SRINIX COLLEGE OF ENGINEERING, BALASORE
1ST INTERNAL EXAMINATION-2021-22

SUBJECT –DS   SEMESTER- 3RD   BRANCH-CSE

FULL MARK-60   TIME- 2HOURS

SECTION A (All questions are compulsory)

$$2 \times 10 = 20$$

1. What is data structure? Differentiate between linear and non linear data structure.
2. Name the data structure used to implement DFS.
3. What is stack? Why it is called a LIFO data structure?
4. Construct a BST using the keys set 45, 87, 34, 77, 90
5. List advantages of linked list over array.
6. A, B and C are 3 integers such that A>B>C. How many BST can be drawn using A, B and C. Also draw them.
7. Write over flow and underflow condition for a circular queue.
8. Define self referential structure. Write code in C to define the node structure in a linked list.
9. Name two sorting techniques which are based on the philosophy of divide and conquer mechanism.
10. There are 1024 no of records in a database. What are the maximum number comparisons required by linear search and binary search to search a record?

SECTION B (Answer Any Four)

$$5 \times 4 = 20$$

11. Convert the following infix expression into postfix using stack: 23+8*7^2-99+77
12. Prove that maximum no of nodes in a binary tree of height h is $2^{h+1} - 1$.
13. Write functions in C for PUSH and POP operation on a stack implemented using array.
14. Construct a binary tree whose in-order and post order traversal are 4 2 1 7 5 8 3 6 and 4 2 7 8 5 6 3 1 respectively.
15. Write a complete program to implement binary search.
16. Explain DFS algorithm for graph traversal.

SECTION C (Answer Any Two)

$$10 \times 2 = 20$$

17. What is circular Queue? Write functions in C for insert and delete operations on a circular queue.
18. Define linked list. Write a menu driven program for traversal, insert and delete operations on a single linked list.
19. Explain AVL tree with the help of an example. Construct and AVL tree using the letters of the word COMPUTER.
20. Write an algorithm to evaluate a postfix expression. Explain with the help of suitable example.

***** ALL THE BEST *****