

This print-out should have 14 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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**Postlab 1 Q1 09F**

**001** (part 1 of 4) 1.0 points

Round 0.05080 to 2 significant figures.

Your answer must be within  $\pm 0.0\%$

Correct answer: 0.051.

**Explanation:**

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**002** (part 2 of 4) 1.0 points

Round 192.6667 to 2 significant figures.

Your answer must be within  $\pm 0.0\%$

Correct answer: 190.

**Explanation:**

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**003** (part 3 of 4) 1.0 points

Round 192.6667 to 1 significant figure.

Your answer must be within  $\pm 0.0\%$

Correct answer: 200.

**Explanation:**

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**004** (part 4 of 4) 1.0 points

Round 15555 to 4 significant figures.

Your answer must be within  $\pm 0.0\%$

Correct answer: 15560.

**Explanation:**

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**Postlab 1 Q2 09F**

**005** (part 1 of 4) 1.0 points

Calculate

$$720.0 + 5.4 \times 10^2 - 117 - 0.064$$

and report the result using the correct number of significant digits.

Your answer must be within  $\pm 0.0\%$

Correct answer: 1140.

**Explanation:**

$$720.0 + 5.4 \times 10^2 - 117 - 0.064 = 1142.94$$

Since this is all addition and subtraction, the  $5.4 \times 10^2$  limits your answer to the 10's place.

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**006** (part 2 of 4) 1.0 points

Calculate

$$\frac{0.834 \times 52.48}{0.09 \times 2.51}$$

and report the result using the correct number of significant digits.

Your answer must be within  $\pm 0.0\%$

Correct answer: 200.

**Explanation:**

$$\frac{0.834 \times 52.48}{0.09 \times 2.51} = 193.751$$

This is all multiplication and division, so the 0.09 limits the answer to one significant digit.

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**007** (part 3 of 4) 1.0 points

Calculate

$$374.82 - 15.74 \times 3$$

and report the result using the correct number of significant digits.

Your answer must be within  $\pm 0.0\%$

Correct answer: 330.

**Explanation:**

$$374.82 - 15.74 \times 3 = 327.6$$

The multiplication operation comes out to 47.22, but has only one significant digit, which is in the 10's place. But don't round yet. The subtraction operation then comes out to 327.60, but you have to round to the 10's place, so it's 330.

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**008** (part 4 of 4) 1.0 points

Calculate

$$\frac{2516.32 \times 1.13 \times 10^{-4}}{6.00} + 8.7 \times 10^{-2}$$

$$-684.2 \times 0.0030$$

and report the result using the correct number of significant digits.

Your answer must be within  $\pm 0.0\%$

Correct answer: -1.9.

**Explanation:**

$$\frac{2516.32 \times 1.13 \times 10^{-4}}{6.00} + 8.7 \times 10^{-2}$$

$$-684.2 \times 0.0030 = -1.91821$$

Using order of operations, do the multiplication first and division first.  $684.2 \times 0.0030$  is 2.0526, but only the first two digits are significant because 0.0030 only has two. Then carry out the addition and subtraction, remembering that the 2.0526 is only good to the tenths place. That limits your final answer to the tenths place.

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**Postlab 1 Q3 09F**

**009** (part 1 of 4) 1.0 points

Which of the following is the correct number of significant figures for the average  $\pm$  experimental error for  $4.005216 \pm 0.000210$  g?

1.  $4.005216 \pm 0.0002$  g
2.  $4.0052 \pm 0.000210$  g
3.  $4.005216 \pm 0.000210$  g
4.  $4.0052 \pm 0.0002$  g **correct**

**Explanation:**

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**010** (part 2 of 4) 1.0 points

Which of the following is the correct number of significant figures for the average  $\pm$  experimental error for  $0.0087164 \pm 0.000671$  m?

1.  $0.0087164 \pm 0.0007$  m
2.  $0.0087 \pm 0.0006$  m
3.  $0.0087 \pm 0.000671$  m
4.  $0.0087 \pm 0.0007$  m **correct**

**Explanation:**

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**011** (part 3 of 4) 1.0 points

Which of the following is the correct number of significant figures for the average  $\pm$  experimental error for  $912.8 \pm 110$  kg?

1.  $910 \pm 110$  kg
2.  $900 \pm 100$  kg **correct**
3.  $912.8 \pm 100$  kg

4.  $900 \pm 110$  kg

**Explanation:**

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**012** (part 4 of 4) 1.0 points

Which of the following is the correct number of significant figures for the average  $\pm$  experimental error for  $64.0 \pm 12$  L?

1.  $64 \pm 10$  L
2.  $60 \pm 12$  L
3.  $64 \pm 12$  L
4.  $60 \pm 10$  L **correct**

**Explanation:**

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**Postlab 1 Q4 09F**

**013** 4.0 points

When a handful of gold-colored metal beads are placed into a graduated cylinder containing 11.5 mL of water, the water level rises to 46 mL. The mass of the empty graduated cylinder is 92.42 g. The total mass of the graduated cylinder with the water and the beads is 412.0 g. Calculate the density of the metal that the beads are made from.

Your answer must be within  $\pm 0.0\%$   
Correct answer: 8.9 g/mL.

**Explanation:**

$$m = 412.0 \text{ g} - 92.42 \text{ g} - 11.5 \text{ g} = 308.08 \text{ g}$$

$$\Delta V = 46 \text{ mL} - 11.5 \text{ mL} = 34.5 \text{ mL}$$

Since 46 ends in the 1's place, the calculated volume is only good to the 1's place, and has two significant digits. Don't round yet, but remember this when you get to the end.

$$d = \frac{m}{\Delta V} = \frac{308.08 \text{ g}}{34.5 \text{ mL}} = 8.92986 \text{ g/mL}$$

$\Delta V$  limits the number of significant digits in your final answer to 2 significant figures.

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**Postlab 1 Q5 09F**

**014** 4.0 points

An aqueous vinegar sample contains 5.4% acetic acid by mass and has a density of 1.006 g/mL. Calculate the amount of acetic acid in grams in 2.00 L of this vinegar. Report your answer using the correct number of significant figures.

Your answer must be within  $\pm 0.0\%$

Correct answer: 110.

**Explanation:**

You must first find the total mass of the sample:

$$2.00 \text{ L} \times \frac{1.006 \text{ g}}{1 \text{ mL}} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 2012 \text{ g}$$

You then multiply the total mass by the percentage:

$$2012 \text{ g} \times 0.054 = 108.648 \text{ g}$$

The mass percent of acetic acid (5.4%) limits the number of significant digits in your final answer.