

GASES Review WORKSHEET

Review Parts of
KMT + different
Gas Laws

1) B/c as Temp \uparrow Pressure \uparrow (directly related) so pressure buildup w/ constant volume can will explode

2) B/c as Temp \downarrow Volume \downarrow (directly related)

3) STP = Standard temp and Pressure

Standard Temp = $0^{\circ}\text{C} = 273\text{K}$

Standard Press = $1\text{atm} = 760\text{mmHg} = 760\text{torr} = 101.325\text{kPa}$

$$4) \frac{360\text{ kPa}}{101.325\text{ kPa}} = \frac{1\text{ atm}}{101.325\text{ kPa}} \rightarrow \frac{3.55\text{ atm}}{1\text{ atm}} = \frac{760\text{ mmHg}}{1\text{ atm}} = \frac{2700.2\text{ mmHg}}{760\text{ mmHg}}$$

5) Could \uparrow temperature or \downarrow pressure would \uparrow volume

6) a) B b) C c) E d) F e) A f) D

7) a) A b) B c) C d) B e) A f) A g) C h) B

8) a) Same b/c same gas

b) Same b/c same amount of gas

c) increase b/c smaller cylinder. so it sides more often

d) decreases b/c compressing cylinder

e) decreases b/c " pushes molecules closer

f) increases b/c more molecules per area = \uparrow density

9) $P_T = P_1 + P_2 + P_3 \dots$

$$50\text{atm} + 20\text{atm} + 10\text{atm} = \boxed{80\text{atm}}$$

10) a) Volume + Temp - Charles'

b) Pressure + Volume - Boyle's

c) moles + Volume - Avogadro

d) $P, V, \text{ moles, Temp} = \text{Ideal Gas Law}$

$PV = nRT$
 ↑ volume in L
 ↓ pressure
 ← Ideal gas constant
 → moles
 → temp in Kelvin

12) $R = 0.0821 \frac{\text{atm}\cdot\text{L}}{\text{mol}\cdot\text{K}}$ or $8.314 \frac{\text{kJ}\cdot\text{L}}{\text{mol}\cdot\text{K}}$

13) $P_1V_1 = P_2V_2$ $(100 \text{ kPa})(10 \text{ mL}) = P_2(2.0 \text{ mL})$
 $P_2 = 500 \text{ kPa}$

14) $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\frac{2.00 \text{ L}}{(22+273)} = \frac{V}{(90+273)}$ $V = 2.46 \text{ L}$

15) $P_1V_1 = P_2V_2$ $(3.8 \text{ atm})(19 \text{ L}) = P_2(26 \text{ L})$
 $P_2 = \frac{26 \cdot 6 \text{ atm}}{1 \text{ atm}} = 21.771 \text{ mmHg}$

16) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $(3.4 \text{ atm})(10.0 \text{ mL}) = (1.02 \text{ atm})(V)$
 $\frac{103 \text{ kPa}}{101.325 \text{ kPa}} = 1.02 \text{ atm}$ $V = 34.3 \text{ mL}$

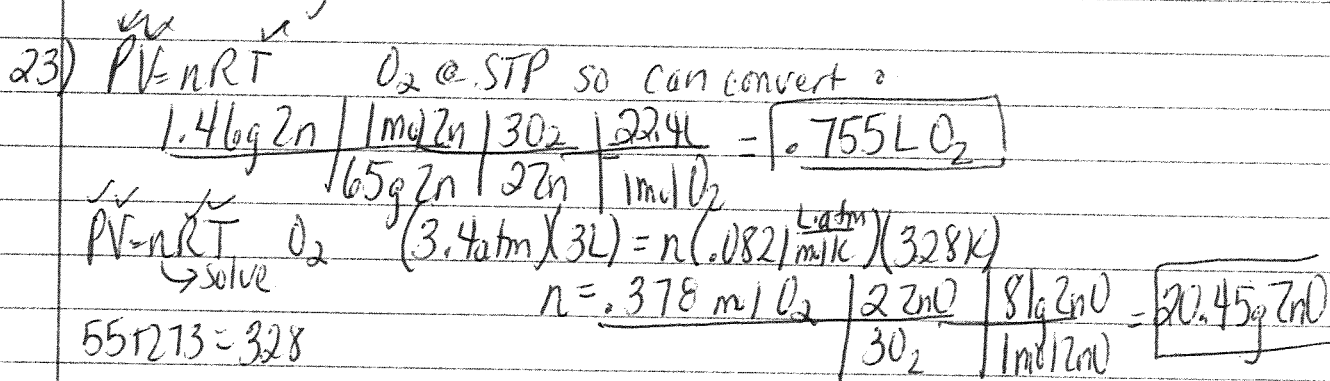
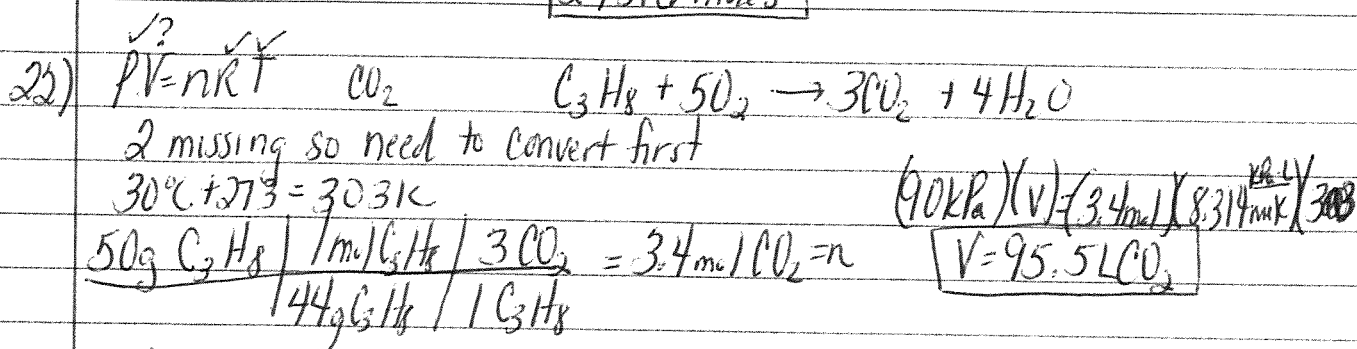
17) $PV = nRT$
 $\frac{940 \text{ torr}}{760 \text{ torr}} = 1.24 \text{ atm}$ $(1.24 \text{ atm})(.253 \text{ L}) = n(0.0821 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}})(373 \text{ K})$
 $n = 0.010 \text{ moles}$
 $253 \text{ mL} = 0.253 \text{ L}$
 $100^\circ\text{C} = 373 \text{ K}$

18) $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ $\frac{0.740 \text{ atm}}{(23+273)} = \frac{1.12 \text{ atm}}{T}$
 $\frac{75.0 \text{ kPa}}{101.325 \text{ kPa}} = 0.740 \text{ atm}$ $T = 448 \text{ K}$

19) $PV = nRT$ $(2 \text{ atm} \times 100 \text{ L}) = (3 \text{ moles}) \times (.0821 \frac{\text{L atm}}{\text{mol K}}) T$
 $812 \text{ K} = T$

20) $PV = nRT$ $(5.6 \text{ atm} \times 25 \text{ L}) = n (.0821 \frac{\text{L atm}}{\text{mol K}}) (22 + 273)$
 $n = 5.78 \text{ moles}$

21) $PV = nRT$ $(200 \text{ atm} \times 30 \text{ L}) = n (.0821 \frac{\text{L atm}}{\text{mol K}}) (300 \text{ K})$
 243.6 moles



24) Lightest to heaviest
 $\text{He} (4 \text{ g})$ $\text{Xe} (131)$ $\text{HCl} (36)$ $\text{Cl}_2 (72)$
 $\text{He}, \text{HCl}, \text{Cl}_2, \text{Xe}$

- 25) a) effusion
 b) diffusion
 c) diffusion.

26) $\text{rate} = \frac{\sqrt{M_{\text{HCl}}}}{\sqrt{M_{\text{He}}}} = \frac{\sqrt{36.46}}{\sqrt{4.00}} = 3.02$ $\text{He is } 3.02 \times \text{ faster than HCl}$

27) $3.16 = \frac{\sqrt{M}}{\sqrt{4.00}}$ $3.16^2 = \frac{M}{4.00}$ $M = 37.9 \text{ g/mol}$