a 0.8870 g sample containing only NaCl and KCL was treated with AgNO3. the AgCl formed had a mass of 1.913 g. Calculate the %Na and %K in the sample.

Solution:
Let's take m(NaCl) = x and m(KCl) = y
The resulting chemical reactions:

$$\underset{58.44g}{\overset{x}{NaCl}} + AgNO_3 = \underset{143.32g}{\overset{m1}{AgCl}} + NaNO_3 \qquad m1 = 143.32x / 58.44 = 2.45x(g)$$

$$\underset{74.55g}{\overset{y}{KCl}} + AgNO_3 = \underset{143.32g}{\overset{m2}{AgCl}} + KNO_3 \qquad m2 = 143.32y / 74.55 = 1.92y(g)$$

m1 + m2 = 1.913 g (according to the condition of the problem)

2.45x + 1.92y = 1.913

m(NaCl) + m(KCl) = 0.8870 g (according to the condition of the problem)

x + y = 0.8870

We get the system of equations:

2.45x + 1.92y = 1.913
x + y = 0.8870

Let's solve it:

2.45(0.8870 – y) + 1.92y = 1.913
2.173 – 0.53y = 1.913
y = 0.49
x = 0.887 – 0.49 = 0.397

Let's calculate the %Na and %K in the sample:

%Na = (0.397 / 0.8870) * 100% = 44.76%
%K = (0.49 / 0.8870) * 100% = 55.24%

Answer: %Na = 44.76% ; %K = 55.24%