

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) $1.7 \times 10^2 \text{ g}$.
- B) $2.7 \times 10^3 \text{ g}$
- C) $3.8 \times 10^3 \text{ g}$
- D) $8.3 \times 10^2 \text{ g}$
- E) $1.8 \times 10^4 \text{ g}$

Sec# 1-2

Grade# 70

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

- A) $7 \times 10^5 \text{ kg}$
- B) $3 \times 10^5 \text{ kg}$
- C) $2 \times 10^5 \text{ kg}$
- D) $1 \times 10^5 \text{ kg}$
- E) $6 \times 10^5 \text{ kg}$

Sec# 1-4

Grade# 60

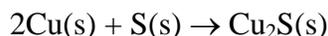
Q3. The element silver (Ag) has two naturally occurring isotopes: ^{109}Ag and ^{107}Ag . Silver consists of 51.82% ^{107}Ag that has a mass of 106.905 amu. The mass of ^{109}Ag is:

- 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:



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?



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

Sec# 3-4

Grade# 80

Q6. How many grams of H₂O will be formed when 8.00 g of H₂ is mixed with 32.0 g of O₂ 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 NH₃ 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, HNO₃, and CH₃COOH (acetic acid) are all strong acid.

Sec# 4-2

Grade# 80

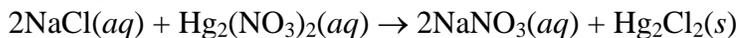
Q9. When the unbalanced equation, $\text{Cl}_{2(g)} \rightarrow \text{Cl}^{-}_{(aq)} + \text{ClO}_{3}^{-}_{(aq)}$ is balanced in the acidic medium, the smallest whole number coefficient of H⁺ will be

- 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.



- A) $\text{Hg}_2^{2+}(aq) + 2\text{Cl}^{-}(aq) \rightarrow \text{Hg}_2\text{Cl}_2(s)$
- B) $\text{Na}^{+}(aq) + \text{NO}_3^{-}(aq) \rightarrow \text{NaNO}_3(aq)$
- C) $\text{NaCl}(aq) \rightarrow \text{Na}^{+}(aq) + \text{Cl}^{-}(aq)$
- D) $\text{Hg}_2(\text{NO}_3)_2(aq) \rightarrow \text{Hg}_2^{2+}(aq) + 2\text{NO}_3^{-}(aq)$
- E) $\text{Hg}_2^{2+}(aq) \rightarrow \text{Hg}_2(s)$

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 $2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$.

- 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) $\text{C}_2\text{H}_4\text{Cl}$
- 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: $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$ and collected over water. A sample of KClO_3 produced 705 mL of $\text{O}_2(\text{g})$ 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

