Lecture-Based Questionnaire

1. What defines a system in thermodynamic equilibrium, according to the lecture?

Answer: b) Its macroscopic properties have stopped changing.

2. Why is the Zeroth Law of Thermodynamics considered crucial for defining temperature globally?

Answer: It allows for the comparison of temperatures between two systems that have never met directly, but have both interacted with a third system (like a thermometer).

3. According to the lecture, why are gas thermometers preferred over liquid thermometers for defining temperature scales?

Answer: c) All dilute gases exhibit a linear relationship between the product of pressure and volume (pV) and temperature, agreeing consistently between fixed points.

4. What is the significance of "absolute zero" temperature, as described in the lecture, and what does it represent in terms of gas properties?

Answer: Absolute zero is the lowest possible temperature, where the pressure of any gas (when extrapolated) vanishes.

5. How is one calorie defined based on the lecture's explanation?

Answer: b) The amount of heat required to raise the temperature of 1 gram of water by 1 degree Celsius.

6. During a phase change (like ice melting into water), what happens to the temperature of the substance despite continuous heat input, and what is this absorbed heat called?

Answer: The temperature remains constant, and the absorbed heat is called latent heat.

7. Which of the following heat transfer mechanisms does NOT require a material medium for heat to be transferred?

Answer: c) Radiation

8. What was the main conclusion drawn from Joule's experiment regarding heat and mechanical energy?

Answer: Mechanical energy can be converted into heat, and there is a fixed proportionality (conversion factor) between joules and calories.

9. Which concept describes the amount of heat required to change the temperature of a unit mass of a substance by one degree, as opposed to how easily heat flows through a material?

Answer: c) Specific Heat

10. Explain the difference between temperature at a macroscopic level and at a microscopic level, as discussed in the lecture.

Answer: Macroscopic temperature is a collective property that is only well-defined when a system is in equilibrium, while at the microscopic level, individual atoms and molecules always have well-defined positions and velocities.