

Question 1

A balloon is inflated and sealed. The pressure inside the balloon is held constant while the temperature increases from 10°C to 100°C .

Which of the following is true regarding the volume occupied by the balloon?

1. The volume stays constant.
2. $V_{\text{final}} = 0.10 V_{\text{initial}}$
3. $V_{\text{final}} = 10 V_{\text{initial}}$
4. V_{final} is between $10 V_{\text{initial}}$ and $2 V_{\text{initial}}$
5. V_{final} is between V_{initial} and $2 V_{\text{initial}}$

Question 2

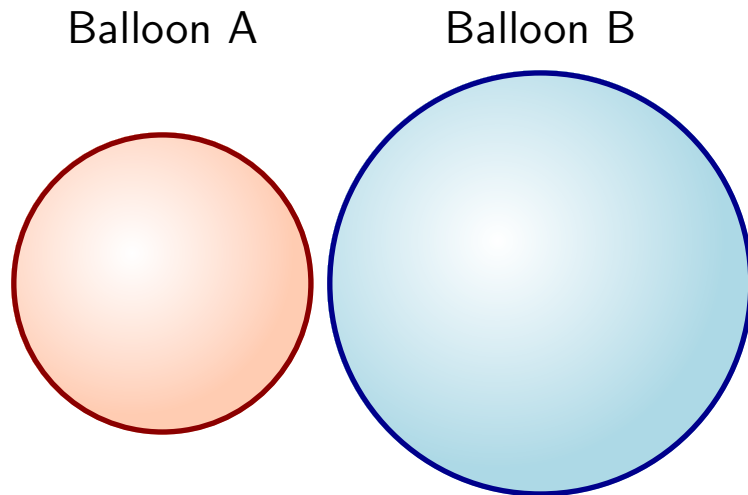
A small quantity of boiling water is placed into the bottom of a glass bottle. The space above the water fills with steam. The bottle is capped with a balloon. The steam and water are allowed to cool to room temperature while the balloon seals the opening of the bottle.

As the steam and water cool to room temperature, what does the balloon do?

1. Stays as it was when placed over the bottle.
2. Inflates a small amount.
3. Inflates a large amount.
4. Deflates a little, but remains outside the bottle.
5. Gets sucked into the bottle.

Question 3

Two balloons contain the same number of moles of monoatomic gases. Balloon A contains helium and B contains argon. An individual argon molecule has mass 10 times as much as that of an individual helium molecule.

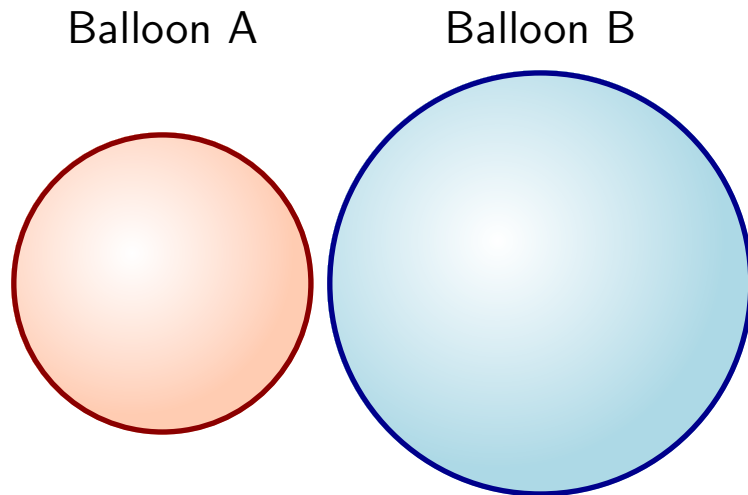


The temperatures are the same. Which of the following is true?

1. The average kinetic energy (per molecule) is the same for the helium as for the argon.
2. The average kinetic energy (per molecule) is large for the helium than for the argon.
3. The average kinetic energy (per molecule) is smaller for the helium than for the argon.

Question 4

Two balloons contain the same number of moles of monoatomic gases. Balloon A contains helium and B contains argon. An individual argon molecule has mass 10 times as much as that of an individual helium molecule.



The temperatures are the same. Which of the following is true?

1. The typical speeds of the helium atoms are the same as for the argon.
2. The typical speeds of the helium atoms are larger than for the argon.
3. The typical speeds of the helium atoms are smaller than for the argon.