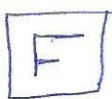




1. What is the mass (in grams) of 1.1×10^{22} atom of gold (Au)?
☐ A) 2.2 B) 2.8 C) 3.6 D) 3.9
2. How many hydrogen atoms are in 5.37 g of $(\text{NH}_4)_3\text{PO}_4$?
☐ A) 1.8×10^{23} B) 1.8×10^{24}
C) 2.2×10^{23} D) 2.6×10^{23}
3. How many moles are in 1.0 kg of pure table sugar $\text{C}_{12}\text{H}_{22}\text{O}_{11}$?
☐ A) 2.92 B) 3.32 C) 3.64 D) 4.16
4. The percentage by mass of nitrogen in $\text{Bi}(\text{NO}_3)_3$ is:
☐ A) 7.36% B) 10.64% C) 8.54% D) 9.75%
5. The combustion of 1.031 g of an organic compound that contains only carbon, hydrogen and oxygen produced 2.265 g of CO_2 and 1.236 g of H_2O . What is the empirical formula of this compound?
☐ A) $\text{C}_2\text{H}_6\text{O}$ B) $\text{C}_3\text{H}_5\text{O}$ C) $\text{C}_3\text{H}_8\text{O}$ D) CH_2O
6. An element "X" combines with oxygen to form a compound with formula XO_2 . If 6.7 g of this element combines with 3.9 g of oxygen, what is the atomic mass of this element (in a.m.u.)?
☐ A) 55 B) 40 C) 65 D) 48
7. What is the theoretically yield (in grams) of copper Cu when 18.1 g of NH_3 gas and 90.4 g solid CuO were allowed to react according to:
$$2\text{NH}_3(\text{g}) + 3\text{CuO}(\text{s}) \rightarrow 3\text{Cu}(\text{s}) + \text{N}_2(\text{g}) + 3\text{H}_2\text{O}(\text{g})$$

☐ A) 48.7 B) 63.6 C) 68.5 D) 72.2
8. What is the percentage yield of lead (Pb) if 50.00 kg of PbO are reduced by heating with excess carbon and 40.75 kg of lead are produced according to:
$$\text{PbO}(\text{s}) + \text{C}(\text{s}) \rightarrow \text{Pb}(\text{l}) + \text{CO}(\text{g})$$

☐ A) 75.88% B) 87.79% C) 90.32% D) 94.65%
9. How many milliliter of water must be added to a stock solution of 6.0M HNO_3 in order to prepare 900 mL of 0.5 M HNO_3 by dilution?
☐ A) 825 B) 850 C) 780 D) 800
10. What is the percent H_2SO_4 by mass in a 6.0 M H_2SO_4 solution that has a density of 1.34 g/mL?
☐ A) 27.83% B) 32.74% C) 43.92% D) 78.25%



11. A sample of Cl_2 gas occupies a volume of 5.0 L at 25°C and 15.0 atm. What volume (in L) will this sample occupy at STP?

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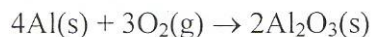
A) 68.7 B) 52.8 C) 40.6 D) 28.4

12. A tennis ball has an internal volume of 145 mL and contains 0.366 g of N_2 gas. What will be the pressure (in atm) inside the ball at 25°C ?

☐

A) 1.8 B) 2.0 C) 2.2 D) 2.4

13. What volume of oxygen gas at STP would be needed to react completely with 20.1 g of aluminum (Al) according to:

☐

A) 10.8 L B) 12.5 L C) 14.3 L D) 15.5 L

14. What is the molar mass (in $\text{g}\cdot\text{mol}^{-1}$) of a certain gas if its density is 1.57 g/L at 25°C and 1.2 atm?

☐

A) 71 B) 44 C) 32 D) 28

15. What is the root-mean-square speed of a neon Ne atom (in m/s) at 27°C ?

☐

A) 450 B) 498 C) 585 D) 609