Name: _____ **Date:** _____

Under Pressure: Can You Predict the Phase Change for 12th Grade AP Chemistry?

Quantify intermolecular forces through vapor pressure calculations and phase diagram analysis to determine how volatile chemicals behave in extreme environments.

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1. Which set of conditions is required for a substance to undergo deposition in a system currently at its triple point?

A. Increasing the temperature while maintaining constant pressure.
B. Decreasing the temperature while maintaining constant pressure.
C. Increasing the pressure while maintaining constant temperature.
D. Decreasing the volume while maintaining an isothermal environment.

2. The resistance of a liquid to flow, which typically decreases as kinetic energy increases, is known as _____.

A. Surface tension
B. Capillary action
C. Viscosity
D. Vaporization

3. Amorphous solids, such as glass, possess a distinct and sharp melting point due to their long-range repeating geometric patterns.

A. True
B. False

4. According to the Clausius-Clapeyron equation, if a liquid has strong intermolecular forces, what can be inferred about its vapor pressure?

A. It will have a high equilibrium vapor pressure at room temperature.
B. Its vapor pressure will remain unaffected by temperature changes.
C. It will have a low equilibrium vapor pressure at room temperature.
D. Its vapor pressure will be equal to the atmospheric pressure only at 0 Kelvin.

5. Sulfur hexafluoride (SF6) behaves as a _____ when it is heated and pressurized beyond its specific critical point, where the distinction between liquid and gas vanishes.

A. Bose-Einstein Condensate
B. Supercritical fluid
C. Crystalline lattice
D. Ionic liquid

6. The molar heat of fusion is generally smaller than the molar heat of vaporization for a given substance.

A. True

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B. False

7. Why does water exhibit a negative slope for the solid-liquid boundary line on its phase diagram?

A. Pressure increases the kinetic energy of the water molecules.
B. The liquid phase is more dense than the solid phase due to hydrogen bonding.
C. Sublimation occurs more readily than melting at high pressures.
D. Ice forms a hexagonal lattice that is more compact than liquid water.

8. While heating a substance, the temperature remains constant during a phase change because the added energy is used to increase _____ energy rather than kinetic energy.

A. Potential
B. Nuclear
C. Rotational
D. Electronic

9. Liquid Nitrogen (bp -196°C) is stored in a Dewar flask. If the flask is sealed and the temperature rises to 25°C, what serves as the primary danger regarding states of matter?

A. The nitrogen will undergo deposition and crack the container.
B. Rapid expansion from liquid to gas state creates immense pressure.
C. The nitrogen will reach its triple point and freeze the flask's lid.
D. The molar mass of nitrogen decreases as it transitions to a gas.

10. In a vacuum where the external pressure is effectively zero, a liquid will boil regardless of the temperature provided it stays above its freezing point.

A. True
B. False