

Chemistry 7
100 Points

Make-Up Exam 1 2008-09, Form: A

Name: _____

Student Number: _____

TA: _____

Date: _____

Section 1. Multiple Choice—3 POINTS EACH

Select the choice that best answers the question. Mark it clearly on your answer sheet or blue book.

1. The ^{235}U isotope is arguably one of the most important and dangerous isotopes on our planet. Select the choice which lists the correct atomic number, neutron number, and mass number, respectively.
 - (a) 92, 235, 143
 - (b) 143, 92, 235
 - (c) 235, 143, 92
 - (d) 92, 143, 235
2. The following properties describe zinc. Which choice is a chemical property?
 - (a) It is bluish-white metal.
 - (b) It corrodes upon prolonged contact with moist air.
 - (c) Its density is 7.14 g/cm^3 .
 - (d) It conducts electricity.
3. Which choice represents a chemical change?
 - (a) evaporation of a water
 - (b) fermentation of sugar in water
 - (c) dissolution of sugar in water
 - (d) melting of gold
4. Which of the following pairs of elements would be most likely to form an ionic compound?
 - (a) P and Br
 - (b) O and Zn
 - (c) Cu and K
 - (d) Al and Rb
5. Which one of the substances below contains the largest number of atoms?
 - (a) 1 mol of CO_2 (g)
 - (b) 1 mol of UF_6 (g)
 - (c) 1 mol of C_2H_6 (g)
 - (d) 1 mol of Fe_2O_3

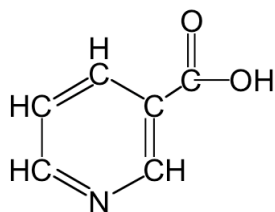
6. An inch is exactly 2.54 cm. Which of the following choices has the same value as one inch?
- (a) 0.000254 m
 - (b) 2.54×10^7 nm
 - (c) 0.254 mm
 - (d) 25.4×10^7 μ m
7. The balancing of a chemical equation is a statement of what law
- (a) conservation of energy
 - (b) multiple proportions
 - (c) conservation of mass
 - (d) constant composition
8. An aluminum cation, Al^{3+} , has:
- (a) 13 protons and 13 electrons
 - (b) 10 protons and 13 electrons
 - (c) 16 protons and 13 electrons
 - (d) 13 protons and 10 electrons
9. Sodium metal melts at 207.9°F. What temperature is this in °C?
- (a) 95.36°C
 - (b) 97.72°C
 - (c) 98.24°C
 - (d) 98.73°F
10. The density of liquid is measured to be 1.37 g/mL at 10°C. What is the mass of 47.4 mL of this liquid?
- (a) 64.9 g
 - (b) 0.346 g
 - (c) 34.6 g
 - (d) 52.5 g

Section 2. Short-Answer I—30 POINTS TOTAL

Answer the following two questions. All work is to be shown in the blue book with answers boxed.

11. For each chemical name provide a chemical formula and for each chemical formula provide a name (1pt each).
- (a) dry ice
 - (b) sulfur dioxide
 - (c) calcium phosphate
 - (d) mercurous chloride
 - (e) sodium sulfite
 - (f) Mg_3N_2
 - (g) Na_2CrO_7
 - (h) CrCl_2
 - (i) CaCO_3
 - (j) N_2O

12. Nicotinic acid is a water-soluble vitamin which plays an essential metabolic role in all living cells.



Nicotinic acid

- (A) Write the molecular formula ($C_7H_7O_2N$) of nicotinic acid? (4pts)
(B) Calculate the molar mass of nicotinic acid? (4pts)
(C) What is the % mass of carbon in nicotinic acid? (4pts)
(D) If you have 0.125 g of nicotinic acid, how many moles do you have? (4pts)
(E) How many carbon atoms are in 0.125 g of nicotinic acid? (4pts)

Section 3. Longer-Problems: 13.33 POINTS EACH

Answer the following three questions. All work is to be shown in the blue book with answers boxed.

13. Adipic acid is a hydrocarbon used in the manufacture of nylon. The composition of the acid is 49.3% C, 6.9% H, with the remaining amount being atomic oxygen, O.
- (A) Determine the empirical formula of adipic acid? (10 points)
(B) If the molecular mass of adipic is 146 amu, what is the molecular formula? (3 pts)
14. Carbon disulfide, CS_2 , burns in oxygen according to the following *unbalanced equation*.
- $$CS_2(g) + O_2(g) \longrightarrow CO_2(g) + SO_2(g)$$
- (A) Write the balanced equation for this reaction (3 pts)
(B) Calculate the grams of sulfur dioxide produced when a mixture of 15.0 g of carbon disulfide and 35.0 g of O_2 gas react. (7 points)
(C) What is the percent yield of the reaction if in a laboratory experiment the same system produces 16.7 g of SO_2 (3pts)?
15. This question is all about the Periodic Table that you hold in front of you. (1.33 pt each)
- (a) What is the general name given to those elements in Group IA?
(b) Name a metalloid in the fourth period.
(c) In general, what is the magnitude of charge of an ion formed from a element in Group VA?
(d) Name the element whose ion has 18 electrons and the ion charge is -1?
(e) What neutral element has 29 electrons?
(f) Reactions between a metal and a non-metal result in what type of bonding between atoms?
(g) Write the symbol for the halogen gas that has the smallest atomic mass?
(h) Write the name of the element whose symbol is Au?
(i) What alkaline-earth element is in the third period?
(j) Write the symbol of three naturally occurring molecular gases?

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- Which of the following pairs of elements would be most likely to form an ionic compound?
 - P and Br
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- Sodium metal melts at 207.9°F . What temperature is this in $^\circ\text{C}$?
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- An inch is exactly 2.54 cm. Which of the following choices has the same value as one inch?
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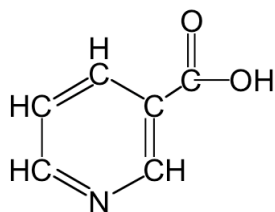
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