

Name _____

Write your name on the back too.

CHEM 1402
Exam I
Dr. Melissa Kelley
September 29, 2011

You have 50 minutes to complete this exam. Provide the one best answer for each, following the instructions given in each section of the exam.

Multiple Choice: Select the one best answer for each question. Multiple answers will not be accepted. Each question is worth 3 points each.

_____ 1. I weighed four pennies and obtained the following data:

4.45 g 4.46 g 4.44 g 4.43 g

The average true value is 4.00 g. Which of the following statements about the data **is true**?

- A. The data is precise and has systematic error.
- B. The data is accurate and has systematic error.
- C. The data is precise and has systematic and random error.
- D. The data is accurate and has random error.
- E. The data is accurate and has systematic and random error.

_____ 2. Which is the largest volume?

- A. 1×10^{12} μL
- B. 100 cL
- C. 10 μL
- D. 1×10^{-3} ML
- E. None listed

_____ 3. Which is the most reactive?

- A. Sulfide
- B. Aluminum ion
- C. Phosphide
- D. Phosphate

_____ 4. Which of the following statements **is not correct**?

- A. Electrons can behave as a wave.
- B. Anions are formed from non-metals that loss electrons.
- C. An electron being promoted from ground state to a higher energy level results in excitation.
- D. Cations can react with non-metals.

_____ 5. Which of the following relationships **is not true**?

- A. Calcium ion is larger in atomic size than calcium.
- B. Aluminum has a lower electron affinity than chlorine.
- C. Cesium has lower ionization energy than sodium.
- D. Chlorine has a smaller atomic size than sodium.

_____ 6. Which of the following has the highest electron affinity?

- A. I
- B. Cl
- C. Br
- D. F

_____ 7. Which is the smallest distance?

- A. 1×10^{-12} Mm
- B. 100 mm
- C. 1×10^6 μm
- D. 1×10^3 cm
- E. None listed

Problems. Credit will only be given if you show your work and units. Circle your final answer. All answers should have the correct number of significant figures.

Useful information:

1 yard= 0.91 meters 1 lb= 454 g 1 in = 2.54 cm 1 L = 2.113 pints 1 gallon=3.78 L

8. (8 points) A child needs to be given an i.v. antibiotic with a concentration of $50 \mu\text{g}/\mu\text{l}$. The child weighs 45 pounds, and the antibiotic needs to be given at a concentration of 250 mg/kg of body weight. The drug needs to be delivered over 4.0 hours. How many milliliters per minute should you set the pump on the i.v machine?

9. (8 points) The television chef Paula Dean likes to cook with butter. She uses 1.0 sticks of butter per recipe, and does 3.0 recipes per television show. She does 100.0 shows per year. One stick of butter contains 8 tablespoons of butter, and one tablespoon is 14.79 mL. The density of butter is $56.9 \text{ lb}/\text{ft}^3$. How many pounds of butter does Paula Dean use in a year of her television show?

10. (6 points) Menthol, an anesthetic and chemical found in peppermint melts at 35°C and boils at 200°C . In what state is it found at 85°F ? A complete answer should include showing all of your work.

11. (6 points) Resting heart rate is 60.00 beats per minute, and the human heart pumps 70.00 mL per minute. How many heartbeats does it take to pump 12.00 pints of blood?

12. (20 points) Fill in the following table for all missing spaces. In spaces where there is a line through that space, you do not need to provide an answer.

Element Name	Element Symbol	# Protons	# Neutrons	# Electrons	Atomic Mass Number	Atomic Number	Electron Configuration	Valence Electrons
				18	31	15	$1s^2 2s^2 2p^6$	
		20		18	40			8

Short Answer

13. (2 points each) In the space provide write the number of significant figures for each number.

- _____ a. 0.05 _____ b. 0.00020×10^{-4}
 _____ c. 3.000 _____ d. 5.2×10^5

14. (3 points each) Perform the following calculations and give the appropriate number of significant figures.

$(0.003 \text{ g} \times 41.03) / 0.12 =$ _____

$44.001 \text{ g} + 0.1 \text{ g} + 0.125 \text{ g} =$ _____

15. (3 points each) In the space provided label each process as a chemical change or physical change.

- _____ a. Frosting a cake.
 _____ b. Frying bacon.
 _____ c. Adding sugar to water.

16. (2 points each) Classify each of the following as heterogeneous or homogeneous mixtures

- _____ a. A bag of chips
 _____ b. A cup of black coffee
 _____ c. A vanilla ice cream cone
 _____ d. A can of oil

The Periodic Table of the Elements

18																				
2																				
1	1	H Hydrogen 1.00794																He Helium 4.003		
		3	4															10		
2	2	Li Lithium 6.941	Be Beryllium 9.012182															F Fluorine 18.9984032	Ne Neon 20.1797	
		11	12															17	18	
3	3	Na Sodium 22.989770	Mg Magnesium 24.3050															Cl Chlorine 35.4527	Ar Argon 39.948	
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
4	4	K Potassium 39.0983	Ca Calcium 40.078	Sc Scandium 44.955910	Ti Titanium 47.867	V Vanadium 50.9415	Cr Chromium 51.9961	Mn Manganese 54.938049	Fe Iron 55.845	Co Cobalt 58.933200	Ni Nickel 58.6934	Cu Copper 63.546	Zn Zinc 65.39	Ga Gallium 69.723	Ge Germanium 72.61	As Arsenic 74.92160	Se Selenium 78.96	Br Bromine 79.904	Kr Krypton 83.80	
		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
5	5	Rb Rubidium 85.4678	Sr Strontium 87.62	Y Yttrium 88.90585	Zr Zirconium 91.224	Nb Niobium 92.90638	Mo Molybdenum 95.94	Tc Technetium (98)	Ru Ruthenium 101.07	Rh Rhodium 102.90550	Pd Palladium 106.42	Ag Silver 107.8682	Cd Cadmium 112.411	In Indium 114.818	Sn Tin 118.710	Sb Antimony 121.760	Te Tellurium 127.60	I Iodine 126.90447	Xe Xenon 131.29	
		55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	
6	6	Cs Cesium 132.90545	Ba Barium 137.327	La Lanthanum 138.9055	Hf Hafnium 178.49	Ta Tantalum 180.9479	W Tungsten 183.84	Re Rhenium 186.207	Os Osmium 190.23	Ir Iridium 192.217	Pt Platinum 195.078	Au Gold 196.96655	Hg Mercury 200.59	Tl Thallium 204.3833	Pb Lead 207.2	Bi Bismuth 208.98038	Po Polonium (209)	At Astatine (210)	Rn Radon (222)	
		87	88	89	104	105	106	107	108	109	110	111	112	113	114					
7	7	Fr Francium (223)	Ra Radium (226)	Ac Actinium (227)	Rf Rutherfordium (261)	Db Dubnium (262)	Sg Seaborgium (263)	Bh Bohrium (262)	Hs Hassium (265)	Mt Meitnerium (266)										

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce Cesium 140.116	Pr Praseodymium 140.90765	Nd Neodymium (145)	Pm Promethium (145)	Sm Samarium 150.36	Eu Europium 151.964	Gd Gadolinium 157.25	Tb Terbium 158.92534	Dy Dysprosium 162.50	Ho Holmium 164.93032	Er Erbium 167.26	Tm Thulium 168.93421	Yb Ytterbium 173.04	Lu Lutetium 174.967
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th Thorium 232.0381	Pa Protactinium 231.03588	U Uranium 238.0289	Np Neptunium (237)	Pu Plutonium (244)	Am Americium (243)	Cm Curium (247)	Bk Berkelium (247)	Cf Californium (251)	Es Einsteinium (252)	Fm Fermium (257)	Md Mendelevium (258)	No Nobelium (259)	Lr Lawrencium (262)