Pressure in a Robotics Diving Bell

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

Pressure in a Robotics Diving Bell

Question 1

At greater depth the water exerts more pressure on the trapped air. The boundary moves upward into the bell, compressing the same number of gas particles into less space. A correct explanation may refer to the inverse relation of pressure and volume at constant temperature.

Question 2

Any trial gives P_1V_1 = 240 kPa·L. Then $V_2 = P_1V_1/P_2$ = (240 kPa·L)/(170 kPa) ≈ 1.41 L. Accept consistent units and equivalent rounding.

Question 3

No. The predicted air volume of about 1.41 L is below the 1.50 L minimum. Accept an equivalent comparison of the requested pressure with the 160 kPa pressure at the cutoff, or a consistently applied earlier result when assessing the decision alone.

Question 4

Choice (3)

At the same pressure and temperature, trapping more air initially leaves a greater air volume at the test point, which can keep the sensor dry.

Question 5

Choice (1)

At constant pressure and fixed amount, the gas volume increases as its Kelvin temperature rises.