

Name: \_\_\_\_\_

130 points

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Test 1

Chemistry 121A

September 29, 1997

**SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS**

$$N_A = 1 \text{ mole} = 6.02 \times 10^{23}$$

**Multiple Choice Questions: Circle the single best answer. No penalty for guessing.**

1. Name the SI prefix used to indicate  $10^{-3}$ . (5 points)

- A) Centi (c)      B) Kilo (k)      C) Milli (m)      D) Nano (n)      E) Pico (p)

2. How many significant figures are present in 53.020? (5 points)

- A) 2                  B) 3                  C) 4                  D) 5                  E) 6

3. Which of the following has a negative charge? (5 points)

- A) Sodium atom    B) Neutron          C) beta particle    D) Proton            E) Alpha Particle

4. What is the charge on a sulfite anion? (5 points)

- A) +2                  B) +1                  C) -1                  D) -2                  E) -3

5. Calculate the mass of 1.50 mole of benzene,  $C_6H_6$ ? (5 points)

- A) 18.0                  B) 19.5                  C) 52.1                  D) 78.1                  E) 117

6. Calculate the mass percent calcium in CaS. (5 points)

- A) 44.4 %              B) 50.0 %              C) 55.5 %              D) 75.0 %              E) 81.7 %

7. How many grams of sugar ( $C_{12}H_{24}O_{12}$ ) do you need to burn to produce 25.3 g of  $CO_2$ . (15 points)

Name: \_\_\_\_\_

Test 1

8. Write complete atomic symbols for two isotopes of the element boron. (5 points)

9. Name the following ionic compounds. (4 points each)

$K_2CO_3$  \_\_\_\_\_

$FeSO_3$  \_\_\_\_\_

$HClO_3$  \_\_\_\_\_

$NH_4Br$  \_\_\_\_\_

10. Write the empirical formula for the following compounds. (4 points each)

lithium phosphate \_\_\_\_\_

diphosphorus pentoxide \_\_\_\_\_

titanium (IV) oxide \_\_\_\_\_

phosphoric acid \_\_\_\_\_

11. Calculate the molecular weight of the following compounds. (5 points each)

$CaSO_4 \cdot 6H_2O$  \_\_\_\_\_

$C_{14}H_{28}O_2$  \_\_\_\_\_

12. Define the term “mole” as it applies to chemistry and Avogadro’s number? (5 points)

Name: \_\_\_\_\_

Test 1

13. Vanillin, the dominant flavoring in vanilla, contains three elements: C, H and O. When 1.05 g of this substance is completely combusted, 2.43 g of CO<sub>2</sub> and 0.50 g of H<sub>2</sub>O are produced. What is the empirical formula of this compound? (12 points)

14. Determine the number of neutrons and protons in a given atom for each of the following elements. (6 points)

Element	Protons	Neutrons
<sup>106</sup> Pd	_____	_____
<sup>122</sup> Sb <sup>3+</sup>	_____	_____
<sup>184</sup> W	_____	_____

15. Balance the following equations. (15 points)

