1. The coefficients necessary to balance the equation correctly are –

A) a = 2, b = 1, c = 1, d = 2
B) a = 1, b = 2, c = 1, d = 2
C) a = 1, b = 1, c = 1, d= 1
D) a = 2, b = 2, c = 1, d = 1

$$a\,Mg(OH)_2 + b\,HCl \rightarrow c\,MgCl_2 + d\,H_2O$$

2. Iodine-131 is a radioactive isotope with a half-life of 8 days. How many grams of a 64 g sample of iodine-131 will remain at the end of 24 days?

A) 56 g
B) 48 g
C) 32 g
D) 8 g

24/8 = 3 Half Lives

64 g ① → 32 g ② → 16 g ③ → 8 g

3. The reaction for the decomposition of ammonia (NH_3) can be written as shown. If a student starts with 21.7 g of NH_3 how many grams of hydrogen (H_2) gas will be produced by the reaction?

A 1.28 g
B 2.55 g
C 3.85 g
D 32.5 g

$$2NH_3(g) \rightarrow N_2(g) + 3H_2(g)$$

$$21.7\,g\,NH_3 \left|\frac{1\,mol\,NH_3}{17.04\,g}\right|\frac{3\,mol\,H_2}{2\,mol\,NH_3}\left|\frac{2.02\,g\,H_2}{1\,mol\,H_2}\right| = 3.86\,g$$

4. What is the volume occupied by 51.0 g of ammonia (NH_3) gas at STP?

F 0.439 L
G 22.8 L
H 67.2 L
J 91.9 L

$$51.0\,g\,NH_3 \left|\frac{1\,mol\,NH_3}{17.04\,g}\right|\frac{22.4\,L}{1\,mol\,NH_3} = 67.0\,L$$

5. When 80 g of sodium hydroxide, NaOH, are dissolved in enough water to make 500 mL of solution, the molarity of the solution is —

A 1 M
B 2 M
C 4 M
D 8 M

$$M = \frac{mol}{L} = \frac{2\,mol}{.5\,L} = 4M$$

$$80\,g\,NaOH \left|\frac{1\,mol\,NaOH}{40\,g}\right. = 2\,mol\,NaOH$$

6. If the pH of a solution is 4, what is the pOH?

F 0
G 6
H 7
J 10

pH + pOH = 14

7. What is the empirical formula of the compound with the molecular formula C_6H_{12}?

A CH
B CH_2
C CH_4
D C_2H_6

8. Which of these is most likely to form between elements transferring electrons to form oppositely charged particles?

F A metallic bond
G A hydrogen bond
H A covalent bond
J An ionic bond

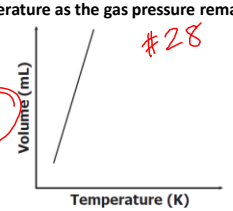
9. The table shows the specific heat capacity of four substances. For an equal mass of each substance, which one will require the *least* amount of heat to raise its temperature from 20°C to 30°C?

A) Aluminum
B) Glass
C) Carbon dioxide
D) Water

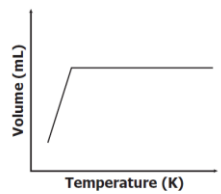
Substance	Heat Capacity $\frac{J}{g \bullet °C}$
Aluminum	0.900
Glass	0.50
Carbon dioxide	0.843
Water	4.18

10. Which graph best shows the relationship between the volume of a gas and its temperature as the gas pressure remains constant?

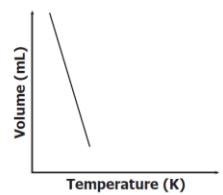
F



H



G



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