CH301 Worksheet 1 Answer Key: High School Chemistry Questions.

For each problem, identify the kind of question BEFORE answering it.

1. A 25 kg ball has a kinetic energy of 225 J. What is the speed of the ball?
   What kind of question is this? energy
   3 m/s

2. How many molecules of water are there in 100 mL of water? (The density of water = 1.000 g/ml.)
   What kind of question is this? stoichiometry

   3.34×10^{24} molecules

3. Given that the atomic mass of carbon is given as 12.0107 g/mol, what are the approximate relative abundances of the two isotopes ^{12}C and ^{13}C? ***What kind of question is this? isotopes***

   98.93% ^{12}C, 1.07% ^{13}C

4. In the electrolysis of $2H_2O \rightarrow 2H_2 + O_2$, how many atom of O in O_2 are made from 4 g of H_2O?
   What kind of question is this? stoichiometry

   1.34×10^{23} molecules

5. What are the most likely ionic forms of (a) sodium and (b) calcium?
   What kind of question is this? periodic trends
   (a) Na^+; (b) Ca^{2+}

6. What is the product of a reaction between metallic lithium and oxygen, O_2?
   What kind of question is this? oxidation numbers
   Li_2O

7. Name the following species: (a) Cl^-, (b) NO_3^-, (c) C_3H_8. ***What kind of question is this? naming***

   (a) chloride; (b) nitrate; (c) propane

8. The combustion of ethanol has the following equation: $C_2H_5OH + 3\ O_2 \rightarrow 2\ CO_2 + 2\ H_2O$
   What mass of CO_2 is formed from 1 kg of ethanol? ***What kind of question is this? stoichiometry***

   1.913 kg

9. Vitamin K contains 78.95% C, 3.95% H, and 21.05% O by mass. What is its empirical formula?
   What kind of question is this? empirical formula calculation

   C_5H_3O

10. Given that vitamin K (see question 9) has molecular weight of 158.15 g/mol, what is its molecular formula? ***What kind of question is this? molecular formula calculation***

   $C_{10}H_6O_2$