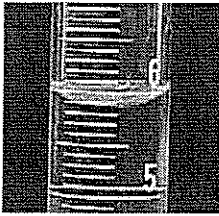


(21)

1. (2 pt) Write the value of the measurement shown in each of these photos. Include the correct number of significant figures and the uncertainty (the  $\pm$ ).



mL

5.89  $\pm$  0.01



2.30  $\pm$  0.01

2. (2 pt) State the quantity (e.g. volume, mass, time, etc.) expressed by each of the following :

11.2 g mass

0.001 s time

99.99 mL volume

55.55  $^{\circ}$ C temp

3. (2 pt) How many significant digits are there in each of the following measurements

35 s 2

20.5 cm<sup>3</sup> 3

500 cm 1

0.015 g 2

4. (1 pt) Indicate which of the following statements is true and which false.

F When writing data in your notebook taken from laboratory equipment, the numerical value is rounded off.

T After doing a calculation using experimental values the answer is rounded off.

5. (1.5 pt) Classify each of the following as an exact (E) or inexact (I) number.

a) I 25 pounds of sugar b) E 12 dozen apples c) E \$24.54

6. (1.5 pt) Round off the number 50,125.09 g to the following significant figures (sig figs). Use scientific notation if needed:

2 sig figs  $5.0 \times 10^3$  4 sig figs 50,130 6 sig figs 50,125.1

7. (1 pt) Convert the following into scientific notation or into decimal notation showing the correct number of significant figures.

34,000,000  $3.4 \times 10^6$  0.00000000030  $3.0 \times 10^{-10}$

8. (2 pt) Carry out the following calculations and round the answers to the correct number of significant figures.

12.1 + 23.1 + 127.01 = 162.2

$2.322 \times 4.00 =$  \_\_\_\_\_  
 $3.200 \times 6.7 =$  \_\_\_\_\_

$(5.405 \times 10^6) + (3.09 \times 10^5) =$  \_\_\_\_\_

$\frac{4.11 \times 10^{-3}}{(3.003 \times 10^{-6}) \times (9.8760 \times 10^{-5})} =$  \_\_\_\_\_

12.1  
 23.1  
 127.01  
 -----  
 162.21

9. (9 pt) The fastest swimming event is the 50 m freestyle. The world record is held by Australian Eamon Sullivan with a time of 21.28 sec. Calculate how fast Eamon is swimming in miles per hour.

$$\frac{50 \text{ m}}{21.28 \text{ s}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{0.62137 \text{ mi}}{1 \text{ km}} \times \frac{60 \text{ s}}{1 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ hr}} =$$

$$\frac{50 \times 0.62137 \times 60 \times 60}{21.28 \times 1000} \frac{\text{mi}}{\text{hr}} =$$

round to 1 sig. fig.

USEFUL CONVERSION FACTORS AND RELATIONSHIPS	
<b>Length</b>	<b>Energy (derived)</b>
<i>SI unit: meter (m)</i>	<i>SI unit: joule (J)</i>
1 km = 0.62137 mi	1 J = 1 kg·m <sup>2</sup> /s <sup>2</sup>
1 mi = 5280 ft	1 J = 0.2390 cal
= 1.6093 km	= 1 C × 1 V
1 m = 1.0936 yd	1 cal = 4.184 J
1 in. = 2.54 cm (exactly)	1 eV = 1.602 × 10 <sup>-19</sup> J
1 cm = 0.39370 in.	
1 Å = 10 <sup>-10</sup> m	<b>Pressure (derived)</b>
	<i>SI unit: Pascal (Pa)</i>
<b>Mass</b>	1 Pa = 1 N/m <sup>2</sup>
<i>SI unit: kilogram (kg)</i>	= 1 kg/m·s <sup>2</sup>
1 kg = 2.2046 lb	1 atm = 101,325 Pa
1 lb = 453.59 g	= 760 torr
= 16 oz	= 14.70 lb/in <sup>2</sup>
1 amu = 1.6605402 × 10 <sup>-24</sup> g	1 bar = 10 <sup>5</sup> Pa
<b>Temperature</b>	<b>Volume (derived)</b>
<i>SI unit: Kelvin (K)</i>	<i>SI unit: cubic meter (m<sup>3</sup>)</i>
0 K = -273.15°C	1 L = 10 <sup>-3</sup> m <sup>3</sup>
= -459.67°F	= 1 dm <sup>3</sup>
K = °C + 273.15	= 10 <sup>3</sup> cm <sup>3</sup>
°C = $\frac{5}{9}$ (°F - 32°)	= 1.0567 qt
°F = $\frac{9}{5}$ °C + 32°	1 gal = 4 qt
	= 3.7854 L
	1 cm <sup>3</sup> = 1 mL
	1 in <sup>3</sup> = 16.4 cm <sup>3</sup>