

## Passage VI

Three experiments were done using  $\text{CO}_2$ , krypton (Kr), or  $\text{O}_2$ . For each gas:

1. A 3 L steel vessel was fitted with a cap that contained a gas inlet valve and a pressure and temperature sensor.
2. Air was pumped out of the vessel until the pressure measured 0.00 torr.
3. The vessel was placed on a balance, and the balance was reset to 0.000 g.
4. Some of the gas was added to the vessel.
5. When the gas in the vessel reached room temperature ( $22^\circ\text{C}$ ), mass and pressure were recorded.
6. Steps 4 and 5 were repeated several times.

The experiments were then repeated, except that a 6 L vessel was used (see Figures 1 and 2).

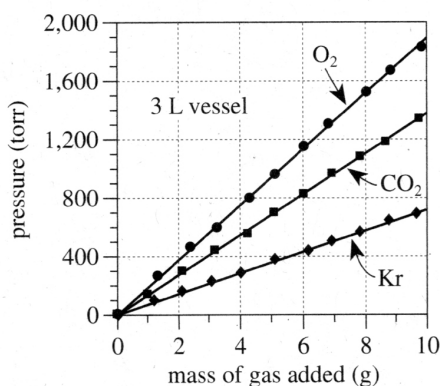


Figure 1

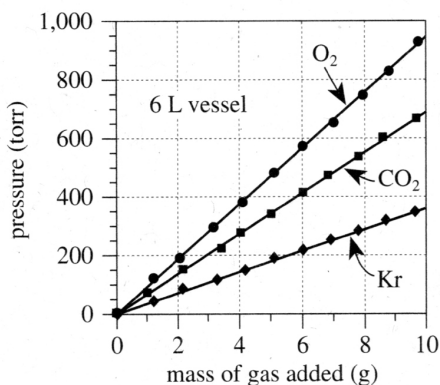


Figure 2

31. Based on Figure 2, if 13 g of Kr had been added to the 6 L vessel, the pressure would have been:
  - A. less than 200 torr.
  - B. between 200 torr and 400 torr.
  - C. between 400 torr and 600 torr.
  - D. greater than 600 torr.
32. Suppose the experiments had been repeated, except with a 5 L vessel. Based on Figures 1 and 2, the pressure exerted by 7 g of  $\text{CO}_2$  would most likely have been:
  - F. less than 500 torr.
  - G. between 500 torr and 1,000 torr.
  - H. between 1,000 torr and 1,500 torr.
  - J. greater than 1,500 torr.
33. Based on Figures 1 and 2, for a given mass of  $\text{O}_2$  at  $22^\circ\text{C}$ , how does the pressure exerted by the  $\text{O}_2$  in a 6 L vessel compare to the pressure exerted by the  $\text{O}_2$  in a 3 L vessel? In the 6 L vessel, the  $\text{O}_2$  pressure will be:
  - A.  $\frac{1}{2}$  as great as in the 3 L vessel.
  - B. the same as in the 3 L vessel.
  - C. 2 times as great as in the 3 L vessel.
  - D. 4 times as great as in the 3 L vessel.
34. Which of the following best explains why equal masses of  $\text{O}_2$  and  $\text{CO}_2$  at the same temperature and in the same-size vessel had different pressures? The pressure exerted by the  $\text{O}_2$  was:
  - F. less, because there were fewer  $\text{O}_2$  molecules per gram than there were  $\text{CO}_2$  molecules per gram.
  - G. less, because there were more  $\text{O}_2$  molecules per gram than there were  $\text{CO}_2$  molecules per gram.
  - H. greater, because there were fewer  $\text{O}_2$  molecules per gram than there were  $\text{CO}_2$  molecules per gram.
  - J. greater, because there were more  $\text{O}_2$  molecules per gram than there were  $\text{CO}_2$  molecules per gram.
35. Suppose the experiment involving  $\text{O}_2$  and the 6 L vessel had been repeated, except at a room temperature of  $14^\circ\text{C}$ . For a given mass of  $\text{O}_2$ , compared to the pressure measured in the original experiment, the pressure measured at  $14^\circ\text{C}$  would have been:
  - A. less, because pressure is directly proportional to temperature.
  - B. less, because pressure is inversely proportional to temperature.
  - C. greater, because pressure is directly proportional to temperature.
  - D. greater, because pressure is inversely proportional to temperature.