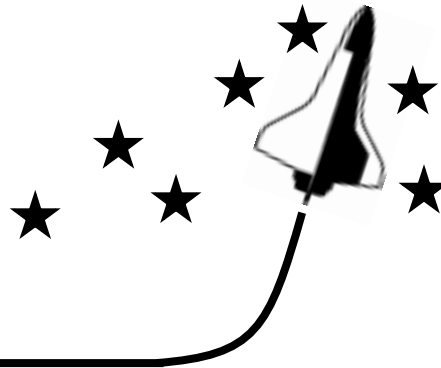


FACULTY NOTES

The LTAs and Spinoffs are designed so that each professor can implement them in a way that is consistent with his/her teaching style and course objectives. This may range from using the materials as out-of-class projects with minimal in-class guidance to doing most of the work in class. The LTAs and Spinoffs are amenable to small group cooperative work and typically benefit from the use of some learning technology. Since the objective of the LTAs and Spinoffs is to support the specific academic goals you have set for your students, the Faculty Notes are not intended to be prescriptive. The purpose of the Faculty Notes is to provide information that assists you to take full advantage of the LTAs and Spinoffs. This includes suggestions for instruction as well as answers for the exercises.



FACULTY NOTES

SPINOFF 11B

The Combined Gas Law

Solutions

Step 1: $P_1V_1 = P_2V_2$ Boyle's Law

Step 2: $\frac{V_1}{T_1} \cdot P_1V_1 = \frac{V_2}{T_2} \cdot P_2V_2$

Step 3: $\frac{P_1}{T_1} \cdot \frac{V_1}{T_1} \cdot P_1V_1 = \frac{P_2}{T_2} \cdot \frac{V_2}{T_2} \cdot P_2V_2$

$$\left(\frac{P_1V_1}{T_1}\right)^2 = \left(\frac{P_2V_2}{T_2}\right)^2$$

Step 4: $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ The Combined Gas Law

Exercises

- 1) Substitute the appropriate values into the Combined Gas Law and solve for V_2 . Remember to convert the Celsius temperatures to the Kelvin scale and the 30 atm pressure to mm Hg.

$$\frac{(700 \text{ mmHg})(500 \text{ liters})}{473 \text{ K}} = \frac{(22,800 \text{ mmHg}) \cdot V_2}{293 \text{ K}}$$
$$V_2 = 9.5 \text{ liters}$$

- 2) Substitute the appropriate values into the Combined Gas Law and solve for P_2 . Remember to convert the Celsius temperatures to the Kelvin scale.

$$\frac{(300 \text{ torr})(800 \text{ mL})}{250 \text{ K}} = \frac{P_2 \cdot (800 \text{ mL})}{500 \text{ K}}$$
$$P_2 = 600 \text{ torr}$$

- 3) Substitute the appropriate values into the Combined Gas Law and solve for T_2 .

$$\frac{(700 \text{ mmHg})(400 \text{ mL})}{295 \text{ K}} = \frac{(350 \text{ mm Hg})(822 \text{ mL})}{T_2}$$
$$T_2 = 303 \text{ K}$$