Name: _____ **Date:** _____

OSHA-Whoops! High-Stakes Lab Liability Quiz for 11th Grade

Analyze complex chemical interactions and evaluate emergency response protocols through high-level synthesis of safety data sheets and industrial standards.

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1. A student is synthesizing an organic compound using a reflux apparatus. They notice a hairline fracture in the boiling flask as the solution reaches its boiling point. What is the most rigorous analytical response?

A. Apply high-temperature vacuum grease to the crack and monitor closely.
B. Immediately cut the heat source and wait for cooling before transferring contents.
C. Increase the stir rate to distribute thermal stress more evenly.
D. Transfer the boiling liquid immediately to a secondary beaker while hot.

2. True or False: According to the Globally Harmonized System (GHS), a 'Signal Word' indicates the relative degree of severity of a hazard, with 'Danger' representing a more severe hazard than 'Warning.'

A. True
B. False

3. When neutralizing a concentrated Bench Acid spill (such as 6M H_2SO_4), the most chemically sound approach involves applying _____ to ensure safety and control.

A. Excess amounts of a strong liquid base like NaOH
B. Large volumes of distilled water to dilute the molarity
C. A weak solid base such as Sodium Bicarbonate
D. Paper towels to absorb the liquid before neutralization

4. A technician is working with an alkali metal (e.g., Sodium) and a small fire ignites. Which fire suppression method is required by NFPA standards?

A. Class A: Pressurized water to lower the temperature.
B. Class B: Carbon dioxide to displace the oxygen.
C. Class C: Halon gas to interrupt the chemical chain reaction.
D. Class D: Dry powder such as Met-L-X to smother the metal.

5. In the context of the 'Hierarchy of Controls,' which method is considered the most effective for mitigating lab risks before relying on PPE?

A. Administrative Controls
B. Elimination
C. Engineering Controls
D. Standard Operating Procedures

6. Evaluate the following scenario: A student spills 10mL of 12M Hydrochloric Acid on their lab coat. Why must they utilize the safety shower rather than just rinsing the area in a sink?

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A. The shower provides a higher pressure to scrub the skin.
B. The sink cannot provide the 15-minute continuous volume needed to prevent deep tissue necrosis.
C. The sink drain may react poorly with the HCl concentration.
D. Standard laboratory sinks are usually contaminated with biological waste.

7. True or False: When diluting a concentrated acid, you should always add the water to the acid slowly to prevent the mixture from splashing.

A. True
B. False

8. Review the NFPA 704 'fire diamond.' If a substance has a '4' in the blue quadrant and a 'W' with a line through it in the white quadrant, what is the primary risk?

A. The substance is highly flammable and radioactive.
B. The substance is lethally toxic and reacts violently with water.
C. The substance is stable at room temperature but oxidizes easily.
D. The substance is a mild skin irritant but dangerous if inhaled.

9. When centrifuging biological samples, the most critical safety step to prevent mechanical failure and aerosolization is _____.

A. Pre-chilling the rotor
B. Using only plastic tubes
C. Ensuring the load is precisely balanced by mass and position
D. Setting the timer for no more than 10 minutes

10. True or False: Laboratory fume hoods are designed to protect the user from volatile vapors, but they are not effective for containing high-velocity projectiles from pressurized explosions.

A. True
B. False