GATE QUESTION Q.55(CS 2014 SET-C)

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1 PROBLEM

(GATE CS-2014 Set C)

Q.5 Let denote the Exclusive OR (XOR) operation. Let '1' and '0' denote the binary constants. Consider the following Boolean expression for F over two variables P and Q:

F(P,Q) = ((1 P) – (P + Q)) + ((P – Q) – (Q – 0))

The equivalent expression for F is

(A) $P + Q$

(B) $\overline{P + Q}$

(C) $P \oplus Q$

(D) $\overline{P \oplus Q}$

2 COMPONENTS

Component	Value	Quantity
Arduino	UNO	1
Bread board	-	1
Jumper wires	M-M	20
Led light	-	1
Resistor	150ohms	1

3 INTRODUCTION

An "identity" is merely a relationship that is always true, regardless of the values that any variables involved might take on; similar to laws or properties. Many of these can be analogous to normal multiplication and addition, particularly when the symbols 0,1 are used for FALSE, TRUE.

4 TRUTH TABLE

The Truth Table for the answer $\overline{P \oplus Q}$ is given below

x	y	Y1	Y2
0	0	0	1
0	1	1	0
1	0	1	0
1	1	0	1

$HereY1 = P \oplus Q$, $Y2 = \overline{P \oplus Q}$

Table 1

5 ARDUINO CONNECTIONS

1) The connections between Arduino and LED are as follows:

LED	$+ve$	$-ve$	$-ve$	$-$
ARDUINO	2	4	Gnd	Vcc

Table 2

6 CODE

The arduino code is given below.

```
include ¡Arduino.h¿
inta, b, c, y;
voidsetup()
pinMode(2, OUTPUT);
pinMode(4,INPUT);
pinMode(5,INPUT);
pinMode(6,INPUT);
//pinMode(7,INPUT);
voidloop()
a=digitalRead(4);
b=digitalRead(5);
c=digitalRead(6);
// d=digitalRead(7);
y= (a!bc)——(!abc);
digitalWrite(2,y);
```