Question 1

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.

Distances, lengths, sizes

Object	Distance/length
Moon's circumference	$10921000\,\text{m}$
Denver to Grand Junction (shortest distance)	$341181\,\text{m}$
Length of a football field	$109.7\,\text{m}$
Width of computer chip	$0.0030\,\text{m}$
Width of flu virus	$0.000009\,\text{m}$

Distances, lengths, sizes

Object	Distance/length (meters)	Distance/length (kilometers)
Moon's circumference	$10921000\,\mathrm{m}$	$10921\,\mathrm{km}$
Denver to GJ	$341181\,\mathrm{m}$	$341.181\,\mathrm{km}$
Length of a football field	$109.7\,\mathrm{m}$	$0.1097\,\mathrm{km}$
Width of computer chip	$0.0030\,\mathrm{m}$	$0.0000030\,\mathrm{km}$
Width of flu virus	$0.000009\,\mathrm{m}$	$0.000000009\,\mathrm{km}$

Question 2

Derived distance units are:

$$1\,\mathrm{km} = 1000\,\mathrm{m}$$

$$1\,\mathrm{mm} = 0.001\,\mathrm{m}$$

Which of the following is true regarding the length of any single object?

1. The length recorded in kilometers is a larger number than in meters.

2. The length recorded in kilometers is a smaller number than in meters.

3. The length recorded is the same number in all units.

Question 3

Consider

$$10^5 \times 10^3$$

Which of the following does this yield?

1. 10^3

2. 10^5

3. 10^8

4. 10^{15}

Question 4

Consider

$$0.0001$$

Which of the following represents 0.0001?

1. 10^4

2. 10^3

3. 10^{-4}

4. 10^{-3}

Question 5

Consider

$$\frac{10^5 \times 10^{-2}}{10^4}$$

Which of the following does this yield?

1. 0.01

2. 0.1

3. 1

4. 10

5. 100