1. The lattice energy is:

   ☐ the (negative) energy change when one mole of solid lattice forms from gaseous ions

   ☐ the energy needed to turn one mole of the solid element into gaseous atoms

   ☐ the (positive) energy change when one mole of gaseous atoms forms from the solid

   ☐ the energy needed to remove one electron from each atom in a mole of gas

2. The enthalpy change of hydration is:

   ☐ always endothermic – energy taken in to separate the ions

   ☐ the energy needed to break the lattice into gaseous ions

   ☐ zero, because water molecules are neutral

   ☐ exothermic – energy released when gaseous ions are surrounded by water

3. Entropy is a measure of:

   ☐ the number of ways the particles and their energy can be arranged (disorder)

   ☐ the temperature of a substance in kelvin

   ☐ the energy released or taken in by a reaction

   ☐ the mass of a substance per mole of particles

4. When is a reaction feasible?

   ☐ When $\Delta G$ is zero or negative

   ☐ When $\Delta G$ is positive

   ☐ When $\Delta S$ is negative

   ☐ When $\Delta H$ is positive

5. Going down Group 17, the first electron affinity becomes:

   ☐ always positive, because energy is needed to add an electron

   ☐ unchanged, because each atom gains the same one electron

   ☐ less exothermic, because the larger atom attracts the electron less strongly

   ☐ more exothermic, because the larger atom has more electrons

6. The enthalpy change when one mole of gaseous ions dissolves in water is the enthalpy of _____.

   _____



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   ☐ True ☐ False

8. $\Delta S = +85$ J/(K mol). What is it in kJ/(K mol)?

   _____

9. The enthalpy change when one mole of an ionic solid forms from gaseous ions is the _____ energy.

   _____

10. Enthalpy of solution can be found from lattice energy and hydration enthalpies using Hess's law.

    ☐ True ☐ False

1. **the (negative) energy change when one mole of solid lattice forms from gaseous ions**

   Strong ionic bonds form, so lattice energy is exothermic (negative).

2. **exothermic – energy released when gaseous ions are surrounded by water**

   Water molecules are attracted to the ions, releasing energy, so hydration is exothermic.

3. **the number of ways the particles and their energy can be arranged (disorder)**

   More ways to arrange particles/energy means higher entropy (more disorder).

4. **When $\Delta G$ is zero or negative**

   $\Delta G \leq 0$.

5. **less exothermic, because the larger atom attracts the electron less strongly**

   A bigger atom pulls the incoming electron in less strongly, so EA is less exothermic.

6. **hydration**

   More negative for smaller, more highly charged ions.

7. **False**

   False. Melting and forming a gas increase disorder, so entropy increases.

8. **0.085**

   Divide by 1000.

9. **lattice**

   Born–Haber cycles use Hess's law to find it.

10. **True**

    A Hess cycle links them.



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