

**PHYS 1140, Fall 2013**  
**Homework 1**

Due Wednesday Sept. 18, 4pm  
Duane G2B66

1) For each of the following quantities, determine how many significant figures are given. Or, if the situation is ambiguous, write “ambiguous”.

- a) 0.003120 m/s
- b) 400 kg m/s<sup>2</sup>
- c) 6.700 x 10<sup>4</sup> C
- d) 9.000001 V
- e) 432 kg m/s<sup>2</sup>

2) Write each of the following quantities and their uncertainties in “standard format”. (See lecture notes.)

Example 1: for  $5.7203 \times 10^{12} \pm 3.81 \times 10^{10}$  m, write  $(5.72 \pm 0.04) \times 10^{12}$  m.

Example 2: for  $5.6319 \text{ V} \pm 0.0137 \text{ V}$ , write  $5.632 \pm 0.014 \text{ V}$ . (The “uncertainty starts with a one” exception.)

- a)  $(27.30 \pm 1.48) \text{ cm}^2$
- b)  $4916.01 \text{ g} \pm 0.0763 \text{ kg}$
- c)  $(-0.00312 \pm 0.005) \text{ V}$
- d)  $2.81415 \times 10^{-7} \text{ s} \pm 3.2 \times 10^{-10} \text{ s}$
- e)  $5000 \text{ Hz} \pm 300 \text{ Hz}$
- f)  $6.700 \mu\text{F} \pm 200 \times 10^{-3} \mu\text{F}$

3) Assume the errors in  $\delta x$  and  $\delta y$  are uncorrelated. Express  $w$  and  $\delta w$  in standard format.

- a)  $x = 13.1 \pm 0.8 \text{ m}$   
 $y = 12.0 \pm 0.8 \text{ m}$   
 $w = x + y$
- b)  $x = (3.0 \pm 0.2) \times 10^{-4} \text{ kgm/s}$   
 $y = (1.5 \pm 0.6) \times 10^{-6} \text{ kgm/s}$   
 $w = x + y$
- c)  $x = (20.73 \pm 0.04) \text{ kg}$   
 $y = (40.196 \pm 0.008) \text{ kg}$   
 $w = x - y$