

1.a) Four properties of an acid are:

- pH less than 7
- Corrosive
- turns litmus paper red ✓
- conducts electricity

(4)

Four properties of a base are:

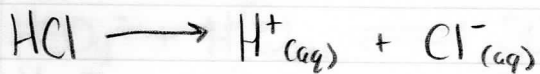
- pH greater than 7
- Corrosive
- turns litmus paper blue ✓
- conducts electricity

b) The operational definition of acids and bases is very limited in discussing the chemistry of these substances because it does not tell you about the composition or reactivity of the substance(s). ✓

(2)

2. An Arrhenius acid is a compound that forms H^+ ions in water ✓

(3)



3. Ammonia (NH_3) poses a problem for the Arrhenius theory of bases because ammonia does not contain an OH^- ion in the formula but is still a base. Arrhenius' theory defined a base as a compound that produces OH^- ions in water which does not occur for NH_3 . ✓

(3)

4. The modified Arrhenius theory was unsuccessful in explaining the nature of acids and bases because the theory still had fundamental flaws. It did not consider that some acid/base reactions can take place in non-aqueous solvents and that water isn't always present. Also some compounds that were predicted to act as acids were in fact basic, such as HPO_4^{2-} .

→