Checking a Warm Surface With Two Thermometers

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

A workshop checks two warm metal blocks with a contact thermometer and an infrared detector. The blocks have different surface finishes. In this model the contact thermometer measures the surface temperature directly. The infrared detector records radiation from the surface. A surface finish can change that radiation at the same temperature.

Block	Contact reading (°C)	Infrared signal (model units)
P, dull finish	60	12
Q, shiny finish	60	4

1 Which readings show that the blocks have the same measured surface temperature?

(1) The two contact readings

(2) The two infrared readings

(3) P’s infrared reading and Q’s contact reading

(4) Neither set of readings

2 A student says the smaller infrared signal shows that Q has a lower surface temperature. Evaluate the claim using the two kinds of measurements. [1]

Answer and work

The workshop puts identical dull patches on both blocks. The patches reach the blocks’ surface temperatures without changing them. The infrared detector now sees only a patch on each block.

3 If the original difference came from the finish, predict the new infrared comparison and explain. [1]

Answer and work

4 Describe a check that establishes whether the two blocks stayed at the same temperature during the patch trial. [1]

Answer and work