

Test 44

Name _____

Chemistry 11100

Section _____

EXAM I

Total Points = 150

TA _____

Monday, 6:30 PM

September 17, 2012

Directions:

1. Each student is responsible for following directions. Read this page carefully.
2. Write your name and other requested information on this page and on the separate answer sheet.
3. CODE your name on the answer sheet using an ordinary (#2) pencil.
4. CODE your correct **10-digit** identification number (PUID) on the answer sheet. **THIS IS VERY IMPORTANT!**
5. CODE your section number on the answer sheet. Please use all four digits, 0034, 0035, 0036, etc. **This is also very important!**
6. CODE the test number shown in the upper right-hand corner on the answer sheet in the block labeled "Test/Quiz Number". **This is Test 44.**
7. Put all calculations on the examination pages. **DO NOT PUT ANY EXTRA MARKS ON THE COMPUTER ANSWER SHEET!**
8. This exam consists of 25 multiple-choice questions worth 6 points each. Choose the one best or correct answer for each question and write it both on your exam paper and on the computer answer sheet. **The computer answer sheet is the only one that will be graded!**
9. This exam consists of 8 pages plus a page of Useful Information, a Periodic Table and a sheet of scratch paper. Please check to be sure that you have them all!

END OF EXAM

- 1) Please make sure that you have entered 25 answers on your scan sheet.
- 2) Make sure that you have entered your name, ID number, and lab section number (4 digits).
- 3) You **MUST** turn the scan sheet in to your TA before leaving the exam!

**KEEP YOUR ANSWERS AND WORK COVERED TO PROTECT
THE INTEGRITY OF YOUR WORK!!**

_____ 1. Convert 255 mL to L

- (a) 0.0255 L
- (b) 0.255 L
- (c) 2.55 L
- (d) 25.5 L
- (e) 255,000 L

_____ 2. Convert 75,600 cm to km.

- (a) 7.56×10^{-1} km
- (b) 7.56×10^1 km
- (c) 7.56×10^2 km
- (d) 7.56×10^5 km
- (e) 7.56×10^9 km

_____ 3. Identify the number that has 3 significant figures.

- (a) 0.006 L
- (b) 0.06050 g
- (c) 60.50 g
- (d) 60.5 mg
- (e) 605.5 mL

_____ 4. Express the answer to this question with the proper number of significant figures.

$$(1.3 \times 10^6) \times 317.832 =$$

- (a) 4.1×10^8
- (b) 4.1×10^9
- (c) 4.1×10^4
- (d) 4.131816×10^9
- (e) 4.131816×10^8

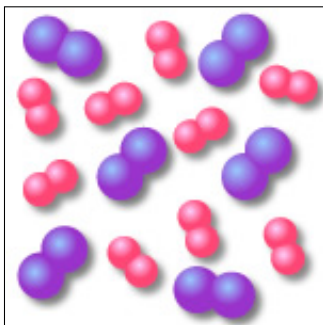
_____ 5. Which of the following has the largest density?

- (a) a 1-g object with a volume of 10 mL
- (b) a 10-g object with a volume of 1 mL
- (c) a 10-g object with a volume of 10 mL
- (d) a 200-g object with a volume of 200 mL
- (e) All of the densities are the same.

_____ 6. Which of the following lists the correct classification for sulfur, silicon and calcium?

	Metal	Metalloid	Nonmetal
(a)	Si	Ca	S
(b)	Ca	S	Si
(c)	S	C	Si
(d)	C	S	Si
(e)	Ca	Si	S

_____ 7. The picture below is an example of



- (a) An element
- (b) A compound
- (c) A mixture of elements
- (d) A mixture of compounds
- (e) A mixture of a compound and an element

_____ 8. How many electrons, protons, and neutrons are in one atom of ^{42}Ca ?

- (a) 42 e, 42 p, 42 n
- (b) 20 e, 20 p, 20 n
- (c) 20 e, 20p, 22 n
- (d) 22 e, 22 p, 20 n
- (e) 22 e, 20 p, 22 n

_____ 9. Which set of values is possible?

	Mass Number	Atomic Number	Number of Protons	Number of Neutrons
(a)	19	42	19	23
(b)	235	92	92	143
(c)	53	131	131	79
(d)	32	15	15	15
(e)	14	7	7	8

_____ 10. Al^{3+} contains _____ protons and _____ electrons.

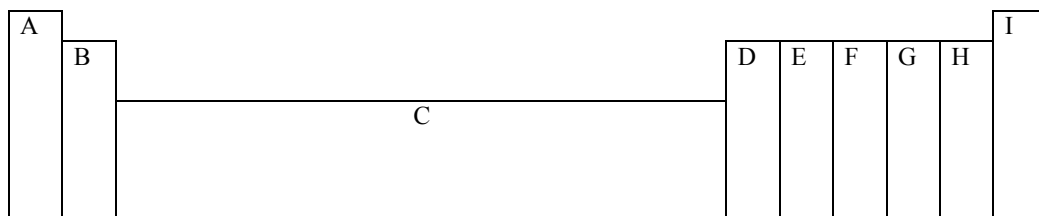
- (a) 10 ; 13
- (b) 13 ; 3
- (c) 13 ; 10
- (d) 13 ; 13
- (e) 13 ; 16

_____ 11. Naturally occurring boron comprises two isotopes, boron-10 and boron-11. The atomic mass of boron-10 is 10.013 amu. The atomic mass of boron-11 is 11.009 amu. What is true about the relative amounts of boron-10 and boron-11 in the natural sample?

- (a) Exactly equal (50.0% boron-10 and 50.0% boron-11)
- (b) Roughly equal (a bit more boron-10 than boron-11)
- (c) The majority of the sample is boron-10.
- (d) The majority of the sample is boron-11.
- (e) Roughly equal (a bit more boron-11 than boron-10)

Comment [MT1]: Spacing got goofy again.

For problems 12 – 16 use the diagram below. Identify the indicated elements (or group of elements) by using the letters from the diagram.



_____ 12. Which column contains the halogens?

- (a) Column A
- (b) Column B
- (c) Column G
- (d) Column H
- (e) Column I

_____ 13. Which column contains the Alkali metals?

- (a) Column A
- (b) Column B
- (c) Column G
- (d) Column H
- (e) Column I

_____ 14. Which column contains the Alkaline Earth metals?

- (a) Column A
- (b) Column B
- (c) Column G
- (d) Column H
- (e) Column I

_____ 15. Which column contains elements that all have a positive 1 charge as ions?

- (a) Column A
- (b) Column B
- (c) Column G
- (d) Column H
- (e) Column I

- _____ 16. Which column contains elements that all have a positive 2 charge as ions?
- (a) Column A
 - (b) Column B
 - (c) Column G
 - (d) Column H
 - (e) Column I
- _____ 17. The charge of the monatomic ions magnesium and nitrogen are _____ and _____, respectively.
- (a) -2; -3
 - (b) +2; -2
 - (c) +1; -3
 - (d) +2; -2
 - (e) +2; -3
- _____ 18. Identify the number of each type of atom in this compound $(\text{NH}_4)_2\text{HPO}_4$
- (a) 1–nitrogen atom, 5–hydrogen atoms, 1–potassium atom, and 4–oxygen atoms.
 - (b) 1–nitrogen atom, 7–hydrogen atoms, 1–phosphorous atom, and 4–oxygen atoms
 - (c) 2–nitrogen atoms, 7–hydrogen atoms, 1–potassium atom, and 4–oxygen atoms.
 - (d) 2–nitrogen atoms, 9–hydrogen atoms, 1–phosphorous atom, and 4–oxygen atoms.
 - (e) 2–nitrogen atoms, 9–hydrogen atoms, 1–phosphorous atom, and 1–oxygen atoms.
- _____ 19. Name the following ion SO_3^{2-}
- (a) Hyposulfite
 - (b) Hyposulfate
 - (c) Sulfate
 - (d) Sulfite
 - (e) Persulfite
- _____ 20. Name the following ion HCO_3^-
- (a) Hydrogen carbonate (or bicarbonate)
 - (b) Carbonate
 - (c) Hydrogen carbonite
 - (d) Carbonite
 - (e) Bicarbonite

- _____ 21. Identify the ions in NaNO_3
- (a) 1 Na^{2+} and 1 NO_3^{2-}
 - (b) 1 Na^{2+} , 1 N^{3-} , and 3 O^{2-}
 - (c) 1 Na^+ and 1 NO_3^-
 - (d) 1 Na^+ , 1 N^{3-} , and 3 O^{2-}
 - (e) 1 Na^+ , 1 N^{3-} , and 1 O_3^{2-}
- _____ 22. What is the formula for a compound containing fluorine and potassium?
- (a) KF
 - (b) KF_2
 - (c) K_2F_2
 - (d) K_2F_3
 - (e) K_2F
- _____ 23. In laboratory you need to measure out 25.00 mL of a liquid. Which piece of glassware do you use and why?
- (a) A 50 mL graduated cylinder because it can measure out 25 mL of liquid to 0.01 mL.
 - (b) A 100 mL beaker because it has a 25 mL mark on it.
 - (c) A 25 mL pipet because it delivers 25.00 mL exactly.
 - (d) Any of these would work because they all can measure out precisely 25.00 mL of liquid.
- _____ 24. In lab you plan to filter a coffee solution to separate the coffee grounds from the coffee liquid. You started with 25.54 grams of coffee grounds. After filtering and allowing the coffee grounds to dry you find that you have 20.17 grams of coffee grounds. What was the percent recovery of coffee grounds?
- (a) 78.97%
 - (b) 2.103 %
 - (c) 126.6 %
 - (d) 44.13 %
 - (e) 55.87%

- _____ 25. In lecture we used a light bulb apparatus to test conductivity. The apparatus is like the one shown below. Imagine that this apparatus is used to test four solutions in Beakers A through D and the results are summarized below. The solids used in beakers B and C are different.

Beaker	Solution description	Conductivity test (light bulb)
A	Pure water	No light
B	Pure water and white solid	Light bulb glows brightly
C	Pure water and white solid	No light
D	Pure water and vinegar	Light bulb glows faintly

Which beaker has a solution containing a strong electrolyte and what experimental evidence supports your conclusion?

- (a) Beaker A because the light bulb didn't glow indicating the presence of sufficient ions.
- (b) Beaker B because the light bulb glowed brightly indicating that the solid dissolved to produce many ions in the solution to complete the electric circuit.
- (c) Beaker C because the light bulb didn't glow indicating that the solid produced ions when it dissolved in pure water.
- (d) Beaker D because the light bulb glowed faintly indicating that the solid dissolved to produce many ions in the solution to complete the electric circuit.
- (e) All of the solutions contain a strong electrolyte because pure water is a strong electrolyte.

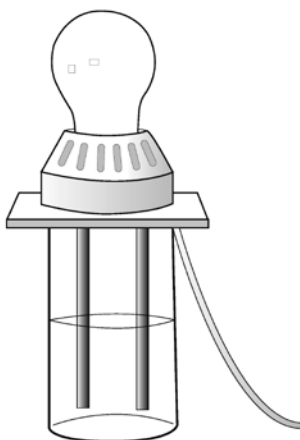


Figure 1: A light bulb apparatus to test conductivity.

Useful Information

$$\% \text{ Error} = \frac{|Actual - Theoretical|}{Theoretical} \times 100\%$$

$$\% \text{ Recovery} = \frac{\text{mass of material recovered}}{\text{mass of material started with}} \times 100\%$$

$$T_K = T_{oc} + 273.15$$

$$T_{or} = 1.8(T_{oc}) + 32$$

Key

- 1.) B
- 2.) A
- 3.) D
- 4.) A
- 5.) B
- 6.) E
- 7.) C
- 8.) C
- 9.) B
- 10.) C
- 11.) D
- 12.) D
- 13.) A
- 14.) B
- 15.) A
- 16.) B
- 17.) E
- 18.) D
- 19.) D
- 20.) A
- 21.) C
- 22.) A
- 23.) C
- 24.) A
- 25.) B