

Answer Key for Ideal Gas Law Worksheet

1. $(790 \text{ torr})(V) = (62.3 \text{ torr}\cdot\text{L}/\text{mol}\cdot\text{K})(250 \text{ g N}_2) \left(\frac{1 \text{ mol}}{28 \text{ g N}_2} \right) (298 \text{ K})$
 $V = 209.8 \text{ L}$
2. $(5 \text{ atm})(.025 \text{ L}) = n (.082 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K}) (294 \text{ K})$
 $n = .0052 \text{ mol}$
 $(.0052 \text{ mol}) (6.02 \times 10^{23})$
3. $(90 \text{ atm})(5000 \text{ L}) = n (.082 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K}) (5 + 273)$
 $n = 19740 \text{ mol of Cl}_2 \text{ or } (19740 \text{ mol Cl}_2)(71 \text{ g Cl}_2/\text{mol Cl}_2)$
 $\text{or } 1,401,562 \text{ grams of Cl}_2$
4. same moles as in 4 but $(19740 \text{ mol}) (28 \text{ g N}_2)/(\text{mol N}_2) = 555,729 \text{ g N}_2$
5. $P_i V_i / T_i = P_f V_f / T_f$
 $(20 \text{ atm})(101.3 \text{ kPa}/1 \text{ atm})(10 \text{ L}) / (30 + 273) = (200 \text{ kPa})(V) / (8 + 273)$
 $V = 93.94 \text{ L}$ then divide by 8L/min gives you 11.74 minutes
6. Volume of a cylinder = $\pi r^2 h = (3.14) (1.1 \text{ cm}/2)^2 (50 \text{ cm}) = 47.49 \text{ cm}^3$
 $\text{or } 47.49 \text{ ml}$
 $PV = nRT$ then becomes
 $P (.0475 \text{ L}) = (50 \text{ g Ne}) \left(\frac{1 \text{ mol}}{20.18 \text{ g Ne}} \right) (.082 \text{ atm}\cdot\text{L}/\text{mol}\cdot\text{K}) (295 \text{ K})$
 $P = 1261.8 \text{ atm or } 127820 \text{ kPa or } 958968 \text{ mm}$