



WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)

Visharambag, Sangli - 416415

Second Year B.Tech. (Computer Science and Engineering)

ESE, ODD SEMESTER, AY 2022-23

Data Structures (6CS202)



ESE

PRN: _____

Day & Date: Saturday, 17/12/2022

Time : 3.00 pm to 5.00 pm

Max Marks:

50

IMP: Verify that you have received question papers with correct course code, branch etc.

- Instructions**
- a) All questions are compulsory.
 - b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
 - c) Assume suitable data wherever necessary.
 - d) Figures to the right of question text indicate full marks.
 - e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
 - f) Except PRN anything else writing on question paper is not allowed.
 - g) Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (Only for faculty use)

Marks

- Q1**
- A)** Illustrate Pseudocode with example. 4 CO1
 - B)** The preorder traversal sequence of a binary search tree is 30, 20, 10, 15, 25, 23, 39, 35, 42. Write postorder traversal sequence of the same tree. 3 CO2
 - C)** Evaluate the following Prefix Expression. 3 CO2
+ / * 20 * 50 * 3 6 30 2
- Q2**
- A)** A stack of int is implemented using an array as the following data type: 3 CO3

```
#define SIZE 20
```

```
typedef struct
```

```
{
```

```
int data[SIZE];
```

```
int top;
```

```
} Stack;
```

Fill up the missing codes in the PUSH, POP, and TOP operations of the Stack.

```
void Push(Stack *s, int d) {
```

```
    _____
```

```
}
```

```
void Pop(Stack *s) {
```

```
    _____
```

```
}
```

```
int Top(Stack *s) {
```

```
    _____
```

```
}
```

- B) Write an algorithm for BFS traversal. 4 CM
- C) Write a function that returns the largest value in the binary search tree. 3 CM
- Q3 A) Illustrate Insertion sort with time complexity. 6 CM
- B) Illustrate the concept of representation of graph in memory. 4 CM
- Q4 A) Differentiate between Kruskal's and Prim's minimum cost spanning tree 4 CM
- B) Instead of specifying the subarray to be searched by giving the starting index and the length you might give the starting and ending indices. Write the code using this for recursive solution to binary search. 6 CM
- Q5 A) Construct an expression tree for the expression $(a + b * c) + ((d * e + 1) * g)$. Give the outputs when you apply preorder, inorder and postorder traversals. 4 CM
- B) Write an algorithm to detect a loop exist in linked list. 4 CM
- C) Data are enqueued to (ENQ operation) and dequeued from (DEQ operation) a queue in the following order: ENQ 3; FRONT; ENQ 7; FRONT; ENQ 6; ENQ 9; FRONT; DEQ; DEQ; FRONT; where the ENQ means element inserted in queue, DEQ means element is deleted from queue, and FRONT operation returns front element from queue. 2 CM
- Write the values returned by FRONT for the sequence of operations above.

-----End of question paper-----