

Show all work to receive full credit

Name _____

- 1) (4 pts) Calculate an answer to the following set of operations. Express your answer in scientific notation and with the proper number of significant figures. Show work that demonstrates the significant figure count. Start by getting the correct answer using your calculator.

$$\frac{[(10.654 \times 10^0) + (23.2 \times 10^{-2})] \cdot 1.32 \times 10^5}{(2.00 \times 10^2 - 1.10 \times 10^2) \cdot 1999} =$$

- 2) (8 pts) Mercury (Hg) poisoning is a debilitating disease that is often fatal due to inactivation of vital enzymes. A polluted lake contains 0.4 micrograms of Hg per 1 mL of lake water. Calculate the total mass of Hg in kilograms. Express your answer in scientific notation and with the proper number of significant figures. The volume of the lake is 3.78×10^1 cubic miles (mi^3).

2.54 cm = 1 inch

1 cup = 8 fl. oz (exact)

128 fl. oz = 1 gallon (exact)

3.785 Liters = 1 gallon

2.205 kg = 1 lbs

1 cal = 4.184 J (exact)

1 mile = 5280 ft (exact)

3) (4 pts) A pure aluminum bar with a mass of 5.85 kg has a specific heat capacity of $0.903 \text{ J/g} \cdot ^\circ\text{C}$.

a) Calculate the quantity of heat, in kilojoules, that could be transferred to water if the bar drops in temperature from 75.0°C to 41.5°C when added to water. Be sure to put your answer in scientific notation with the correct number of significant figures.

b) Without calculating the answer, is the temperature change (ΔT) for the water larger or smaller than that for the Al bar? Explain.

4) (10 points) Complete the isotope table using numbers (not masses). The isotope symbols must contain the element symbol, the mass number, the atomic number, and the charge. If the atom is neutral there is no need to write a charge = 0.

Symbol	^{75}As			N
Protons (p^+)			24	
Electrons (e^-)	36		18	
Neutrons (n)		38		
Atomic Number		30		
Mass Number			54	15

5) (1.5 points) What would occur if:

- a) two neutrons were pushed toward each other.
- b) a sodium cation was pushed toward a chloride ion (an anion).
- c) two electrons were pushed toward each other.

6) (1 point) You here someone say, "The carbon atom weighs 12.011 u." Do you agree with this statement? Explain.

7) (1.5 points) Circle the correct description

boron is a	metal	non-metal	metalloid
titanium is a	metal	non-metal	metalloid
fluorine is a	metal	non-metal	metalloid

Extra Credit:

1) A white solid with a melting point of $730\text{ }^{\circ}\text{C}$ is melted. When electricity is passed through the resultant liquid, a brown gas and a liquid metal are produced. Neither the metal or gas can be broken down into anything simpler by chemical means. Classify each-the white solid, the brown gas, the liquid metal-as a mixture, a compound, or an element.

2) If the mass of water in question 3 is 800.0 g and it's initial temperature was $25\text{ }^{\circ}\text{C}$, calculate the final temperature of the water.