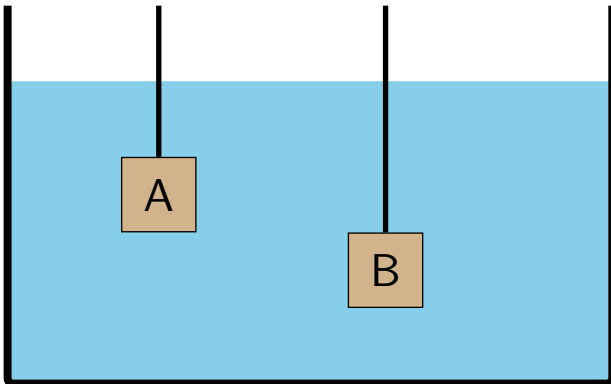


# Question 1

Two blocks are suspended by strings and held at rest in a fluid as indicated. The density of block A is larger than that of B but their volumes are the same.

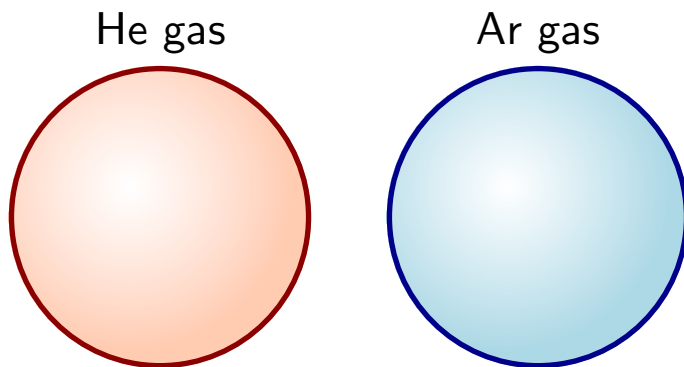


Which of the following is true?

1. Buoyant force on A is the same as on B; tension in string A is the same as in B.
2. Buoyant force on A is the same as on B; tension in string A is larger than in B.
3. Buoyant force on A is larger than on B; tension in string A is the same as in B.
4. Buoyant force on A is larger than on B; tension in string A is smaller than in B.
5. Buoyant force on A is smaller than on B; tension in string A is larger than in B.

## Question 2

A balloon contains helium gas, whose molar mass is 4 g. Another balloon, with the same volume, is filled with an equal number of argon molecules at the same temperature. Argon is a gas whose molar mass is 40 g.

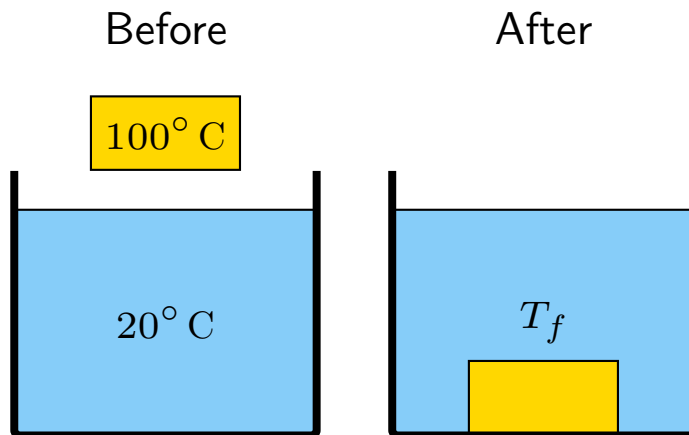


Which of the following is true about the forces exerted each gas on the upper half of the balloon?

1. The force exerted by argon is larger than that exerted by helium.
2. The force exerted by argon is smaller than that exerted by helium.
3. The forces are the same.

## Question 3

A 10 kg block of gold, initially at  $100^\circ\text{C}$  is immersed into 1 kg of water initially at  $20^\circ\text{C}$ . The specific heat of water is  $4190\text{ J/kgK}$  and gold  $129\text{ J/kgK}$ .



Which of the following is true regarding the final temperature of the mixture?

1.  $T_f \geq 60^\circ\text{C}$
2.  $T_f = 60^\circ\text{C}$
3.  $T_f \leq 60^\circ\text{C}$

## Question 4

An 80 kg person swings on one swing. Another 20 kg person swings on an identical swing. The amount of time to swing back and forth through ten cycles is observed.

Which of the following is true regarding the time to swing back and forth through ten cycles for the two people? Ignore air resistance.

1. These are identical.
2. The time taken for the 80 kg person is larger.
3. The time taken for the 80 kg person is smaller.