Systems Biology BME 105 (Spring 2007)
Quiz on Jan 18

K. Truong, M. Radisic, W. Stanford

Name: Kevin Siu
Student #: 995518462

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Information:

The formula for dilutions (M is molar concentration; V is volume):

$M_{original} \times V_{original} = M_{diluted} \times V_{diluted}$

At 25 °C, $[H][OH] = 10^{-14} M^2$

[1 mark] **Q1.** If 1 mL of a solution of 0.01 M HCl is diluted to 100 mL at 25 °C, what is the pH of the resulting solution? (Note that HCl completely dissociates)

ANSWER:

$M_1V_1 = M_2V_2$

$0.01M \times 0.001L = M_2 \times 0.100\ L$

$M_2 = 1.0 \times 10^{-4}\ M$

$pH = -\log [H^+]$

$pH = -\log (1 \times 10^{-4}\ M)$

$\boxed{pH = 4.0}$ ✓

[1 mark] **Q2.** If 1 mL of a solution of 1M NaOH is diluted to 100 L at 25 °C, what is the pH of the resulting solution? (Note that NaOH completely dissociates)

ANSWER:

$M_1V_1 = M_2V_2$

$1M \times 0.001mL = M_2 \times 100L$

$M_2 = 1.0 \times 10^{-5}\ M$

$pOH = -\log [OH^-]$

$= -\log (1.0 \times 10^{-5} M)$

$= 5$

$pH = 14 - pOH$

$pH = 14 - 5$

$\boxed{pH = 9}$ ✓