Checking Iron Protection After a Contact Opens

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A corrosion simulation exposes equal areas of an iron strip to the same conducting liquid in each trial. A separate zinc piece contacts the liquid but never covers or touches the iron. A wire can provide an electron path between the pieces. Zinc atoms that become Zn^{2+} each release two electrons. Iron loss is tracked from the iron ions formed during the test.

Trial	Connection between zinc and iron	Iron atoms converted to ions	Zinc atoms converted to ions
P	Open	4	1
Q	Closed	1	5

1 Which trial gives less iron oxidation?

(1) P only

(2) Q only

(3) The trials give equal iron oxidation.

(4) The zinc count prevents a comparison.

2 Compare the electrons released by zinc oxidation in P and Q. [1]

Answer and work

3 A student says zinc protects the iron by blocking liquid from reaching its surface. Evaluate the claim with the controlled exposure and the two records. [1]

Answer and work

An independent meter in Q records electrons moving from zinc through the connection to iron. A repeat opens the connection midway while keeping the exposed areas fixed.

4 State what two changes the class should look for after the connection opens if the protection depends on that electron path. [1]

Answer and work