Question #: 1

When using gloves as personal protective equipment, which of the following procedures should be followed? Select 4 that apply.

A. Wear gloves of a material known to be resistant to permeation by the substances in use.
B. Inspect gloves for small holes or tears before use.
C. Decontaminate or wash gloves before removing them.
D. Remove gloves before handling objects such as doorknobs, telephones, pens, and computer keyboards.
E. Replace gloves periodically.


Question #: 2

Accidents often result from ___. Select 4 that apply.

A. failure to use common sense.
B. using proper technique.
C. an indifferent attitude.
D. wearing appropriate personal protective equipment.
E. failure to follow instructions.
F. carefully pouring solutions.
G. making mistakes.
H. wearing nitrile gloves.
I. listening to your TA.
J. reading all directions.
### Question #: 3

Identify the following pieces of laboratory equipment.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="Image1.png" alt="Equipment Image 1" /></td>
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<tr>
<td>![Equipment Image]</td>
<td>4</td>
</tr>
<tr>
<td>![Equipment Image]</td>
<td>5</td>
</tr>
</tbody>
</table>

1. _________
2. _________
3. _________
4. _________
5. _________
**Question #: 4**

A student collected a series of mass and volume measurements for different sized pieces of aluminum foil in lab. A graph of their data is shown below. Based on the information provided in the graph, how many significant figures should be used when reporting the density of aluminum foil?

A. 2  
B. 3  
C. 4  
D. 5

**Question #: 5**

A metal cube having a mass of 26.5 grams is dropped into a graduated cylinder containing 15.64 mL of water. This causes the water level to rise to 39.50 mL. What is the density of the cube?

A. 2.86 g/mL  
B. 1.11 g/mL  
C. 3.94 g/mL  
D. 10.4 g/mL
Question #: 6

What is the mass percent of carbon in calcium acetate?

A. 30.37 %  
B. 7.590 %  
C. 23.51 %  
D. 25.34 %

Question #: 7

A student tested his/her product from the synthesis of aspirin and the sample turned a light purple color. What should the student conclude about his/her product?

A. The sample is pure aspirin.  
B. The sample is pure salicylic acid.  
C. The sample likely contains a mixture of salicylic acid and aspirin.  
D. You cannot determine anything from the results of this experiment.

Question #: 8

In the presence of gaseous hydrogen sulfide (H₂S) and oxygen, metallic silver is converted to silver sulfide (Ag₂S) according to the balanced equation:

\[ 4 \text{Ag}(s) + 2\text{H}_2\text{S}(g) + \text{O}_2(g) \rightarrow 2\text{Ag}_2\text{S}(s) + 2\text{H}_2\text{O}(l) \]

If 38.2 g of Ag is allowed to react with 5.60 g of H₂S and 3.00 g of O₂, what is the theoretical yield of silver sulfide for this reaction? Report your answer to **three** significant figures. Do **NOT** include the units in your answer.

1. ________ g

1. __________

Question #: 9

Balance the following chemical reaction by filling in the blank coefficients below with the smallest possible whole numbers. If the coefficient is 1, enter the number 1.

\[ _1 \text{C}_3\text{H}_8 (g) + _2 \text{O}_2(g) \rightarrow _3 \text{CO}_2 (g) + _4 \text{H}_2\text{O} (l) \]

1. __________  
2. __________  
3. __________  
4. __________
What is the net ionic equation for the reaction between the reagents in aqueous solution shown below?

lithium phosphate + strontium hydroxide

Complete the table shown below with your response, **starting with the cation as substance 1.**

<table>
<thead>
<tr>
<th>Substance</th>
<th>State</th>
<th>Substance</th>
<th>State</th>
<th>Substance</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(2)</td>
<td>+</td>
<td>3</td>
<td>(4)</td>
<td>→</td>
</tr>
</tbody>
</table>

Do **NOT** balance the reaction. Enter ionic charges without superscripts; e.g., Ca^{2+}. All parentheses must be used correctly in chemical formulas.

1. __________
2. __________
3. __________
4. __________
5. __________
6. __________
An aqueous solution containing 0.3845 g of KHP (KHC₈H₄O₄) was titrated with a solution of sodium hydroxide, producing the following titration curve. What is the concentration of the NaOH solution?

A. $4.59 \times 10^{-3}$ M
B. 0.537 M
C. 0.438 M
D. $6.48 \times 10^{-2}$ M
**Question #: 12**

A 45.0 g rock is heated to 97.2°C and placed into 75.3 g of water originally at 32.0 °C. If the final temperature of the water was 46.2°C, what is the specific heat capacity of the rock? The specific heat capacity of water is 4.184 \( \frac{J}{g \cdot ^\circ C} \)

Report your answer to **two decimal places**. Do **NOT** include units in your answer.

1. __________

**Question #: 13**

What is the oxidation half reaction for the reaction shown below?

\[
Cr_2O_7^{2-}(aq) + 6Cl^-(aq) + 14H^+(aq) \rightarrow 2Cr^{3+}(aq) + 3Cl_2(aq) + 7H_2O(l)
\]

<table>
<thead>
<tr>
<th>Substance</th>
<th>State</th>
<th>Substate</th>
<th>Substance</th>
<th>State</th>
<th>Substate</th>
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<tbody>
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<td>(2)</td>
<td></td>
<td>3</td>
<td>(4)</td>
<td></td>
<td>5</td>
</tr>
</tbody>
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Complete the table shown below with your response, listing substances in the order they appeared in the balanced reaction. Your half reaction **MUST** be balanced, including coefficients in with your substance. Enter ionic charges without superscripts; e.g., Ca\(^{2+}\). All parentheses must be used correctly in chemical formulas.

1. __________
2. __________
3. __________
4. __________
5. __________

**Question #: 14**

18.7 mL of 0.102 M NaOH is required to neutralize 20.0 mL of a citric acid (H\(_3\)C\(_6\)H\(_5\)O\(_7\)) solution. What is the concentration of the citric acid solution?

\[ 1 \text{ M} \]

Report your answer to **three** significant figures. Do **NOT** include the units in your answer.

1. __________
Question #: 15

Which substance is the reducing agent?

\[ 2\text{Li}(s) + \text{Fe(C}_2\text{H}_3\text{O}_2)_2(aq) \rightarrow 2 \text{LiC}_2\text{H}_3\text{O}_2(aq) + \text{Fe}(s) \]

A. Fe  
B. H  
C. C  
D. Li  
E. O
Question #: 1

When using gloves as personal protective equipment, which of the following procedures should be followed? Select 4 that apply.

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<tr>
<td><img src="image1" alt="Funnel" /></td>
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</tr>
<tr>
<td><img src="image2" alt="Tongs" /></td>
<td>2</td>
</tr>
<tr>
<td><img src="image3" alt="Bottle" /></td>
<td>3</td>
</tr>
</tbody>
</table>
1. glass funnel|funnel|
2. tongs|crucible tongs|
3. wash bottle
4. test tube brush|brush|
5. three finger clamp|clamp|three-finger clamp|
**Question #: 4**

A student collected a series of mass and volume measurements for different sized pieces of aluminum foil in lab. A graph of their data is shown below. Based on the information provided in the graph, how many significant figures should be used when reporting the density of aluminum foil?

![Graph of Mass versus Volume of Aluminum Foil](image)

- A. 2
- B. 3
- C. 4
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If 38.2 g of Ag is allowed to react with 5.60 g of H₂S and 3.00 g of O₂, what is the theoretical yield of silver sulfide for this reaction? Report your answer to three significant figures. Do NOT include the units in your answer.

1. 40.7

Question #: 9

Balance the following chemical reaction by filling in the blank coefficients below with the smallest possible whole numbers. If the coefficient is 1, enter the number 1.

$$\_\_\_\_\_\_\_\text{C}_3\text{H}_8 (\text{g}) + \_\_\_\_\_\_\_\text{O}_2(\text{g}) \rightarrow \_\_\_\_\_\_\_\text{CO}_2 (\text{g}) + \_\_\_\_\_\_\_\text{H}_2\text{O (l})$$

1. 1
2. 5
3. 3
4. 4
**Question #: 10**

What is the net ionic equation for the reaction between the reagents in aqueous solution shown below?

lithium phosphate + strontium hydroxide

Complete the table shown below with your response, starting with the cation as substance 1.

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<td>(2)</td>
<td>+</td>
<td>3</td>
<td>(4)</td>
<td>→</td>
</tr>
<tr>
<td>Sr</td>
<td>Sr^2+</td>
<td>PO_4^3-</td>
<td>PO_4^-3</td>
<td>Sr_3(PO_4)_2</td>
<td></td>
</tr>
</tbody>
</table>

Do **NOT** balance the reaction. Enter ionic charges without superscripts; e.g., Ca^{2+}. All parentheses must be used correctly in chemical formulas.

1. Sr^{2+}Sr^2+|Sr^{2+}Sr^2+|Sr^{2+}Sr^2+|
2. aq|aq|aqueous|
3. PO_4^{3-}|PO_4^-3|PO_4^-3|PO_4^-3|
4. aq|aq|aqueous|
5. Sr_3(PO_4)_2 |
6. s|solid|
Question #: 11

An aqueous solution containing 0.3845 g of KHP (KHC\textsubscript{8}H\textsubscript{4}O\textsubscript{4}) was titrated with a solution of sodium hydroxide, producing the following titration curve. What is the concentration of the NaOH solution?

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Report your answer to two decimal places. Do NOT include units in your answer.

1. 1.98

Question #: 13

What is the oxidation half reaction for the reaction shown below?

\[
\text{Cr}_2\text{O}_7^{2-}(aq) + 6\text{Cl}^-(aq) + 14\text{H}^+(aq) \rightarrow 2\text{Cr}^{3+}(aq) + 3\text{Cl}_2(aq) + 7\text{H}_2\text{O}(l)
\]

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<td>2e(^-)</td>
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Report your answer to three significant figures. Do NOT include the units in your answer.

1. 0.0318\(\times10^{-2}\)
Which substance is the reducing agent?

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A. Fe
B. H
C. C
\checkmark D. Li
E. O