What is Entropy?

Worksheet

Entropy S is the measure of disorder in a system. S = entropy change tells us how much randomness increases or decreases. Second law: the entropy of an isolated system increases for any spontaneous process (S_universe > 0).

Questions

1. Melting ice, S is

A) Negative
B) Positive
C) Zero
D) Unknown

2. Entropy measures

A) Heat content
B) Disorder and randomness
C) Temperature
D) Pressure

3. Second law of thermodynamics states

A) Energy is conserved
B) Entropy of universe increases
C) Heat flows from cold to hot
D) Work = heat

4. Gas diffusing into a room, S

A) Negative
B) Positive
C) Zero
D) Unpredictable

5. Ice melting to water at 0C. Is S_sys positive or negative?

6. Water evaporating. Entropy increases or decreases?

7. Gas cooling to liquid. Entropy change?

8. Define: What is entropy?

9. Define: High entropy means

10. Define: When entropy increases?

Answer Key

1. B) Positive - Melting increases disorder S > 0.
2. B) Disorder and randomness - Entropy S measures disorder.
3. B) Entropy of universe increases - S_universe > 0 for all spontaneous processes.
4. B) Positive - Gas spreading is more disordered S > 0.
5. Melting: solid liquid Molecules become more disordered Disorder increases S_sys > 0 (positive)
6. Evaporation: liquid gas Gas is much more disordered than liquid S_sys is large and positive
7. Condensation: gas liquid Molecules become more ordered S_sys < 0 (negative, disorder decreases)
8. A measure of disorder and randomness in a system.
9. Many possible arrangements, high disorder, many microstates.
10. When disorder increases - melting, boiling, gas diffusion.