Checking a Solid That Conducts Under Light

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

A display tests a solid strip between metal contacts. The strip stays at the same temperature and voltage during the readings. The exhibit has an independent sensor that estimates how many electrons in the strip can move through it. Atoms stay in place in this model.

Condition	Current (model units)	Mobile-electron reading (model units)
In darkness	0	0
Under light P	6	12
Under light Q	0	0
In darkness after light P	0	0

1 Which condition provides evidence of mobile charge in the solid strip?

(1) Darkness before either light

(2) Light P

(3) Light Q

(4) Darkness after P

2 Use both sensors to explain why a solid can carry current during light P even with its atoms fixed. [1]

Answer and work

3 A student says light P must melt the strip to make it conduct. Select whether the readings support or refute the claim. Use the stated conditions and the sensor record. [1]

Select one

☐ Supports the claim

☐ Refutes the claim

Answer and work

In another run, the display turns on a second light that delivers the same energy per second as P but does not make electrons mobile.

4 Predict the current in this run. Explain why the energy-per-second reading alone is insufficient. [1]

Answer and work