Name (Key) Date _____ Class _____

7-2 Practice Problems

1. Find the mass of 0.89 mol of $CaCl_2$.

$0.89 \text{ mol } CaCl_2 \times \frac{110.98 \text{ g } CaCl_2}{\text{mol } CaCl_2} = \boxed{99 \text{ g } CaCl_2}$

2. A bottle of $PbSO_4$ contains 158.1 g of the compound. How many moles of $PbSO_4$ are in the bottle?

$158.1 \text{ g } PbSO_4 \times \frac{1 \text{ mol}}{303.3 \text{ g } PbSO_4} = \boxed{0.5213 \text{ mol}}$

3. Find the mass of 1.112 mol of HF.

$1.112 \text{ mol } HF \times 20.01 \text{ g } HF = \boxed{22.25 \text{ g } HF}$

4. Determine the number of moles of C_5H_{12} that are in 362.8 g of the compound.

$\frac{1 \text{ mol } C_5H_{12}}{72.17 \text{ g } C_5H_{12}} \times 362.8 \text{ g } C_5H_{12} = \boxed{5.027 \text{ mol } C_5H_{12}}$

5. Find the mass of 0.159 mol of SiO_2.

$0.159 \text{ mol } SiO_2 \times \frac{60.09 \text{ g } SiO_2}{1 \text{ mol } SiO_2} = \boxed{9.55 \text{ g } SiO_2}$

6. You are given 12.35 g of $C_4H_8O_2$. How many moles of the compound do you have?

$12.35 \text{ g } C_4H_8O_2 \times \frac{1 \text{ mol } C_4H_8O_2}{88.12 \text{ g } C_4H_8O_2} = \boxed{0.1401 \text{ mol}}$

7. Find the mass of 3.66 mol of N_2.

$3.66 \text{ mol } N_2 \times \frac{28.02 \text{ g } N_2}{1 \text{ mol } N_2} = \boxed{103 \text{ g } N_2}$

8. A bottle of $KMnO_4$ contains 66.38 g of the compound. How many moles of $KMnO_4$ does it contain?

$66.38 \text{ g } KMnO_4 \times \frac{1 \text{ mol } KMnO_4}{158.04 \text{ g } KMnO_4} = \boxed{0.4200 \text{ mol } KMnO_4}$

9. Determine the number of atoms that are in 0.58 mol of Se.

$0.58 \text{ mol Se} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol Se}} = \boxed{3.5 \times 10^{23}}$

10. How many moles of barium nitrate ($BaNO_3$) contain 6.80×10^{24} formula units?

$6.80 \times 10^{24} \text{ } Ba(NO_3)_2 \times \frac{1 \text{ mol}}{6.02 \times 10^{23}} = \boxed{11.3 \text{ mol}}$

11. Determine the number of atoms that are in 1.25 mol of O_2.

$1.25 \text{ mol } O_2 \times \frac{2 \text{ atoms}}{1 \text{ mol } O_2} \times \frac{6.02 \times 10^{23} \text{ atoms}}{1 \text{ mol } O_2} = \boxed{1.50 \times 10^{24} \text{ atoms}}$

12. How many moles of magnesium bromide ($MgBr_2$) contain 5.38×10^{24} formula units?

$5.38 \times 10^{24} \text{ Fus} \times \frac{1 \text{ mol Fus}}{6.02 \times 10^{23} \text{ Fus}} = \boxed{8.94 \text{ mol } MgBr_2}$

13. Determine the number of formula units that are in 0.688 mol of $AgNO_3$.

$0.688 \text{ mol } AgNO_3 \times \frac{6.02 \times 10^{23} \text{ Fus}}{1 \text{ mol}} = \boxed{4.14 \times 10^{23} \text{ Fus}}$

14. How many moles of ethane (C_2H_6) contain 8.46×10^{24} molecules.

$8.46 \times 10^{24} \text{ molec.} \times \frac{1 \text{ mol}}{6.02 \times 10^{23}} = \boxed{14.1 \text{ moles}}$

15. Determine the number of formula units that are in 1.48 mol of NaF.

$1.48 \text{ mol} \times \frac{6.02 \times 10^{23} \text{ Fu}}{1 \text{ mol}} = \boxed{8.91 \text{ mol}}$

16. How many formula units are in 3.5 g of NaOH?

$3.5 \text{ g NaOH} \times \frac{1 \text{ mol NaOH}}{40.00 \text{ g}} \times 6.02 \times 10^{23} = \boxed{5.3 \times 10^{22} \text{ Fu}}$

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7-2 *Practice Problems (continued)*

17. If you burned 6.10×10^{24} molecules of ethane (C_2H_6), what mass of ethane did you burn?

$6.10 \times 10^{24} \times \frac{1 \text{ mol}}{6.02 \times 10^{23}} \times \frac{30.08 \text{ g } C_2H_6}{1 \text{ mol}} = \boxed{305 \text{ g}}$

18. How many formula units are in 5.1 g of TiO_2?

$5.1 \text{ g } TiO_2 \times \frac{1 \text{ mol } TiO_2}{79.90 \text{ g } TiO_2} \times \frac{6.02 \times 10^{23}}{1 \text{ mol } TiO_2}$

$= \boxed{3.8 \times 10^{22} \text{ Fu of } TiO_2}$

19. What is the mass of 3.62×10^{24} molecules of methanol (CH_3OH)?

$3.62 \times 10^{24} \times \frac{1 \text{ mol}}{6.02 \times 10^{23}} \times \frac{32.05 \text{ g}}{1 \text{ mol}} = \boxed{193 \text{ g } CH_3OH}$

20. How many formula units are in 1.4 g of $PbCl_2$?

$1.4 \text{ g } PbCl_2 \times \frac{1 \text{ mol } PbCl_2}{278.1 \text{ g } PbCl_2} \times \frac{6.02 \times 10^{23}}{1 \text{ mol } PbCl_2}$

$= \boxed{3.03 \times 10^{21}}$

21. Determine the mass of 2.94×10^{24} molecules of decane ($C_{10}H_{22}$).

$2.94 \times 10^{24} \text{ } C_{10}H_{22} \times \frac{1 \text{ mol } C_{10}H_{22}}{6.02 \times 10^{23} \text{ } C_{10}H_{22}} \times \frac{142.32 \text{ g } C_{10}H_{22}}{1 \text{ mol } C_{10}H_{22}}$

$= \boxed{695 \text{ g } C_{10}H_{22}}$

22. How many formula units are in 5.6 g of H_2S?

$5.6 \text{ g } H_2S \times \frac{1 \text{ mol } H_2S}{34.08 \text{ g } H_2S} \times \frac{6.02 \times 10^{23}}{1 \text{ mol } H_2S}$

$= \boxed{9.9 \times 10^{22} \text{ Fu}}$

23. A container with a volume of 893 L contains how many moles of air at STP?

$893 \text{ L} \times \frac{1 \text{ mol}}{22.41 \text{ L}} = \boxed{39.8 \text{ mol Air}}$

24. A chemical reaction produces 0.37 mol of N_2 gas. What volume will that gas occupy at STP?

$0.37 \text{ mol } N_2 \times \frac{22.41 \text{ L}}{1 \text{ mol}} = \boxed{8.3 \text{ Liters}}$

25. A canister with a volume of 694 L contains how many moles of oxygen at STP?

$694 \text{ L} \times \frac{1 \text{ mol}}{22.41 \text{ L}} = \boxed{31.0 \text{ moles}}$

26. A chemical reaction produces 13.8 mol of CO gas. What volume will that gas occupy at STP?

$13.8 \text{ mol CO} \times \frac{22.41 \text{ L}}{1 \text{ mol CO}} = \boxed{309 \text{ L}}$

27. A tube with a volume of 3.68 L contains how many moles of neon gas at STP?

$3.68 \text{ L} \times \frac{1 \text{ mol Ne}}{22.41 \text{ L Ne}} = \boxed{0.164 \text{ mol}}$

28. A chemical reaction produces 0.884 mol of H_2S gas. What volume will that gas occupy at STP?

$0.884 \text{ mol } H_2S \times \frac{22.41 \text{ L}}{1 \text{ mol}} =$

$= \boxed{19.8 \text{ L}}$

29. A container with a volume of 101 L contains how many moles of argon gas at STP?

$101 \text{ L} \times \frac{1 \text{ mol}}{22.41 \text{ L}} = \boxed{4.51 \text{ mol}}$

30. A chemical reaction produces 138 mol of HBr gas. What volume will that gas occupy at STP?

$138 \text{ mol HBr} \times \frac{22.41 \text{ L}}{1 \text{ mol HBr}} =$

$= \boxed{3090 \text{ L}}$