Assignment 2 | FPGA Lab

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1 Question

Using the truth table, state whether the following proposition is a tautology, contingency or a contradiction:

$$(A.B)' + (A' => B)$$

2 Operators Description

2.1 Binary Operator: AND

The AND operator (symbolically: "**.**") also known as logical conjunction requires both A and B to be True(1) for the result to be True(1). All other cases result in False(0).

2.2 Binary Operator: OR

The OR operator (symbolically: "+") requires only one premise to be True(1) for the result to be True(1)

2.3 Binary Operator: NOT

The NOT operator is commonly represented by a [**'**]. It negates, or switches truth value.

2.4 Conditional Operator: if-then

Logical implication (symbolically: $\mathbf{A} \rightarrow \mathbf{B}$ or "=>"), also known as "if-then", results True(1) in all cases except the case T $\rightarrow$ F.This is logically equivalent to **A'**+**B**

3 Solution

3.1 Tautology

Truth Values are True(1) for any combination of truth value of variables.

3.2 Contradiction

Truth Values are False(0) for any combination of truth value of variables.

3.3 Contingency

Some Truth Values are True(1) for some combination of truth value of variables and some truth value are False(0) for truth value combination of other variables.

3.4 Truth Table

A	B	$A.B$	$(A.B)'$	A'	$(A' => B)$	$(A.B)' + (A' => B)$
1	**1**	1	0	0	1	**1**
1	**0**	0	1	0	1	**1**
0	**1**	0	1	1	1	**1**
0	**0**	0	1	1	0	**1**

3.5 Result

Since for all combination of A and B given proposition gives output as **True(1)** hence, given proposition is a **Tautology**.