

**MOLE PROBLEM SET #1: Avogadro's Number and Molar Mass****1) REPRESENTATIVE PARTICLES**

Directions: For each substance below, state the representative particle (atom, ion, molecule, or formula unit). If the RP is a molecule, state the number of atoms that make up the molecule. If the RP is a formula unit, state the number of ions that make up the formula unit.

Formula:	# of atoms in the formula:	Formula:	# of atoms in the formula:
NaCl	2	Cl <sub>2</sub>	2
H <sub>2</sub> SO <sub>4</sub>	7	KCrO <sub>4</sub>	6
K <sup>+</sup>	1	H <sub>2</sub> O <sub>2</sub>	4
CaCl <sub>2</sub>	3	Li <sub>3</sub> PO <sub>3</sub>	7
S	1	NH <sub>4</sub> <sup>+</sup>	5
SBr <sub>3</sub>	4	Fe <sub>2</sub> O <sub>3</sub>	5
NH <sub>4</sub> Br	6	NaC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	8
Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	13	PO <sub>4</sub> <sup>3-</sup>	5
C <sub>6</sub> H <sub>12</sub> O <sub>11</sub>	29	Hg	1
Mg(NO <sub>3</sub> ) <sub>2</sub>	9	CuSO <sub>4</sub>	6

2) Calculate the number of representative particles (molecules, formula units, or atoms) for each of the following (show work for at least the first 2):

A) 8.20 mol CuSO<sub>4</sub>

**4.94 x 10<sup>24</sup> particles**

E) 22.68 mol Mg<sub>3</sub>P<sub>2</sub>

**1.365 x 10<sup>25</sup> particles**

B) 13.67 mol H<sub>2</sub>O

**8.23 x 10<sup>24</sup> molecules**

F) 162.4 mol C

**9.776 x 10<sup>25</sup> atoms C**

C) 0.773 mol Cu

**4.65 x 10<sup>23</sup> atoms Cu**

G) 0.000553 mol CO<sub>2</sub>

**3.33 x 10<sup>20</sup> molecules**

D) 1.39 mol C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>

**8.37 x 10<sup>23</sup> molecules**

H) 5.32 x 10<sup>-17</sup> mol Al

**3.20 x 10<sup>7</sup> atoms Al**

3) Calculate the number of MOLES represented by each of the following (show work for at least the first 2):

A) 8.67 x 10<sup>18</sup> atoms Zn

**1.44 x 10<sup>-5</sup> mol Zn**

E) 2.888 x 10<sup>15</sup> atoms of silver

**4.797 x 10<sup>-9</sup> mol Ag**

B) 327.8 formula units H<sub>3</sub>PO<sub>4</sub>

**5.445 x 10<sup>-22</sup> mol H<sub>3</sub>PO<sub>4</sub>**

F) 6.80 x 10<sup>26</sup> formula units Ba(NO<sub>3</sub>)<sub>2</sub>

**1.13 x 10<sup>3</sup> mol Ba(NO<sub>3</sub>)<sub>2</sub>**

C) 3.55 x 10<sup>23</sup> atoms of copper

**0.590 mol Cu**

G) 8.46 x 10<sup>22</sup> molecules C<sub>2</sub>H<sub>6</sub>

**0.141 mol C<sub>2</sub>H<sub>6</sub>**

D) 5.66 x 10<sup>26</sup> atoms of xenon

**9.40 x 10<sup>2</sup> mol Xe**

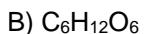
H) 5.38 x 10<sup>17</sup> formula units CaBr<sub>2</sub>

**8.94 x 10<sup>-7</sup> mol CaBr<sub>2</sub>**

4) Calculate the molar mass (g/mol) of each of the following (show work for at least the first 2):



**44.0 g/mol**



**180.0 g/mol**



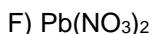
**154.0 g/mol**



**63.0 g/mol**



**55.8 g /mol**



**331.2 g/mol**



**199.9 g/mol**



**120.4 g/mol**



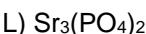
**34.0 g/mol**



**212.3 g/mol**



**227.0 g/mol**



**452.8 g/mol**

5) Determine the mass (in grams) of:



**$3.4 \times 10^2$  g**



**$1.15 \times 10^5$  g**



**90.6 g**



**485 g**



**2341 g**



**99 g**



**$1.866 \times 10^3$  g**



**0.224 g**

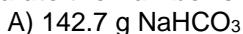


**$1.72 \times 10^3$  g**

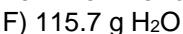


**$1.5 \times 10^2$  g**

6) Calculate the number of moles for each of the following (show work for at least the first 2):



**1.699 mol**



**6.43 mol**



**$8.62 \times 10^{-6}$  mol**



**2.75 mol**



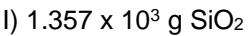
**26.6 mol**



**0.0036 mol**



**2.873 mol**



**22.58 mol**



**$3.07 \times 10^{-6}$  mol**

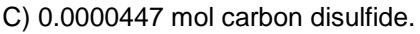


**0.4201 mol**

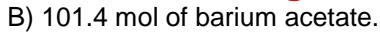
7) Find the mass (in grams) of:



**$3.10 \times 10^3$  g**



**0.00341 g**



**$2.589 \times 10^4$  g**



**$1.20 \times 10^9$  g**