

Charles's Law:

Part C

Refrigerators are usually kept at about 5°C, while room temperature is about 20°C. If you were to take an "empty" sealed 2-liter soda bottle at room temperature and place it in the fridge, would you expect it to contract to one-fourth its original volume?

Refrigerators are usually kept at about , while room temperature is about . If you were to take an "empty" sealed 2-liter soda bottle at room temperature and place it in the fridge, would you expect it to contract to one-fourth its original volume?

A: Yes, because 5 is one-fourth of 20.

B: No, because there is no gas inside the bottle.

C: No, because Celsius is not an absolute temperature scale.

Solution.

In accordance with Charles's Law

$$\frac{V_2}{V_1} = \frac{T_2}{T_1}$$

$$T_1 = 20^\circ\text{C} = 293 \text{ K}$$

$$T_2 = 5^\circ\text{C} = 278 \text{ K}$$

$$\frac{V_2}{V_1} = \frac{278}{293} = 0.94$$

So V_2 will be in 0.94 times less than V_1

Answer: C.