Comparing Charge Over Two Cell Tests

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

A classroom cell simulation records current during two tests of an electron-transfer reaction. One ampere corresponds to one coulomb of charge passing per second. Assume all measured charge comes from the reaction. In the model, oxidation of one M atom releases two electrons.

Test	Current during first 10 s (A)	Current during second 10 s (A)
P	0.40	0.10
Q	0.30	0.30

1 Which test transfers more charge during the first 10 s?

(1) P, because it has the larger current during that interval.

(2) Q, because its current stays constant for longer.

(3) P and Q transfer the same charge during that interval.

(4) The first-interval currents do not allow the charges to be compared.

2 Calculate the total charge transferred in each test. Show how you use both intervals. [1]

Answer and work

3 Which test oxidizes more M atoms? Explain why the first-interval comparison alone would give the wrong conclusion for the complete test. [1]

Answer and work

The class repeats P but continues its second current of 0.10 A for 20 s instead of 10 s. The first interval remains unchanged.

4 Determine whether the repeated P test oxidizes the same number of M atoms as the original Q test. Show your comparison. [1]

Answer and work