Name KEY Period A, C, G Date 10/10

USING MEASUREMENTS TO IDENTIFY MATTER – QUIZ REVIEW

PART A – ACCURACY, PRECISION, & PERCENT ERROR

1. Each of five students used the same ruler to measure the length of the same pencil. These data resulted: 15.33 cm, 15.34 cm, 15.33 cm, 15.33 cm, & 15.34 cm. The actual length of the pencil was 15.85 cm. Describe whether accuracy and precision are each good or poor for these measurements. Calculate the average, range, plus/minus amount, and the percent error for the set of measurements and then the percent error using the average length and the actual length of the pencil. ACCURACY → YES

PRECISION

Average: 15.33 cm
Range: 0.01 cm
+/- : ±0.005 cm
%E = (± amount ÷ average) × 100

%E = 0.03%
Very Precise

$$\%\text{ERROR} = \frac{15.85 - 15.33}{15.85} \times 100 = 3.3\%$$

$$\%E = \left|\frac{\text{Actual} - \text{Experiment}}{\text{Actual}}\right| \times 100$$

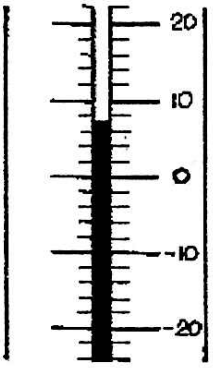
2. A chemistry student measured the boiling point of naphthalene ($C_{10}H_8$) at 231.0°C. What is the percent error for this measurement if the literature value is 217.9°C?

Accuracy → $\%E = \frac{217.9 - 231.0}{217.9} \times 100 = 6.0\%$ Not very accurate

PART B – SIGNIFICANT FIGURES

3. 7°C

► Using the thermometer on the right, record the temperature in degrees Celsius. Show the correct number of significant figures.



Determine the number of significant figures in each of the following:

4. 3.57 m — 3
5. 20.040 g — 5
6. 0.004 m^3 — 1
7. 730 000 kg — 2

Perform the following calculations and express your answers in the correct units and number of significant figures.

8. (5.14 cm)(6.742 cm) = 34.7 cm^2

9. $\frac{2.8\text{ g}}{6.86\times10^{-3}\text{ L}}$ = 410 g/L

10.
45.68 g
+ 3.2 g
48.88 g
48.9 g

11.
1,423 mL
- 40 mL
1383 mL
1380 mL

PART C – SCIENTIFIC NOTATION

Convert the following numbers into or out of scientific notation. Remember to keep the same number of significant figures.

12. 0.00003 cm — 3×10^{-5} cm
13. 8,600,000 g — 8.6×10^{6} g
14. 1.05×10^5 mm — 105,000 mm
15. 1.00×10^{-3} m — 0.00100 m