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Student:

Thermodynamics: Heat and Heat Transfer

Objective: Gain a clear understanding of the concept of heat and explore the different methods of heat transfer through practical examples and problem-solving.

I. Understanding Heat

Definition of Heat: Heat is a form of energy that is transferred between systems or bodies at different temperatures. This transfer occurs in the direction from the hotter body to the cooler one until thermal equilibrium is reached.

Heat vs. Temperature: Heat is energy in transit, while temperature is a measure of the average kinetic energy of the particles in a substance.

II. Methods of Heat Transfer

Conduction: The process of heat transfer through direct contact. Occurs when molecules at a higher temperature transfer their energy to neighboring molecules in a lower temperature area.

Convection: Heat transfer that occurs in fluids (liquids or gases) by the movement of warmer fluid from one place to another.

Radiation: Transfer of heat through electromagnetic waves, such as sunlight, without the need for a physical medium.

III. In-Class Problems

For each scenario, identify which method of heat transfer is primarily at work and explain your reasoning.

Ice Cream Melting on Different Benches: Scenario: "An ice cream scoop is left on a metal bench and another on a wooden bench in sunlight. Why does the ice cream on the metal bench melt faster?"

Hot Air Balloon Heating: Scenario: "A hot air balloon is being filled. Describe the process that heats the air inside the balloon and what causes the balloon to rise."

Feeling Warm in Sunlight: Scenario: "On a chilly but sunny day, why do you feel warm when standing in direct sunlight, despite the cold air?"