

is negative pH value possible?

### **Solution**

The constant of dissociation of water is  $1 \cdot 10^{-14}$

As far as the  $\text{pH} = -\log [\text{H}^+]$  and  $\text{pOH} = -\log [\text{OH}^-]$  .

$[\text{OH}^-] \cdot [\text{H}^+] = 10^{-14}$ ;  $-\log [\text{H}^+] - \log [\text{OH}^-] = -\log (10^{-14})$ ;  $\text{pOH} + \text{pH} = 14$ ;

So, if the  $\text{pOH} = 15$  ( $[\text{OH}^-] = 10^{-15} \text{ mol/l}$ ),  $\text{pH} = -1$

Any acid that yields a concentration of hydrogen ions with a molarity greater than 1 will be calculated to have a negative pH. For example, the pH of 12M HCl is calculated to be  $-\log(12) = -1.08$ .

**Answer:** the pH can be negative.