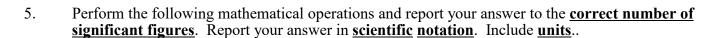Name _____ Rec. TA/time _____

Show **ALL** your work or **EXPLAIN** to receive full credit.

1. (3 pts) Which of the following statements is **INCORRECT**?

   a) Pure substances must be uniform throughout.
   b) Some pure substances can be decomposed into simpler pure substances.
   c) Heterogeneous mixtures can contain elements.
   d) Every compound is a homogeneous mixture.
   e) A heterogeneous mixture must contain at least two different substances.

2. (3 pts) Choose from the following list those properties that are **physical** properties of the red-brown liquid **bromine**?

   A. Its density is 3.12 g/cm^3.
   B. It reacts with hydrogen gas.
   C. It freezes to form an orange solid.
   D. It boils at 58.8°C.
   E. It forms ionic compounds with metals

   a) B, E   b) A, C, D   c) B, D, E   d) B, C   e) C

3. (3 pts) Indicate the number of **significant figures** for each of the following numbers.

   a) 0.020510   b) - 9.030 x 10^{-10}

4. (4 pts) Do the indicated arithmetic and give the answer to the correct number of significant figures.

$$(14.9 \times 0.049) - (3.53 \div 0.0840) + 101.600$$

5. Perform the following mathematical operations and report your answer to the **correct number of significant figures**. Report your answer in **scientific notation**. Include **units**..

NOT on quiz but good for practice.

$$\frac{(6.115 \times 10^4 \text{ m}^2)(36.76 \text{ kg} - 29.018 \text{ kg})}{0.0045231 \text{ s}} =$$

6. (5 pts) A crucible is known to weigh 24.3162 g. Three students in the class determine the weight of the crucible by repeated measurements on a simple balance. Which of the conclusions summarizes the data?

	trial 1	trial 2	trial 3	trial 4	trial 5
Student A	24.8	24.9	24.7	24.9	24.8
Student B	24.6	24.0	24.2	24.1	24.3
Student C	24.5	24.1	24.5	24.1	24.3

A. student B has done the most precise work and student C the most accurate
B. student B has done the most precise work and student A the most accurate
C. student C has done the most precise work and student B the most accurate
D. student C has done the most precise work and student A the most accurate
E. student A has done the most precise work and student C the most accurate

7. (4 pts) A 27.40-g sample of a metal is placed in a graduated cylinder containing 30.00 mL of water and the water level rises to 31.22 mL. What is the **density** (in **g/cm³**) of the sample of metal?

8.   (5 pts) Socrates (469 - 399 B.C.) was made to drink hemlock, which contains the poison coniine. The lethal dose of the drug coniine taken orally is 7.0 mg per kilogram of body weight in mice. Calculate the lethal dose in **grams** for a 90.0 lb person, assuming that a human functions the way mice do. (1 lb = 453.6 g)

9.   (7 pts) The amount of mercury, Hg, in the air on a particular day is 1.50×10^{-10} lb/ft^3. What volume of air (in **m³**) contains 9.13×10^{-9} kg of mercury?   (1.000 lb = 453.6 g, 1 in = 2.54 cm) You **MUST** use **dimensional analysis** (factor unit method) to receive **full** credit!

10.   (3 pts) Select the combination of statements which are **CORRECT**.

    1) The mass number of an atom is the number of neutrons in the nucleus.
    2) The number of protons in atom is its atomic number.
    3) The number of electrons is greater than the number of protons in a cation.
    4) The masses of a proton and a neutron are both approximately 1 amu.
    5) Isotopes of an element differ in the number of neutrons.

    a) 1, 3, 4   b) 2, 3   c) 1, 2, 3   d) 1, 4, 5   e) 2, 4, 5

11.   (3 pts) Fill in the blanks in the table below for the isotope indicated.

Symbol	number of protons	number of neutrons	number of electrons	atomic number	mass number
$^{109}_{52}$Te					109

	IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIIIB			IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA
1	1.008 **H** 1																	4.003 **He** 2
2	6.941 **Li** 3	9.012 **Be** 4											10.811 **B** 5	12.011 **C** 6	14.007 **N** 7	15.999 **O** 8	18.998 **F** 9	20.179 **Ne** 10
3	22.990 **Na** 11	24.305 **Mg** 12											26.98 **Al** 13	28.09 **Si** 14	30.974 **P** 15	32.06 **S** 16	35.453 **Cl** 17	39.948 **Ar** 18
4	39.098 **K** 19	40.08 **Ca** 20	44.96 **Sc** 21	47.88 **Ti** 22	50.94 **V** 23	52.00 **Cr** 24	54.94 **Mn** 25	55.85 **Fe** 26	58.93 **Co** 27	58.69 **Ni** 28	63.546 **Cu** 29	65.38 **Zn** 30	69.72 **Ga** 31	72.59 **Ge** 32	74.92 **As** 33	78.96 **Se** 34	79.904 **Br** 35	83.80 **Kr** 36
5	85.47 **Rb** 37	87.62 **Sr** 38	88.91 **Y** 39	91.22 **Zr** 40	92.91 **Nb** 41	95.94 **Mo** 42	98 **Tc** 43	101.07 **Ru** 44	102.91 **Rh** 45	106.42 **Pd** 46	107.87 **Ag** 47	112.41 **Cd** 48	114.82 **In** 49	118.69 **Sn** 50	121.75 **Sb** 51	127.60 **Te** 52	126.90 **I** 53	131.39 **Xe** 54
6	132.91 **Cs** 55	137.33 **Ba** 56	138.91 **La** 57	178.39 **Hf** 72	180.95 **Ta** 73	183.85 **W** 74	186.21 **Re** 75	190.23 **Os** 76	192.22 **Ir** 77	195.08 **Pt** 78	196.97 **Au** 79	200.59 **Hg** 80	204.38 **Tl** 81	207.2 **Pb** 82	208.98 **Bi** 83	209 **Po** 84	210 **At** 85	222 **Rn** 86
7	223 **Fr** 87	226.03 **Ra** 88	227.03 **Ac** 89	261 **Rf** 104	262 **Ha** 105	263 **Sg** 106	262 **Ns** 107	265 **Hs** 108	266 **Mt** 109	269 110	272 111	277 112						

Lanthanide Series	140.12 **Ce** 58	140.91 **Pr** 59	144.24 **Nd** 60	145 **Pm** 61	150.36 **Sm** 62	151.96 **Eu** 63	157.25 **Gd** 64	158.93 **Tb** 65	162.50 **Dy** 66	164.93 **Ho** 67	167.26 **Er** 68	168.93 **Tm** 69	173.04 **Yb** 70	173.04 **Lu** 71
Actinide Series	232.04 **Th** 90	231.04 **Pa** 91	238.03 **U** 92	237.05 **Np** 93	**Pu** 94	**Am** 95	**Cm** 96	**Bk** 97	**Cf** 98	**Es** 99	**Fm** 100	**Md** 101	**No** 102	**Lr** 103

A PERIODIC CHART OF THE ELEMENTS
(Based on ^{12}C)