

# Ch. 14 Review Wkst KEY

## Vocab

1. G

2. I

3. J

4. F

5. D

6. E

7. C

8. A

9. H

10. B

## Practice Problems

### 14.1

1. On average, temperatures are higher in the summer. The motion of the tires causes the air inside to heat up which increases the pressure.
2. Overnight the air in the mattress cools down, slowing particles + decreasing pressure + volume.

### 14.2-14.4

$$1. P_2 = \frac{P_1 \times V_1}{V_2} = \frac{155 \text{ kPa} \times 22 \text{ L}}{10 \text{ L}} = 341 \text{ kPa}$$

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2. No

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$$3. V_2 = \frac{V_1 \times T_2}{T_1} = \frac{10 \text{ L} \times 373 \text{ K}}{248 \text{ K}} = 15.0 \text{ L}$$

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#4

$$5. P_2 = \frac{P_1 \times V_1 \times T_2}{T_1 \times V_2} = \frac{105.4 \text{ kPa} \times 55 \text{ L} \times 323 \text{ K}}{248 \text{ K} \times 105 \text{ L}} = 71.9 \text{ kPa}$$

$$4. P_1 = \frac{P_2 \times V_2 \times T_1}{T_2 \times V_1} = \frac{501 \text{ kPa} \times 5.2 \text{ L} \times 373 \text{ K}}{298 \text{ K} \times 7 \text{ L}} = 466 \text{ kPa}$$

$$6. n = \frac{P \times V}{R \times T} = \frac{1.24 \times 10^4 \text{ kPa} \times 25 \text{ L}}{8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \times 297 \text{ K}} = 1.3 \times 10^2 \text{ mol Ar}$$

$$7. T = \frac{P \times V}{n \times R} = \frac{500 \text{ kPa} \times 35 \text{ L}}{7 \text{ mol} \times 8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}}} = 3.01 \times 10^2 \text{ K}$$

$$8. n = \frac{P \times V}{R \times T} = \frac{102 \text{ kPa} \times 25 \text{ L}}{8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \times 297 \text{ K}} = 1.03 \text{ mol He} \quad \left| \begin{array}{l} 4 \text{ g He} \\ 1 \text{ mol He} \end{array} \right. = 4.12 \text{ g He}$$

$$9. V = \frac{n \times R \times T}{P} = \frac{2.25 \text{ mol} \times 8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \times 273 \text{ K}}{101.3 \text{ kPa}} = 50.4 \text{ L}$$

$$10. V_2 = \frac{V_1 \times T_2}{T_1} = \frac{10.5 \text{ L} \times 300 \text{ K}}{473 \text{ K}} = 6.66 \text{ L}$$

$$11. V = \frac{n \times R \times T}{P} = \frac{0.355 \text{ mol} \times 8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \times 273 \text{ K}}{101.3 \text{ kPa}} = 7.95 \text{ L}$$

$$12. n = \frac{25 \text{ g}}{144 \text{ g/mol}} = 0.568 \text{ mol} \quad V = \frac{n \times R \times T}{P} = \frac{0.568 \text{ mol} \times 8.31 \times 273 \text{ K}}{101.3 \text{ kPa}} = 12.7 \text{ L}$$

$$13. P_{O_2} = P_{\text{total}} - (P_{N_2} + P_{Ar}) \\ = 98.5 \text{ kPa} - (22 \text{ kPa} + 50 \text{ kPa}) \\ = 26.5 \text{ kPa} \quad n = \frac{P \times V}{R \times T} = \frac{26.5 \text{ kPa} \times 3.5 \text{ L}}{8.31 \frac{\text{L} \cdot \text{kPa}}{\text{mol} \cdot \text{K}} \times 298 \text{ K}} = 3.75 \times 10^{-2} \text{ mol } O_2$$

14. Nitrogen would effuse slightly faster.  
Both are diatomic so molar masses have to be doubled.