CEE 432/532 Fate and Transport of Organic Pollutants **Fall 2005**

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Quiz #1

1. Fill in the blanks: **[10]**

(a) The single most important parameter in environmental fate and transport studies is chemical concentration.

(b) The unit "mg/kg" is used extensively to quantify contaminant concentration in soil.

(c) The unit "mg of contaminant per square foot of area" is a commonly used unit to express level of contaminant on surfaces.

(d) Molarity is the number of moles of solute dissolved in one liter of solution.

(e) Equivalent weight = molecular weight/ charge.

(f) Normality = mass of substance per liter/ equivalent weight.

(g) For wastewater and most natural waters,
Concentration in ppm = Concentration in mg/L.

(h) $pH = -\log_{10}[H]$

(i) pH + pOH = 14.

(j) When a 1.0 N acid solution is available, solutions of any normality less than 1.0 N can be prepared from it by dilution.

[2]

2. The concentration of nitrogen in a water sample is reported as 5 mg/L. Which of the following statement is correct?

(A) 5 mg of nitrogen gas in 1.0 liter of water.
(B) 5 mg of nitrite-nitrogen in 1.0 liter of water.
(C) 5 mg of ammonia-nitrogen in 1.0 liter of water.
(D) the reported value must indicate the particular nitrogen specie.

[4]

3. A water contains 1.3×10^{-3} moles per liter of H_2SO_4 (H = 1, S = 32, O = 16). The pH of the water is most nearly:

(A) 2.28
(B) 2.58
(C) 2.88
(D) none of the above.

$H_2SO_4 \longrightarrow 2H^+ + SO_4^{-2}$

$[H] = 2 * 1.3 \times 10^{-3}$ moles/L

$pH = -\lg[H^+] = 2.58$

[4]

4. The concentration of SO_4^{--} ion in a water sample is 1.5 g/L. The concentration (in g/L of sulfur) is most nearly:

(A) 1,500
(B) 0.031
(C) 0.016
(D) 0.5

$\frac{1.5}{96} * 32 = 0.5$ gm/L as S