Molar Volume of Gases Worksheet

Answer the following questions.

1. Determine the volume of 0.545 mol of CH_4 at STP.

2. How many moles are contained in 46.7 liters of Ne at STP?

3. Calculate the number of molecules in 17 liters of O_2 gas at STP.

4. How much does 11.5 liters of Cl_2 gas weigh at STP?

5. Find the volume of 56 grams of O_2 at STP.

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Answers

1. Determine the volume of 0.545 mol of CH_4 at STP.

   At STP, 1 mole represents 22.4 liters

   Volume of 0.545 mol of CH_4 at STP = 0.545 x 22.4 liters = 12.2 liters

2. How many moles are contained in 46.7 liters of Ne at STP?

   At STP, 1 mole represents 22.4 liters

   Number of moles = (46.7/22.4) moles = 2.08 moles

3. Calculate the number of molecules in 17 liters of O_2 gas at STP.

   At STP, 1 mole represents 22.4 liters

   1 mole represents of 6.023×10^{23} molecules

   Number of molecules = (17/22.4) x 6.023×10^{23} molecules = 4.57×10^{23} molecules

4. How much does 11.5 liters of Cl_2 gas weigh at STP?

   At STP, 1 mole represents 22.4 liters

   Molar mass of Cl_2 gas = 70.906 g/mol

   The weight of 11.5 liters of Cl_2 gas at STP = (11.5/22.4) x 70.906 grams = 36.4 grams

5. Find the volume of 56 grams of O_2 at STP.

   At STP, 1 mole represents 22.4 liters

   Molar mass of O_2 gas = 31.999 g/mol

   The volume of 56 grams of O_2 at STP = (56/31.999) x 22.4 liters = 39.2 liters