# Online Examination

## Topic: Bitwise Operators, 2-D Array and Recursive Functions

## Section A2

**Full Marks: 20** **Time: 60 minutes**

**Problem 1:** Write down a C program that takes the binary representation of a decimal number (a sequence of 0's and 1's terminated by new line) as input, and output the corresponding decimal number.

**Constraints:**

1. **You must have to use bitwise operator.**
2. **You CANNOT use any arithmetic operator.**
3. **You CANNOT use any array. [Marks: 7]**

| Sample input | Corresponding Output |
|---|---|
| 1001 | 9 |
| 000100100 | 36 |

**Problem 2:** Write down a C program that takes the dimension of a 2-D array followed by the elements of the array. Elements will be of two types, either 1, or 0. You will have to determine whether 1 elements form a 'T'-shape. If *n* is number of rows and *m* is number of columns, then the range of *n* is $3 \leq n \leq 10$ and the range of *m* is $3 \leq m \leq 11$, and *m* will always be an odd number. Print "YES" if 1 elements form a 'T'-shape, print "NO" otherwise. **[Marks: 7]**

| Sample input | Corresponding Output |
|---|---|
| 3 3<br>1 1 1<br>0 1 0<br>0 1 0 | YES |
| 4 5<br>1 1 1 1 1<br>0 0 1 0 0<br>0 0 1 0 0<br>0 0 1 0 0 | YES |
| 4 5<br>1 1 1 1 1<br>0 0 1 0 0<br>1 0 1 0 0<br>0 0 1 0 0 | NO |

**Problem 3:** Write a C program which takes a string as input (maximum length would be 50 and all will be in lowercase), and find out the number vowels in the string using recursive function. [**Marks: 6**]

| Sample Input | Corresponding Output |
|---|---|
| abc def | 2 |
| xyzw | 0 |