

What are Acid-Base Definitions?

Worksheet

Arrhenius definition: An acid produces H ions in water; a base produces OH ions. Brnsted-Lowry definition: An acid is a proton (H) donor; a base is a proton acceptor. Brnsted-Lowry is broader and works beyond water.

Questions

1. HNO in water produces H. Which definition(s) apply?

- A) Arrhenius only
- B) Brnsted-Lowry only
- C) Both
- D) Neither

2. What is the conjugate base of HCl (Brnsted-Lowry)?

- A) H
- B) Cl
- C) HCl
- D) ClOH

3. Water in HCl(aq) acts as a base (Brnsted-Lowry). Why?

- A) It produces OH
- B) It accepts H from HCl
- C) It donates H
- D) It is polar

4. Which species is NOT a Brnsted-Lowry base?

- A) NH
- B) OH
- C) HCO
- D) HCl

5. HCl in water: Arrhenius or Brnsted-Lowry?

6. NH in water: Name its roles.

7. In ammonia liquid (no water), HCl dissolves and reacts. What framework explains this?

8. Define: Arrhenius acid definition?

9. Define: Brnsted-Lowry acid definition?

10. Define: Arrhenius base definition?

Answer Key

1. C) Both - HNO produces H (Arrhenius acid) AND donates H to water (Brnsted-Lowry acid). Both apply.
2. B) Cl - HCl loses H Cl is the conjugate base.
3. B) It accepts H from HCl - HO + HCl HO + Cl. Water accepts the proton, so it's a base.
4. D) HCl - HCl donates H, so it's an acid. All others can accept H.
5. HCl H + Cl (produces H, so Arrhenius acid) HCl donates H to water (H donor, so Brnsted-Lowry acid) Both definitions apply to HCl - Brnsted-Lowry is the broader view.
6. NH doesn't produce OH directly (Arrhenius base? No - incorrect!) NH accepts H from water: NH + HO NH + OH (Brnsted-Lowry base) NH is a Brnsted-Lowry base, not Arrhenius.
7. Arrhenius needs water - doesn't apply here. Brnsted-Lowry: HCl (H donor) reacts with NH (H acceptor) Brnsted-Lowry explains acid-base chemistry beyond aqueous solutions.
8. A substance that produces H ions in water.
9. A substance that donates a proton (H) to another substance.
10. A substance that produces OH ions in water.

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