**Answer on Question #59406 – Chemistry - General Chemistry**

**Task (1): What is the mass of 0.452 moles of methane, $CH_4$?**

**Solution (1):**

The formula mass methane is the sum of the atomic masses for each atom in the compound.

Then,

$$1(C)+4(H)=1\times12+4\times1=16\frac{g}{mole}CH_4.$$

One mole of methane ($CH_4$) has a mass of 16.0 g.

Let us find the mass that is 0.452 moles of methane:

$$0.452mole\times\left[\frac{16.0g\,CH_4}{1mole\,CH_4}\right]=7.232g\,CH_4.$$

$$m(CH_4)=7.232g$$

**Answer (1):** $m(CH_4)$ = 7.232g are in 0.452 moles of methane ($CH_4$).

**Task (2): What is the mass of 1.55 moles of $N_2O$?**

**Solution (2):**

The formula mass $N_2O$ is the sum of the atomic masses for each atom in the compound.

Then,

$$2(N)+(O)=2\times14+1\times16=44\frac{g}{mole}N_2O.$$

One mole of $N_2O$ has a mass of 44.0 g.

Let us find the mass that is 1.55 moles of $N_2O$:

$$1.55 mole \times \left[ \frac{44.0 g\ N_2O}{1 mole\ N_2O} \right] = 68.2 g\ N_2O.$$

$$m(N_2O) = 68.2 g$$

**Answer (2):** m($N_2O$) = 68.2g are in 1.55 moles of $N_2O$.

**Task (3): What is the mass of 3.28 moles of dinitrogen tetroxide?**

**Solution (3):**

The formula mass dinitrogen tetroxide ($N_2O_4$) is the sum of the atomic masses for each atom in the compound.

Then,

$$2(N) + 4(O) = 2 \times 14 + 4 \times 16 = 92 \frac{g}{mole} N_2O_4.$$

One mole of N2O4 has a mass of 92.0 g.

Let us find the mass that is 3.28 moles of $N_2O_4$:

$$3.28 mole \times \left[ \frac{92.0 g\ N_2O_4}{1 mole\ N_2O_4} \right] = 301.76 g\ N_2O_4.$$

$$m(N_2O_4) = 301.76 g$$

**Answer (3):** m($N_2O_4$)=301.76g are in 3.28 moles of dinitrogen tetroxide ($N_2O_4$).

### Task (4): What is the mass of 1.95 moles of potassium phosphate?

### Solution (4):

The formula mass potassium phosphate ($K_3PO_4$) is the sum of the atomic masses for each atom in the compound.

Then,

$$3(K)+1(P)+4(O)=3\times39+1\times31+4\times16=212\frac{g}{mole}K_3PO_4.$$

One mole of $K_3PO_4$ has a mass of 212.0 g.

Let us find the mass that is 1.95 moles of K3PO4:

$$1.95mole\times\left[\frac{212.0g\ K_3PO_4}{1mole\ K_3PO_4}\right]=413.4g\ K_3PO_4.$$

$$m(K_3PO_4)=413.4g$$

**Answer (4):** $m(K_3PO_4)$ = 413.4g are in 1.95 moles of potassium phosphate ($K_3PO_4$).

### Task (5): What is the mass of 10.5 moles of hydrogen, $H_2$?

### Solution (5):

The formula mass hydrogen ($H_2$) is the sum of the atomic masses for each atom in the compound.

Then,

$$2(H)=2\times1=2\frac{g}{mole}H_2.$$

One mole of $H_2$ has a mass of 2 g.

Let us find the mass that is 10.5 moles of $H_2$:

$$10.5 mole \times \left[ \frac{2.0 g\, H_2}{1 mole\, H_2} \right] = 21.0 g\, H_2.$$

$$m(H_2) = 21.0 g$$

**Answer (4):** $m(H_2)$ = 21.0g are in 1.05 moles of hydrogen (H2).