CHM 211 Test 1 Name: _____
Fall 2024 (Please print)

Multiple Choice: (4 points each. Put answers in left margin as capital letters.)

1. Which of these is an extensive property?

   A) boiling point C) density E) volume
   B) color D) hardness

2. Which of the following responses has the correct number of significant digits:
   distance (ft)=(1.642 inches) $\left(\frac{1\text{ ft}}{12\text{ in}}\right)$?

   A) 0.1 ft B) 0.14 ft C) 0.137 ft D) 0.1368 ft E) 0.13683 ft

3. Which of the following is **false**?

   A) Accuracy refers to how closely individual measurements agree with each other.
   B) Compounds are pure substances made up of atoms of two or more different elements chemically bonded together.
   C) Elements are substances that cannot be decomposed into simpler substances.
   D) Matter is anything that has mass and occupies space.
   E) Numbers obtained by measurement are always inexact.

4. One millimeter equals 10^x meters. What is x?

   A) -6 B) -3 C) -2 D) -1 E) 3

5. Which of the following is most likely a gas at 25 ºC?

   A) $CaCl_2$ B) Cl_2O_3 C) $Fe(NO_3)_2$ D) Mn E) None are gases

6. An alpha (α) particle is a(n)?

   A) electron C) helium atom E) proton
   B) energy wave D) helium nucleus

7. The correct number of protons, neutrons, and electrons in Pt^{2+} (Pt-195) is:

   A) 78p, 117n, 76e C) 78p, 117n, 78e E) 81p, 114n, 78e
   B) 78p, 117n, 74e D) 80p, 115n, 78e

8. What percentage of nitrogen in $Ca(NO_3)_2$?

   A) 13.7% B) 17.1% C) 18.9% D) 25.9% E) 28.0%

9. Which of the formulas must be a molecular formula?

   A) Al_2O_3 B) CH_2O C) $C_3H_4O_3$ D) H_2O_2 E) PO

Discussion Questions: (**You must show your work to receive credit**.)

1. Define: (12 points)
   extensive property –

   compound –

   isotope –

2. Classify these substances. Select all classifications that apply to each substance. (8 points)
   N_2, H_2O, air (write all into appropriate lines, leave lines blank where no substance applies)
   element _____
   compound _____
   pure substance _____
   homogeneous mixture _____
   heterogeneous mixture _____
   solution _____

3. List 4 properties typically associated with nonmetals. (10 points).

4. For the following, give the name or formula where appropriate: (15 points)
   CH_3CO_2H – calcium nitrate –

   Na_2S – hydrobromic acid –

   Fe_2O_3 –

5. On another planet, the isotopes of titanium have the natural abundances in the table below.

Isotope	Abundance	Mass (amu)
Ti-46	72.000%	45.95263
Ti-48	15.200%	47.94795
Ti-50	12.800%	49.94479

   What is the average atomic mass of titanium on that planet? (9 points)

6. Benzoic acid is a common preservative in many processed foods. It contains 68.8% carbon, 4.95% hydrogen, 26.2% oxygen by mass. It has a molar mass of about 120 g/mol. What is its empirical and molecular formulae. (**You may not work backwards from its molar mass**.) (10 points)