+6)

5.

- a) Write Prim's and Krushkal's minimum spanning tree algorithms. Explain both with an example.
- b) Write Depth First Search (DFS) algorithm. Explain the same with an example.

(12+6)

6.

- a) Write Brute-Force String Matching algorithm and explain the same with an example.
- b) Write a program in Java to implement 'Quick Sort'. Trace with an example.

(9+9)

7.

- a) Write a Java program to implement Heap Sort. Explain its complexity with Best, Average and Worst cases.
- b) Write a program in Java to implement a circular Queue.

(9+9)