1. Lye (sodium hydroxide) solutions are often used to remove mixtures of solidified grease and hair from clogged plumbing. Select the BEST answer which indicates why lye is effective for this purpose?

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| --- | --- | --- |
|  |  | The lye solution absorbs the hair and grease. |
|  |  | The lye solution forms a water soluble soap with the hair and grease. |
|  |  | The lye bleaches the hair and grease. |
|  |  | The lye coagulates the hair and grease. |

1. The primary acids in acid rain are sulfuric and nitric acids. When it rains, a chemical reaction between the sulfuric acid (in the rain) and limestone structures will form carbon dioxide, water, and a salt of the metal. This salt is:

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|  |  | CaCl2. |
|  |  | CaCO3. |
|  |  | Ca(NO3)2. |
|  |  | CaSO4. |

1. Di-lithium is composed of two lithium atoms. Which of the following statements regarding di-lithium or lithium is FALSE?

|  |  |  |
| --- | --- | --- |
|  |  | They oxidize very slowly in air. |
|  |  | They remain in the solid state even after getting fragmented. |
|  |  | Their temperature exceeds the boiling point of water during their reaction to water. |
|  |  | The hydrogen dissipates into the surrounding environment when reacting to water. |

1. A common product of hydrolysis when some substances react with water is hydrogen chloride. Which of the following water reactive substances does NOT produce hydrogen chloride?

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| --- | --- | --- |
|  |  | Acetyl chloride |
|  |  | Chlorine dioxide (hydrate) |
|  |  | Chromium oxychloride |
|  |  | Lithium hypochlorite |

1. Which of the following acids is present in soft drinks?

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| --- | --- | --- |
|  |  | Hydrofluoric acid |
|  |  | Glacial acetic acid |
|  |  | Phosphoric acid |
|  |  | Oxalic acid |
|  |  |  |

* \_\_\_\_\_\_\_\_\_\_ is a regulatory agency that requires employers to provide suitable facilities for quick drenching and flushing of the eyes and body in all areas within a workplace where employees may be exposed to a corrosive material.
* Aluminum phosphide can be used as a fumigant for almond and pistachio nuts. When aluminum phosphide is shipped, the description will be: \_\_\_\_\_\_\_\_\_\_.
* When metallic potassium reacts with water, the \_\_\_\_\_\_\_\_\_\_ produced initially concentrates around the metal where it self-ignites.
* \_\_\_\_\_\_\_\_\_\_ is a colorless liquid that is mainly used as a chlorinating and dehydrating agent. When it reacts with water, a gaseous hydrochloric acid and aqueous sulfuric acid are produced.
* \_\_\_\_\_\_\_\_\_\_, which is considered a weak acid, reacts with the components of glass, so it is transported in polyethylene or other acid resistant plastic containers.

1. The element *titanium* occurs on earth as titanium (IV) oxide and is found mostly in the mineral called *rutile*. Rutile is abundant in beach sands in Australia and South Africa. For titanium to be useful, rutile has to be processed to obtain the basic metal form of titanium. Although the process is costly, titanium is gaining popularity as a material for various equipment due to its strength and light weight. One such application is in sports equipment.
   1. Explain the chemical process of manufacturing the metal form of titanium.
   2. Explain why titanium is a good choice of material for golf clubs. When not in use, discuss at least one precaution to observe when storing clubs?
   3. During the fabrication of golf clubs, finely divided titanium is generated, which poses a dangerous risk of fire and explosion. Explain the chemical process involved.

Your total response must be at least 200 words in length.

1. A garage that specializes in foreign cars had a small magnesium fire when a car part was ignited. The mechanic knew from his training that he should not use water but could use a dry powder like a sodium chloride based fire extinguishing powder (MET-L-X) or a graphite based (LITH-X). He knows that the CO2 extinguishing powder is not a good choice.
   1. Explain the reasons why the mechanic thinks using CO2 is not a good idea.
   2. If MET-L-X or LITH-X is used, a residue could be left on the metal and if cleaned with water, the fire may be rekindled. Explain the chemical process involved in this phenomenon for both types of fire extinguishing powder.

Your total response must be at least 200 words in length.