1.
The logic circuit that you want to design is a exclusive-OR (XOR) gate. An XOR gate outputs a 1 if and only if one of its inputs is a 1 and the other input is a 0. So, if we use two XOR gates, we can create a circuit that outputs a 1 if and only if either of the following conditions is met:

* A is a 0 and B is a 1.
* A is a 1 and B is a 0.

Here is the circuit diagram:

A	*B*	*XOR1*	*XOR2*	*Output*
0	*0*	*0*	*0*	*0*
0	*1*	*1*	*0*	*1*
1	*0*	*1*	*0*	*1*
1	*1*	*0*	*1*	*0*

As you can see, the output of the circuit is a 1 only when one of the XOR gates outputs a 1. This happens when either A is a 0 and B is a 1, or A is a 1 and B is a 0. In all other cases, the output of the circuit is a 0.

The logic gates that you would use to create this circuit are two XOR gates. You can also use a NAND gate and a NOR gate to create the same circuit, but this is less efficient.

2.

- C: Carbon dioxide pressure too low (1 when true, 0 when false)
- W: Water pressure > 10 bar (1 when true, 0 when false)
- T: Temperature > 300°C (1 when true, 0 when false)
- X: Output that triggers the alert (1 when true, 0 when false)

Now, let's construct the truth table based on the given conditions:

C	W	T	X
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

Now, let's write the logic expression for the output X based on the truth table:

X = (C' * W' * T' * 0) + (C' * W' * T * 0) + (C' * W * T' * 0) + (C' * W * T * 0) + (C * W' * T' * 0) + (C * W' * T * 1) + (C * W * T' * 0) + (C * W * T * 1)

Since the term "C * W' * T * 1" appears in two cases where X = 1, we can simplify the expression:

X = (C' * W' * T * 0) + (C * W * T * 1)

Additionally, any term multiplied by 0 can be removed, so the final simplified logic expression is:

X = C * W * T

So, the logic expression for the alert display is "X = C * W * T". This means the alert will be triggered when both carbon dioxide pressure is too low and water pressure is greater than 10 bar, and the temperature is above 300°C.