

2019 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS

4. A student is doing experiments with $\text{CO}_2(g)$. Originally, a sample of the gas is in a rigid container at 299 K and 0.70 atm. The student increases the temperature of the $\text{CO}_2(g)$ in the container to 425 K.
- (a) Describe the effect of raising the temperature on the motion of the $\text{CO}_2(g)$ molecules.
 - (b) Calculate the pressure of the $\text{CO}_2(g)$ in the container at 425 K.
 - (c) In terms of kinetic molecular theory, briefly explain why the pressure of the $\text{CO}_2(g)$ in the container changes as it is heated to 425 K.
 - (d) The student measures the actual pressure of the $\text{CO}_2(g)$ in the container at 425 K and observes that it is less than the pressure predicted by the ideal gas law. Explain this observation.