

Some answers to the review packet, problem number 16 from the second page of the review packet

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The image shows two handwritten calculations on a piece of paper. The first calculation, labeled 'c 2)', shows the volume of a gas being compressed from 4.0 L at 1.1 atm to 1.3 L at 3.4 atm. The second calculation, labeled 'c 3', shows a gas being compressed from 5.0 liters at 123 K and 0.65 atm to 2.1 liters at 473 K and 1.05 atm.

$$c 2) 4.0 L \times \left(\frac{1.1 \text{ atm}}{3.4 \text{ atm}} \right) = 1.3 L$$
$$c 3$$
$$5.0 \text{ liters} \times \left(\frac{123 K}{473 K} \right) \times \left(\frac{1.05 \text{ atm}}{0.65 \text{ atm}} \right) = 2.1 \text{ Lites}$$

Molecular Mass PRACTICE

Chemistry

Final exams start January 20. YOU SHOULD START WRITING YOUR ONE PAGE 'CHEAT SHEET' TODAY. See the website.



Name _____

Period ANN
SUHS

1. For the substance dipropylene glycol $C_3H_8O_2$ (an ingredient in Old Spice deodorant)...

According to the periodic table, what is the mass of a mole of this molecule? **

$$\begin{aligned} C: & 3 \times 12.01 = 36.03 \\ H: & 8 \times 1.01 = 8.08 \\ O: & 2 \times 16.00 = 32.00 \\ & \hline & 76.11 \text{ grams/mole} \end{aligned}$$

Find the mass of 0.0550 moles of this molecule.

$$0.0550 \text{ mol} \times \left(\frac{76.11 \text{ gram}}{1 \text{ mol}} \right) = 4.19 \text{ grams}$$

2. For the substance iodine (Remember the Wacky Seven? Remember Hoffen Brickl?)

How would you draw one molecule?



According to the periodic table, what is the mass of a mole of this molecule? **

$$I: 2 \times (126.90) = 253.8 \text{ grams/mol}$$

Find the number of molecules in 33.77 grams of this molecule.

$$33.77 \text{ grams} \times \left(\frac{1 \text{ mole}}{253.8 \text{ g}} \right) \left(\frac{6.02 \times 10^{23} \text{ molecules}}{1 \text{ mole}} \right) = 8.01 \times 10^{22}$$

3. How many moles of copper are in 4.7×10^{22} atoms of copper?

$$4.7 \times 10^{22} \text{ atoms} \times \left(\frac{1 \text{ moles}}{6.02 \times 10^{23} \text{ atoms}} \right) = 0.078 \text{ moles}$$

4. How many moles of molecules are in each of the following?

a. 1.50×10^{23} molecules of NH_3

$$1.50 \times 10^{23} \text{ molecules} \times \left(\frac{1 \text{ moles}}{6.02 \times 10^{23} \text{ molecules}} \right) =$$

b. 6.02×10^{22} molecules of Br_2

$$6.02 \times 10^{22} \text{ molecules} \times \left(\frac{1 \text{ moles}}{6.02 \times 10^{23} \text{ molecules}} \right) = 0.100 \text{ moles}$$

5. What is the mass in grams of each of the following?

a. 0.720 moles of N_2O

N:	$2 \times (14.01) = 28.02$
O:	$1 \times (16.00) = 16.00$
	<u>44.02 gram/mol</u>

$$0.720 \text{ mol } \text{N}_2\text{O} \times \left(\frac{44.02 \text{ gram}}{1 \text{ mol } \text{N}_2\text{O}} \right) =$$

b. 5.08×10^{21} molecules of $\text{C}_2\text{H}_6\text{O}$

C:	$2 \times (12.01) = 24.02$
H:	$6 \times (1.01) = 6.06$
O:	$1 \times (16.00) = 16.00$
	<u>46.08 gram/mol</u>

$$5.08 \times 10^{21} \text{ molecules} \times \left(\frac{1 \text{ mole}}{6.02 \times 10^{23} \text{ MOLEC}} \right) \times \left(\frac{46.08 \text{ gram}}{1 \text{ mole}} \right) =$$

6. How many hydrogen atoms are in a molecule of each of these substances?

a. $\text{Ca}(\text{OH})_2$ 2 b. $\text{C}_3\text{H}_8\text{O}$ 8 c. $(\text{NH}_4)_3\text{PO}_4$ 12 d. $\text{HC}_2\text{H}_3\text{O}$ 4

7. (Challenge problem!) How many atoms of chlorine are there in 16.5 g of iron (III) chloride, FeCl_3 ?

$$16.5 \text{ grams } \text{FeCl}_3 \times \left(\frac{1 \text{ mol } \text{FeCl}_3}{162.2 \text{ gram } \text{FeCl}_3} \right) \times \left(\frac{3 \text{ mol } \text{Cl atoms}}{1 \text{ mol } \text{FeCl}_3} \right) \times \left(\frac{6.02 \text{ Cl atoms}}{16^{23}} \right) = 1.84 \times 10^{23} \text{ Cl atoms}$$