Exercises

**Siginificant Figures Exercise**

1. What is the correct number of significant figures in the following measurements?

a. 2.0004 cm

5---- inclusive zeroes are significant

b. 300. cm(there is a deliberate point after the last zero)

3---When there's a decimal trailing zeros are significant.

c. 300 m

1---No decimal, so trailing zeros are NOT significant.This can written as $3 \times 10^2$

d. There are about 6 billion people on earth.

1

e. 1.9900 ml

5

f. $2.00 \times 10^4$ kg

3 (the exponent is not a significant number)

g. 0.00403 g

3---this number can be written as $4.03 \times 10^{-3}$

2. The mass of an empty can is 61 $\pm 1$ grams. Then 30 $\pm 1$ grams of water are added to the can. What is the lowest possible total mass for the can and water? The highest?

It can be anywhere from 89 to 93 g, so the sum is $91 \pm 2$ g . **If you were subtracting, the uncertainties would also be additive.**

3. A student observed that the temperature of 100.0 ml of water with a known density of 1.0 g/ml increased from 10.5 $^oC$ to 22.8 $^oC$. Express the amount of heat absorbed by the water in kJ with the correct number of significant figures. Use $c$ = 4.19 J/(g$^o$C).

**$5.15 \times 10^3$ J = 5.15 kJ**

4. A gas sample contains 1000.233 moles of He and 0.35 moles of $H_2$. What is the total number of moles of gas in the sample, expressed with the correct number of sig- figs?

1000.58 g. Here we are only adding. See rule 4 in the stencil.

5. $H_2$ with a molar mass of 2(1.00797) g/mole consumes 8.0 grams of sodium, according to the following reaction:

$$2\ Na_{(s)} + H_{2(g)} \rightarrow 2\ NaH_{(s)}$$

How many grams of sodium hydride, NaH will be produced? Express with the correct number of significant figures.

8.0g/23.0 g/mole = 8/23 moles of Na

Ratio is 2: 2 or 1: 1 so we get 8/23 moles of NaH.

(8/23) * 24.01 g/mole = 8.4 g of NaH ( 2SF due to NaH)

6. In a lab, measurements for the height of a tube ranged from 5.5 cm to 6.8 cm. The least accurate concentrations of the solutions used was 0.0010 M. Assuming that the value for K( an equilibrium constant) should have been expressed with just as many significant figures as in the above numbers, how should Peter have expressed the average of the following 4 values for K?

96.37754
87.05914
126.1661
230.3015

The average of those experimentally derived numbers is 134.9761, but it's derived from measurements with only 2 SF, so the answer is K =1.3 $X10^2$