A. Multiple Choice

Chapter 1

1. a) Quantitative means a specific amount. Only “measurement” meets this requirement.

2. e) Only “hypothesis” is an explanation.

3. d) A law is defined as a statement of fact deduced from observation.

4. b) By definition, Kg is the SI unit of mass.

5. a) Since the actual density is not known, the accuracy cannot be determined.

6. d) Ice melting is a physical change.

7. c) III and IV are correct. Answer I would not apply to addition and subtraction. Answer II is

incorrect because leading zeros are not significant.

8. c) Answer c) is correct because leading zeros are not significant.

9. a) Answer a) is correct because multiplication conserves the leastnumber of significant digits.

10. d) Answer d) is correct because when adding, significant digits are based on the least significant

decimal place.

11. b) Bisecting the paper 30 times results in a strip approximately 3 x 10

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cm wide.

12. d) The Celsius and Kelvin scales have the same size degree. Each is 9/5 the size of 1 ºF.

13. e) 10.00 g ÷ 1.40 mL = 7.14 g/mL

14. b) Answer b) is correct because carbon dioxide is a pure compound.

15. b) A solution (on the molecular level) is the definition of a homogeneous mixture.

Chapter 2

1. b) An example of this would be carbon reacting with oxygen and forming either CO or CO2.

The small whole-number mass ratio would be 1.33g ÷ 2.66 g, or 1 to 2.

2. d) Isotopes were not known during the time when Dalton proposed his theory.

3. a)

4. c)

5. d)

6. b)

7. b) The mass number is the sum of the protons and neutrons within the nucleus. The atomic

symbol is defined by the number of protons.

8. c) Isotopes have the same number of protons.

9. c)

10. e)

11. a)

12. e) Chloride has a 1–charge and M will have a 2+ charge within the compound. The neutral

metal will have 28 electrons, and therefore 28 protons, which is nickel.

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13. e) Barium is in Group 2A on the periodic table and would have a 2+ charge, losing its 2 valence

electrons.

14. a) Per IUPAC naming conventions, Type I metal cations have the same name as the parent

atom.

15. d) Per IUPAC naming conventions; iron is a Type II metal.

Chapter 3

1. c) The “mystery” metal has an atomic mass ¼the mass of silver (108 ÷ 4 = 27).

2. d) This is the only example that represents 6.022 x 10

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3. d) The mass of nitrogen is 14 g/mol and iodine is 127 g/mol, which explains a molar mass of

395 g/mol for nitrogen triiodide: 14 + 3(127) = 395.

4. b) (0.7 x 62.93 amu) + (0.3 x 64.93 amu) = 63.53 amu

5. a) The fraction of the total mass is 14/17 = 0.824 x 100 = 82.4%.

6. e) Substance AB2is 40% B, assuming a 100-g sample. AB2going to AB would lose half the

initial mass of B, or 20 g. Therefore, AB would consist of 80 g A and 20 g B, or 75% A, by

mass.

7. d) Any total mass can be assumed.

8. e) The balanced equation is 4 FeCr2O4+ 8 K2CO3+ 7 O2 ! 8 K2CrO4+ 2 Fe2O3+ 8 CO2.

9. e) The balanced equation is Fe2O3+ 3 C ! 2 Fe + 3 CO.

10. b) The mass ratio for the reaction is 84.01 g/mol÷188.18 g/mol = 0.4464; 0.4464 x 8.0 g = 3.6 g.

11. a) 16 g of methane is one mole. As per the balanced chemical equation, one mole of methane

produces two moles of water: 18 g x 2 = 36 g.

12. e) The limiting reactant in each mixture limits the amount of product (NH3) to 2 moles.

13. b) 2 H2+ O2 !2 H2O. The mass ratio of hydrogen to oxygen is 4:32, or 1:8.

14. b) The methanol is the limiting reactant.

15. c) The reaction requires 7 moles of oxygen per 2 moles of ethane. The molar mass of ethane is

30 g/mol and the molar mass of oxygen is 32 g/mol.