WLHS / Chem / Monson

Name_____
Date_____Per_____

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_2	**2**
H_2SO_4	**7**	$KCrO_4$	**6**
K^+	**1**	H_2O_2	**4**
$CaCl_2$	**3**	Li_3PO_3	**7**
S	**1**	NH_4^+	**5**
SBr_3	**4**	Fe_2O_3	**5**
NH_4Br	**6**	$NaC_2H_3O_2$	**8**
$Ca_3(PO_4)_2$	**13**	PO_4^{3-}	**5**
$C_6H_{12}O_{11}$	**29**	Hg	**1**
$Mg(NO_3)_2$	**9**	$CuSO_4$	**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 $CuSO_4$
4.94×10^{24} particles

B) 13.67 mol H_2O
8.23×10^{24} molecules

C) 0.773 mol Cu
4.65×10^{23} atoms Cu

D) 1.39 mol $C_6H_{12}O_6$
8.37×10^{23} molecules

E) 22.68 mol Mg_3P_2
1.365×10^{25} particles

F) 162.4 mol C
9.776×10^{25} atoms C

G) 0.000553 mol CO_2
3.33×10^{20} molecules

H) 5.32×10^{-17} mol Al
3.20×10^{7} atoms Al

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

A) 8.67×10^{18} atoms Zn
1.44×10^{-5} mol Zn

B) 327.8 formula units H_3PO_4
5.445×10^{-22} mol H_3PO_4

C) 3.55×10^{23} atoms of copper
0.590 mol Cu

D) 5.66×10^{26} atoms of xenon
9.40×10^{2} mol Xe

E) 2.888×10^{15} atoms of silver
4.797×10^{-9} mol Ag

F) 6.80×10^{26} formula units $Ba(NO_3)_2$
1.13×10^{3} mol $Ba(NO_3)_2$

G) 8.46×10^{22} molecules C_2H_6
0.141 mol C_2H_6

H) 5.38×10^{17} formula units $CaBr_2$
8.94×10^{-7} mol $CaBr_2$

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

A) CO_2

44.0 g/mol

B) $C_6H_{12}O_6$

180.0 g/mol

C) CCl_4

154.0 g/mol

D) HNO_3

63.0 g/mol

E) Fe

55.8 g /mol

F) $Pb(NO_3)_2$

331.2 g/mol

G) $CaBr_2$

199.9 g/mol

H) $MgSO_4$

120.4 g/mol

I) H_2O_2

34.0 g/mol

J) K_3PO_4

212.3 g/mol

K) $C_7H_5N_3O_6$

227.0 g/mol

L) $Sr_3(PO_4)_2$

452.8 g/mol

5) Determine the mass (in grams) of:

A) 8.6 mol Ar

3.4×10^2 g

B) 7.55 mol C

90.6 g

C) 11.67 mol mercury atoms

2341 g

D) 13.87 mol $CuCl_2$

1.866×10^3 g

E) 11.3 moles $FeSO_4$

1.72×10^3 g

F) 3.14×10^3 mol HCl

1.15×10^5 g

G) 6.55 moles $Ca(OH)_2$

485 g

H) 0.89 mol of $CaCl_2$

99 g

I) 0.0112 mol of HF

0.224 g

J) 0.83 moles $C_6H_{12}O_6$

1.5×10^2 g

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

A) 142.7 g $NaHCO_3$

1.699 mol

B) 8.63×10^{-4} g $CaCO_3$

8.62×10^{-6} mol

C) 53.2 g H_2

26.6 mol

D) 115.2 g Ca

2.873 mol

E) 0.00073 g U

3.07×10^{-6} mol

F) 115.7 g H_2O

6.43 mol

G) 82.6 g C_2H_6

2.75 mol

H) 0.61 g $AgNO_3$

0.0036 mol

I) 1.357×10^3 g SiO_2

22.58 mol

J) 66.38 g $KMnO_4$

0.4201 mol

7) Find the mass (in grams) of:

A) 7.72 mol of aluminum chromate.

3.10×10^3 g

B) 101.4 mol of barium acetate.

2.589×10^4 g

C) 0.0000447 mol carbon disulfide.

0.00341 g

D) 7.23×10^6 mol potassium oxalate.

1.20×10^9 g