1) False
For an “AND” statement to be true, both parts have to be true. Even though the first part is true, because $0 < 10$, the second part is not true, because $10$ is not less than $10$. So the “AND” statement is not true. If this were an “OR” statement, it would be true.

2) True
Even though the first part of the “OR” statement is false, namely $10$ is not greater than $20$, the second part is true, because $0 < 5$. So the entire statement is true because for an “OR” statement to be true, it is enough for only one part to be true.

3) Input A must be true.
If A were False, the top level would be false, because two false parts make an “OR” statement false (in fact that is the only way an “OR” statement could be false). So the “OR” statement would give a false output, which when combined in an “AND” statement with a true statement, gives a false output, since an “AND” statement requires both parts to be true.
On the other hand, if A were true, then the “OR” statement would be true, putting two true inputs into the “AND” statement, resulting in a true output, since two true parts make an “AND” statement true.

4) Choice 4
The first choice is wrong because if you are on Floor 1, even if the elevator is not called, the first parenthetical statement would be true because it only takes one part to be true to make an “OR” statement true, so the elevator will move even if not called. If you are on the second floor, then the second parenthetical statement would be true even if the elevator is not called. Since the entire statement is an “OR” statement, the elevator will move whether you are on floor 1 or floor 2, even if it is not called to any floor.
The second choice is wrong because the elevator will never move. You can’t be on Floor 1 and Floor 2 at the same time, so there is no way both parenthetical “AND” statements could be true at the same time, and therefore the entire AND statement can’t be true.
The third choice is wrong because, for example, you could be on Floor 1 and the first parenthetical statement would be correct, and you could be called to Floor 1, which would make the second parenthetical statement correct. So the entire AND statement would be correct and the elevator would move even though the original prompt says the elevator should only move if it is called to a floor that is not currently on.
The fourth choice is correct because if the elevator is on the first floor and called to the second floor “OR” you are on the second floor and called to the first floor, the elevator will move. Only one of the two situations needs to be true since the entire statement is an “OR” statement.