Answers Percent Composition and Empirical Formula

1. a) 1 mole $KClO_3$ = (39.1 g K) + (35.4 g Cl) + (3 x 16.0 = 48.0 g O) = 122.5 g

   % K = 39.1/122.5 = **31.9% K**;

   % Cl = 35.4/122.5 = **28.9 % Cl**;

   % O = 48.0/122.5 = **39.2% O**

   b) calcium hydroxide = $Ca(OH)_2$

1 mole $Ca(OH)_2$ = (40.08 g Ca) + (2 x 16.0 = 32.0 g O) + (2 x 1.008 = 2.02 g H) = 74.1 g

   % Ca = 40.08/74.1 = **54.1% Ca**;

   % O = 32.0/74.1 = **43.2% O**;

   % H = 2.02/74.1 = **2.73% H**

2.   a) In 100 g of the compound:

      41.3 g C x (1 mol C/12.0 g C)   =   3.44 mol C

      10.4 g H x (1 mol H/1.01 g H)   =   10.4 mol H

      48.2 g N x (1 mol N/14.0 g N)   =   3.44 mol N

   Ratio: C: 3.44/3.44 = 1; H: 10.4/3.44 = 3; N: 3.44/3.44 = 1; CH_3N

   b) In 100 g of the compound:

      1.92 g x (1 mol Mn/54.9 g) = 0.350 mol Mn

      1.12 g x (1 mol O/16.0 g)   =   0.700 mol O

   Ratio: Mn: 0.0350/0.0350 = 1; O: 0.0700/0.0350 = 2; MnO_2

c) In 100 g of the compound:

6.51 g Cu x (1 mol Cu/63.5 g C) = 1.03 mol Cu

32.8 g O x (1 mol O/16.0 g O) = 2.05 mol O

2.1 g H x (1 mol H/1.0 g H) = 2.1 mol H

Ratio: Cu: 1.03/1.03 = 1; O: 2.05/1.03 = 2; N: 2.1/1.03 = 2;

$Cu(OH)_2$ (it contains copper, so it's ionic) name = copper(II) hydroxide

d) In 100 g of the compound:

1.56 g C x (1 mol C/12.0 g C) = 0.130 mol C

0.333 g H x (1 mol H/1.01 g H) = 0.333 mol H

2.08 g O x (1 mol O/16.0 g O) = 0.130 mol O

0.910 g N x (1 mol N/14.0 g N) = 0.0650 mol N

Ratio: C: 0.130 /0.0650 = 2; H: 0.333/0.0650 = 5; O: 0.130 /0.0650 = 2;

N: 0.0650 /0.0650 = 1; $C_2H_5O_2N$