Stretching Carbon Dioxide in an Infrared Cell

Scoring guide · one credit per question · review written work against each rubric

Stretching Carbon Dioxide in an Infrared Cell

Question 1

Oxygen has a higher electronegativity than carbon, so it attracts shared electrons more strongly. Each oxygen end of a C–O bond has partial negative charge.

Question 2

Choice (1)

The bonds have equal lengths on opposite sides of carbon in Model A. Model B shows one bond longer and the other shorter.

Question 3

At each moment the bonds are equivalent and point in opposite directions along the same line. Even if their dipoles change in magnitude as the bonds stretch, their contributions remain equal and opposite, so the net dipole stays zero.

Question 4

The asymmetric motion changes the left-right charge distribution, so the opposing bond dipoles no longer cancel throughout the vibration. The changing overall dipole lets the motion absorb infrared light at a matching frequency.