

Calculation Questions with Moles

Converting between the atomic scale and moles (show your work)

1. Determine the number of atoms in 3.50 moles of Zinc.	
2. If you are given 2.25 moles of NO_3 , what number of molecules are present?	
3. Calculate the number of molecules in 11.5 moles of H_2O .	

4. How many moles of each substance are equal to each of the following? (show your work)

a. 5.75×10^{24} atoms Al	
b. 3.75×10^{24} molecules CO_2	
c. 3.58×10^{23} formula units ZnCl_2	
d. 2.50×10^{20} atoms Fe	

Conceptual Questions about Moles

5. How is a mole similar to a dozen?	
6. What is the relationship between Avogadro's number and one mole?	
7. Explain how you can convert from the number of representative particles of a substance to moles of that substance.	
8. Explain why chemists use the mole.	
9. Arrange the following from the smallest number of representative particles to the largest number of representative particles: 1.25×10^{25} atoms Zn; 3.56 mol Fe; 6.78×10^{22} molecules glucose ($C_6H_{12}O_6$).	
10. Determine the number of representative particles in each of the following and identify the representative particle: 11.5 mol Ag; 18.0 mol H_2O ; 0.150 mol NaCl.	

Calculation Questions with Mass

11. Determine the mass in grams of each of the following. (show your work)

a. 3.57 mol Al	
b. 42.6 mol Si	
c. 3.45 mol Co	
d. 2.45 mol Zn	

12. Determine the number of moles in each of the following. (show your work)

a. 25.5 g Ag	
b. 300.0 g	
c. 125 g Zn S	
d. 1.00 kg Fe	

13. How many atoms are in each of the following samples? (show your work)

a. 55.2 g Li	
b. 0.230 g Pb	
c. 11.5 g Hg	
d. 45.6 g Si	

14. What is the mass in grams of each of the following? (show your work)

a. 6.02×10^{24} atoms Bi	
b. 1.00×10^{24} atoms Mn	
c. 3.40×10^{22} atoms He	
d. 1.50×10^{15} atoms N	

Conceptual Questions with Mass

15. Explain what is meant by molar mass.	
16. What conversion factor should be used to convert from mass to moles? Moles to mass?	
17. Explain the steps needed to convert the mass of an element to the number of atoms of the element.	
18. The mass of a single atom is usually given in the unit amu. Would it be possible to express the mass of a single atom in grams? Explain.	
19. Arrange the following in order of mass from the smallest mass to the largest: 1.0 mol Ar, 3.0×10^{24} atoms Ne, 20 g Kr.	