Q1. A block of iron has a mass of 826 g. What is the mass of a block of magnesium that has the same volume as the block of iron? Given the following densities at 25°C:

magnesium: 1.7 g/cm^3 iron: 7.9 g/cm^3

A) 1.7 x 10^2 g.
B) 2.7 x 10^3 g
C) 3.8 x10^3 g
D) 8.3 x 10^2 g
E) 1.8 x10^4 g

Sec# 1-2
Grade# 70

Q2. The amount of mercury in a polluted lake is 0.4 μg Hg/mL. If the lake has a volume of 6.0 x 10^{10} ft^3, what is the total mass in kilograms of mercury in the lake? (1 inch = 2.54 cm; 1ft = 12 inch)

A) 7 x 10^5 kg
B) 3 x 10^5 kg
C) 2 x 10^5 kg
D) 1 x 10^5 kg
E) 6 x 10^5 kg

Sec# 1-4
Grade# 60

Q3. The element silver (Ag) has two naturally occurring isotopes: ^{109}Ag and ^{107}Ag. Silver consists of 51.82% ^{107}Ag that has a mass of 106.905 amu. The mass of ^{109}Ag is:

A) 108.9 amu
B) 105.7 amu
C) 109.4 amu
D) 107.4 amu
E) 110.0 amu

Sec# 3-2
Grade# 75

Q4. In a specific experiment, a 1.50-g copper sample was heated with excess sulfur to yield 1.76 g copper(I) sulfide according to the following balanced equation:

$$2Cu(s) + S(s) \rightarrow Cu_2S(s)$$

The percent yield in that experiment was:

A) 93.7%
B) 85.2%
C) 50.0%
D) 75.2%
E) 22.3%

Sec# 3-9
Grade# 60

Q5. What is the sum of the coefficients for the reactants and products of the following equation when it is balanced using smallest whole number integers?

$$NaNH_2 + NaNO_3 \rightarrow NaN_3 + NaOH + NH_3$$

A) 9
B) 5
C) 6
D) 10
E) 18

Sec# 3-4
Grade# 80

Q6. How many grams of H_2O will be formed when 8.00 g of H_2 is mixed with 32.0 g of O_2 and allowed to react to form water?

A) 36.0 g
B) 288 g
C) 18.0 g
D) 64.0 g
E) 144 g

Sec# 3-6
Grade# 40

Q7. A student added 50.0 mL of an NaOH solution to 100.0 mL of 0.400 M HCl. The solution was then treated with an excess of chromium(III) nitrate, resulting in the formation of 2.06 g of $Cr(OH)_3$ precipitates. Determine the concentration of the original NaOH solution. (Molar Mass of $Cr(OH)_3$ = 103.02 g/mol)

A) 2.00 M NaOH

B) 4.00 M NaOH
C) 0.400 M NaOH
D) 4.55 M NaOH
E) 4.95 M NaOH

Sec# 4-3
Grade# 40

Q8. Which of the following statement is true?

A) Strong electrolytes are substances that are completely ionized when they are dissolved in water.
B) NaCl, KOH, and NH_3 are all strong electrolytes.
C) Non electrolyte solutions can conduct electric current.
D) Ionic solids dissolve in water because water is a nonpolar solvent.
E) HCl, HNO_3, and CH_3COOH (acetic acid) are all strong acid.

Sec# 4-2
Grade# 80

Q9. When the unbalanced equation, $Cl_{2(g)} \rightarrow Cl^-_{(aq)} + ClO_3^-{}_{(aq)}$ is balanced in the acídic medium, the smallest whole number coefficient of H^+ will be

A) 6
B) 3
C) 4
D) 8
E) 12

Sec# 4-6
Grade# 70

Q10. Select the net ionic equation for the reaction between sodium chloride and mercury(I) nitrate.
$2NaCl(aq) + Hg_2(NO_3)_2(aq) \rightarrow 2NaNO_3(aq) + Hg_2Cl_2(s)$

A) $Hg_2^{2+}(aq) + 2Cl^-(aq) \rightarrow Hg_2Cl_2(s)$
B) $Na^+(aq) + NO_3^-(aq) \rightarrow NaNO_3(aq)$
C) $NaCl(aq) \rightarrow Na^+(aq) + Cl^-(aq)$
D) $Hg_2(NO_3)_2(aq) \rightarrow Hg_2^{2+}(aq) + 2NO_3^-(aq)$
E) $Hg_2^{2+}(aq) \rightarrow Hg_2(s)$

Sec# 4-5
Grade# 70

Q11. Which of the following two reagents will be completely ionized when dissolved in water to give a **net ionic** equation of $2H^+(aq) + CO_3^{2-}(aq) \rightarrow H_2O(l) + CO_2(g)$.

A) Na_2CO_3 and HCl
B) $BaCO_3$ and H_2SO_4
C) H_2CO_3 and NaOH
D) $NiCO_3$ and KOH
E) $CaCO_3$ and HCl

Sec# 4-9
Grade# 60

Q12. When J. J. Thomson discovered the electron, what physical property of the electron did he measure?

A) its charge-to-mass ratio, e/m
B) its charge, e
C) its temperature, T
D) its mass, m
E) its atomic number, Z

Sec# 2-1

Grade# 75

Q13. A sample of a compound X is found to contain 2.5 grams of oxygen, 5.0 grams of carbon, and 10. grams of nitrogen. The law of definite proportion would predict that a 35 gram sample of compound X should contain how many grams of oxygen?

A) 5.0 grams

B) 20. grams

C) 10. grams

D) 15. grams

E) 3.5 grams

Sec# 2-2

Grade# 7

Q14. Which one of the following elements is chemically similar to oxygen?

A) sulfur

B) fluorine

C) silicon

D) nitrogen

E) potassium

Sec# 2-7
Grade# 75

Q15. The correct name for Co_2S_3 is:

A) cobalt(III) sulfide
B) dicobalt trisulfide
C) cobalt(VI) sulfide
D) cobalt trisulfide
E) cobalt(II) sulfide

Sec# 2-8
Grade# 75

Q16. The degree of agreement among several measurements of the same quantity is called_____. It reflects the reproducibility of a given type of measurement.

A) precision
B) error
C) significance
D) certainty
E) accuracy

Sec# 1-2
Grade# 60

Q17. A volatile liquid produced 0.5090 grams of vapor in a 129.4-mL flask at 371 K and 746 torr. The volatile compound would be,

A) $CHCl_3$
B) CH_2Cl_2
C) C_2H_4Cl
D) CH_3I
E) CCl_4

Sec# 5-4
Grade# 75

Q18. The average kinetic energy of a gas molecule is

A) directly proportional to the average of the square of its velocity.
B) directly proportional to the square of its mass.
C) directly proportional to its average speed.
D) inversely proportional to the absolute temperature.
E) inversely proportional to the square of its mass.

Sec# 5-6
Grade# 75

Q19. An inert gas is filled in two separate flasks A and B. In Flask A, it has a volume of 4.0 liters and a pressure of 1.0 atm. In Flask B, it has a volume of 1.0 liter and a pressure of 4.0 atm. If the gases in the two flasks are allowed to mix, what will be the final pressure of the gas in the flasks?

A) 1.6 atm
B) 1.0 atm
C) 2.0 atm
D) 4.0 atm
E) 2.2 atm

Sec# 5-5
Grade# 75

Q20. Oxygen is produced by the reaction: $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$ and collected over water. A sample of $KClO_3$ produced 705 mL of $O_2(g)$ saturated with water vapor at 20°C, where the vapor pressure of water is 17.54 mmHg. The total gas pressure was 1.104 atm. What mass of $KClO_3$ decomposed?

A) 2.59 g

B) 3.89 g

C) 5.95 g

D) 5.83 g

E) 5.25 g

Sec# 5-5
Grade# 75