

Quiz 1

ENGR 340-Introduction to Environmental Engineering

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Name:

KEY

1. (8 points) The maximum contaminant level (MCL) of vinyl chloride (MW = 62.5 g/mole), a known carcinogen, is 2 ppb_m. What is this concentration in units of

(a) mg/L

$$[VC] = 2 \text{ ppb}_m \times \frac{1 \text{ ppm}_m}{1000 \text{ ppb}_m} = 0.002 \text{ ppm}_m = 0.002 \text{ mg/L}$$

$$[VC] = 0.002 \text{ mg/L}$$

(b) mole/L

$$[VC] = 0.002 \frac{\text{mg}}{\text{L}} \times \frac{1 \text{ mole}}{62.5 \text{ g}} = 3.2 \times 10^{-8} \frac{\text{mole}}{\text{L}}$$

$$[VC] = 3.2 \times 10^{-8} \frac{\text{mole}}{\text{L}}$$

(c) mmole/L

$$[VC] = 3.2 \times 10^{-8} \frac{\text{mole}}{\text{L}} \times \frac{1000 \text{ mmole}}{\text{mole}}$$

$$[VC] = 3.2 \times 10^{-5} \frac{\text{mmole}}{\text{L}}$$

(d) $\mu\text{g/L}$

$$[VC] = 0.002 \frac{\text{mg}}{\text{L}} \times \frac{1000 \mu\text{g}}{\text{mg}} = 2 \frac{\mu\text{g}}{\text{L}}$$

$$[VC] = 2 \frac{\mu\text{g}}{\text{L}}$$

2. (2 points) Define (with an equation) parts per million on a volume basis, or ppmv

$$\text{ppmv} = \frac{V_i}{V_{\text{TOT}}} \times 10^6$$

$$\text{ppmv} = \frac{P_i}{P_{\text{TOT}}} \times 10^6$$

$$\text{ppmv} = \frac{n_i}{n_{\text{TOT}}} \times 10^6$$