Dr. Zellmer | Chemistry 1250 | T, R
Time: 7 PM Sun. | Spring Semester 2022 | January 23, 2022
40 min | Quiz I

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) -9.030×10^{-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. (4 pts) Perform the following mathematical operations and report your answer to the **correct number of significant figures**. Report your answer in **scientific notation**. Include **units**..

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

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/cm^3**) 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 **m^3**) 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. (2 pts) Which of the following statements is **TRUE**?

a) A hypothesis is speculation that is difficult to test.
b) An observation explains why nature does something.
c) A scientific law is fact.
d) A scientific law summarizes a series of related observations.
e) Once a theory is constructed, it is considered fact.

	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)