18.1 HW problems

Grey textbook – pg. 711

#16.30

a) $H_2O_{(l)} \rightleftharpoons H^+_{(aq)} + OH^-_{(aq)}$

b) $K_W = [H^+][OH^-]$

*note no $[H_2O]$ as it is pure liquid and its concentrate will not measurably change.

c) $[OH^-] > [H^+]$

*not related to pH. – not the definition of acidity/basicity

16.33 $[H^+] = 3.5 \times 10^{-8}$ M

$[OH^-] =$ "

16.39

$[H^+]$ M	$[OH^-]$ M	pH	pOH	Acidic or Basic?
7.5×10^{-3}	1.3×10^{-12}	2.12	11.88	acidic
2.8×10^{-5}	3.6×10^{-10}	4.56	9.44	acidic
5.6×10^{-9}	1.8×10^{-6}	8.25	5.75	basic
5.0×10^{-9}	2.0×10^{-6}	8.30	5.70	basic

16.41 $pH = 7.40$ $K_w = 2.4 \times 10^{-14}$ @37°C

$[H^+] = 10^{-7.40} = \boxed{4 \times 10^{-8}\ M}$

$K_w = 2.4 \times 10^{-14} = [H^+] \times [OH^-]$

$[OH^-] = \frac{2.4 \times 10^{-14}}{[H^+]} = \frac{2.4 \times 10^{-14}}{4 \times 10^{-8}}$

$= \boxed{6.0 \times 10^{-7}\ M}$

$pOH = -\log(6 \times 10^{-7}) = \boxed{6.22}$