Unit 2: Review Problems

1- What mass will a sample of ammonium carbonate have if it contains 8.50×10^{27} atoms?

2- What is the volume occupied by 125 g of butane gas (C_4H_{10}) at RTP?

3- Determine the density of silane gas (SiH_4) at RTP.

4- Find the molar mass for an unknown compound if 4.75×10^{25} molecules of the compound have a mass of 3.63×10^3 g.

5- 500. atoms of Niobium have a volume of 9.00×10^{-21} mL. Determine the density of Niobium.

6- An object is weighed in an unknown gaseous element at RTP. It's true mass is 55.50 g. If it's mass in the unknown gas is 55.24 g and it displaces 75.0 mL of the gas, find the identity of the unknown gas.

7- A sphere holds 68.2 g of hydrogen sulphide gas. Under identical conditions, it holds 76.0 g of an unknown gaseous element. Identify the unknown element.

8- A steel canister holds 7.50×10^{24} atoms of helium gas. What mass of carbon dioxide gas would it hold under the same conditions?

9- What mass of potassium manganite would contain 225 g of potassium?

10- What volume of carbon disulfide gas at RTP would contain 5.50×10^{26} atoms?

11- The radius of a silicon atom is 1.69×10^{-8} cm. Ignoring interstitial space, find the density of silicon.

12- 25.0 g of an unknown gaseous element occupy 15.3 L at RTP. There are 3.77×10^{23} atoms of the gas in that volume. Identify the gaseous element.

ANSWERS

1- Mass of ammonium carbonate = 9.68×10^4 g

2- Volume of C_4H_{10} = 52.7 L

3- ρ_{SiH_4} = 1.31 g/L

4- Molar mass = 46.0 gmole$_{-1}$

5- ρ_{Nb} = 8.57 g/mL

6- The unknown gas is krypton.

7- The unknown element is fluorine.

8- Mass of carbon dioxide gas = 550. g

9- Mass of $KMnO_2$ = 725 g

10- Volume of CS_2 = 7.46×10^3 L

11- ρ_{Si} = 2.31 g/mL

12- The element is Ar.