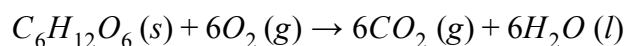


9. Calculate the density of  $\text{CO}_2$  at STP.

10. A gaseous compound is 78.14% B and 21.86% H. At  $27^\circ\text{C}$ , 74.3 mL of the gas exerted a pressure of 1.12 atm. If the mass of the gas was 0.0934 g, what is the molecular formula?

11. What is the volume of  $\text{CO}_2$  produced at  $37.00^\circ\text{C}$  and 1.00 atm when 5.60 g of glucose are used up in the reaction:

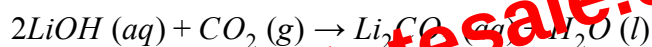


12. If 34.6 L of  $\text{N}_2$  was produced at  $75^\circ\text{C}$  and 760. mmHg, how many grams of  $\text{NaN}_3$  were used in the reaction:



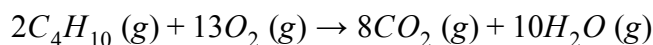
16. A 2.14 L sample of HCl gas at 2.61 atm and 28°C is completely dissolved in 668 mL of water to form hydrochloric acid solution. Calculate the molarity of the acid solution assuming no change in volume.

17. Carbon dioxide inside a submarine cabin has a volume of  $2.4 \times 10^5$  L and a pressure of  $7.9 \times 10^{-3}$  atm at 312 K. A solution of LiOH with negligible volume was introduced. Eventually the pressure fell to  $1.2 \times 10^{-3}$  atm. How many grams of lithium carbonate are formed by this process?



Preview from Notesale.co.uk  
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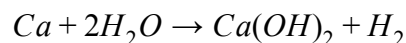
18. If you have 5.0 L of  $\text{C}_4\text{H}_{10}$  and 25.0 L of  $\text{O}_2$ , how many liters of  $\text{CO}_2$  can form at 50°C and 1.25 atm?



$$P_{N_2} = 0.780(790. \text{ mmHg}) = 616 \text{ mmHg}$$

$$P_{Ar} = 0.009(790. \text{ mmHg}) = 7 \text{ mmHg}$$

23. Part 1:



$$P_{H_2} = P_T - P_{H_2O} = (988 - 31.82)\text{mmHg} = 956 \text{ mmHg}$$

$$956 \text{ mmHg} * \frac{1 \text{ atm}}{760 \text{ mmHg}} = 1.26 \text{ atm}$$

$$T = (30 + 273.15)K = 303 \text{ K}$$

$$n_{H_2} = \frac{PV}{RT} = \frac{(1.26 \text{ atm})(0.641 \text{ L})}{(0.08206 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}})(303 \text{ K})} = 0.0325 \text{ mol}$$

$$0.0325 \text{ mol } H_2 * \frac{2.016 \text{ g } H_2}{\text{mol } H_2} = 0.0655 \text{ g } H_2$$

Part 2:

$$0.0325 \text{ mol } H_2 * \frac{\text{mol } Ca}{\text{mol } H_2} * \frac{40.08 \text{ g } Ca}{\text{mol } Ca} = 1.30 \text{ g } Ca$$

24.  $P_{gas} = P_{atm} - P_{H_2O} - P_{height \text{ difference}}$

$$P_h = 754 \text{ mmHg} * \frac{1 \text{ mmHg}}{1.36 \text{ mmHg}} = 11.3 \text{ mmHg}$$

$$P_{gas} = (743.7 - 19.5 - 11.3)\text{mmHg} = 712.9 \text{ mmHg}$$

25.  $r_{CO} = 1.48 r_X$

$$\frac{r_{CO}}{r_X} = (1.48)^2 = \left(\sqrt{\frac{M_X}{M_{CO}}}\right)^2$$

$$(1.48)^2 = \frac{M_X}{28.01 \text{ g/mol}}$$

$$M_X = 61.4 \text{ g/mol}$$

26.  $H_2S$  no, there is no FON

$C_6H_6$  no, there is no FON

$CH_3OH$  yes, H is attached to O.

$CH_3OCH_3$  no, H is not attached to FON.

$$0^{\circ}\text{C} - 4.48^{\circ}\text{C} = -4.48 \text{ (freezing point of soln)}$$

$$49. \Delta T_f = K_f m$$

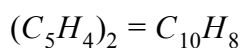
$$1.05^{\circ}\text{C} = \left(\frac{5.12^{\circ}\text{C}}{m}\right)(m)$$

$$m = 0.205 \text{ m} = \frac{0.205 \text{ mol } (C_5H_4)_n}{\text{kg benzene}}$$

$$0.301 \text{ kg benzene} * \frac{0.205 \text{ mol } (C_5H_4)_n}{\text{kg benzene}} = 0.0617 \text{ mol } (C_5H_4)_n$$

$$\frac{7.85 \text{ g}}{0.0617 \text{ mol}} = 127 \text{ g/mol}$$

$$n = \frac{127 \text{ g/mol}}{64.08 \text{ g/mol } C_5H_4} = 2$$



$$50. \Delta T_f = K_f m$$

$$5.50^{\circ}\text{C} - 5.16^{\circ}\text{C} = \left(\frac{5.12^{\circ}\text{C}}{m}\right)x$$

$$x(\text{or molality}) = 0.066 \text{ m}$$

$$0.1000 \text{ kg benzene} * \frac{0.066 \text{ mol/kg}}{\text{kg benzene}} = 0.0066 \text{ mol/kg}$$

$$\frac{0.83 \text{ g}}{0.0066 \text{ mol}} = 128 \text{ g/mol} = 128.103 \text{ g/mol}$$

$$51. (\text{Lowest fp} = \text{most particles})$$

$$0.20 \text{ m } KNO_3$$

- $i = 2$
- $2 * 0.20 = 0.40 \text{ m}$