Total No. of printed pages = 3

CS 471

Roll No. of candidate | | | | | | | | | | |

2019

B.E. 4th Semester End-Term Examination

DATA STRUCTURE

(GU Syllabus)

Full Marks – 100 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* of the following.

1. (a) Define Tree data structure. What is level and order of a tree? (2+3=5)

   (b) Write an iterative (non recursive) function to add on element into a Binary Search Tree (BST). Also write a function to display the tree. (10+5=15)

2. (a) Write a program to reverse a string using a stack. (6)

   (b) What is sorting? Why sorting is important? Implement bubble sort and merge sort (using functions). (2+2+4+6=14)

[Turn over

3. (a) Explain how Quick sort and Radix Sort works on the following words: (7 + 7 = 14)

India, Australia, England, Netherlands, Zimbabwe, Brazil, Denmark.

(b) Write a program to concatenate two strings. (6)

4. (a) Explain with an example how doubly linked lists are useful. Also state its demerits. (5)

(b) Write the following functions: (Use singly linked lists) (3×5=15)

(i) To insert an element in a queue.

(ii) To delete an element from the queue.

(iii) To display the queue.

5. (a) Define data structure. What are its types? State with examples. (2 + 2 + 2 = 6)

(b) Write a function to delete an element from a Binary Search Tree (BST) (4)

(c) Convert the following into: (5+5=10)

(i) $A + B - C * D - E / F$ (Prefix expression)

(ii) $9 - ((3 * 4) + 8) / 4$ (Postfix expression)

6. Write the following functions: (4×5=20)

(a) To determine the height of a Binary Search Tree (BST).

(b) To find the total number of internal nodes of a Binary Search Tree (BST).

(c) To find the mirror image of a Binary Search Tree (BST).

(d) To search a node of a Binary Search Tree (BST).

7. (a) What is an AVL tree? State its properties. (2+3=5)

(b) Insert the following into an AVL tree (Show the steps): (6)

23, 19, 12, 7, 5, 25, 65, 8, 29, 2, 44, 46, 13, 3

(c) Now delete the following from the above tree in 7(b) (Show the steps): (6)

12, 25, 44, 13, 12, 3, 19

(d) State the demerits of AVL tree. (3)
