

Please Print your Name:

Key

- The quiz is closed book & notes. CSUS operates on the honor system. All works must be clearly shown for credit. If we can't read it, we won't grad it. Good luck!

- 1) How many kilojoule of energy are required to change 50.0 g of ethyl alcohol from 60.0 °C to vapor at 78.4 °C ? The specific heat of ethyl alcohol is 2.138 J/(g . °C).(3 pts)

$$q = c m \Delta T$$

$$q = 2.138 \times 50.0 \times (78.4 - 60.0) = 1966.96 \text{ J}$$

$$q = 1.97 \text{ kJ}$$

$$q = m \cdot H_v = 50.0 \times 855 = 42750 \text{ J}$$

$$q = 44.7 \text{ kJ}$$

- 2) Write a balanced equation for the following reactions (1 pts):
a) Sodium oxide with water.



- 3) Calculate percent of water in Epsom salts, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (2 pts)

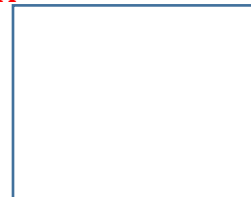
$$\frac{7 \times 18.02}{(120.36) + (7 \times 18.02)} \times 100 = \frac{126.14}{246.5} \times 100 = 51.2\%$$

- 4) How many grams of potassium hydroxide (KOH) are required to prepare 600.0 mL of 0.450 M KOH? (3 pts)

$$M = \frac{\text{mol}}{L}$$

$$\text{mol} = M \cdot L = 0.450 \times 0.600 \text{ L} = 0.270 \text{ mol}$$

$$\text{mass} = \text{mol} \times \text{molar mass} = 0.270 \times 56.1 = 15.1 \text{ g KOH}$$



- 5) How many milliliters of 0.50 M NaOH are required to react with 25.0 mL of 1.5 M , HCl? (2 pts)

$$\begin{aligned}M \cdot V &= M' \cdot V' \\(1.5)(25.0) &= 0.5 V' \\V' &= 75 \text{ mL}\end{aligned}$$

- 6) What is molality (m) of a solution prepared by dissolving 2.70 g CH₃OH in 25.0 g H₂O? (2 pts)

$$m = \frac{\text{mol}}{\text{kg}} = \frac{2.70/32.04}{25.0/1000} = \frac{0.0843}{0.025} = 3.37$$

- 7) Define Osmosis. (1 pts)

Diffusion of water from a dilute solution through a semipermeable membrane into a higher concentration solution.

- 8) A Bronsted-Lowry base is : (1 pts) a proton acceptor

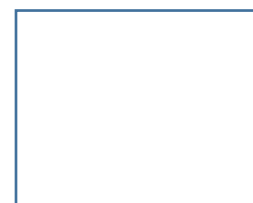
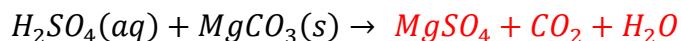
- 9) Indicate the conjugate base for these acids: (2 pts)



- 10) Indicate the conjugate acid for this base: (1 pts)



- 11) Complete the following reaction for the acid and base: (2 pts)



12) What is the molarity of each ion in a solution of 0.4 M K_2SO_4 ? (1 pts)

$$[K^+] = 2 \times 0.4 = 0.80 M$$

$$[SO_4^{2-}] = 1 \times 0.4 = 0.40 M$$

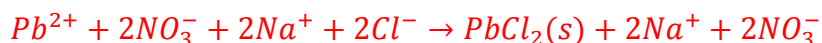
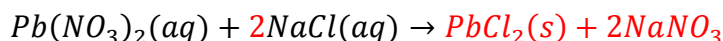
13) A 50.0 mL sample of HCl required 24.81 mL of 0.1250 M NaOH for neutralization. What is the pH of the acid? (3 pts)

$$M_a \cdot V_a = M_b \cdot V_b$$

$$M_a = \frac{(0.1250)(24.81)}{50.0} = 0.062 M$$

$$pH = -\log[0.062] = 1.21$$

14) Write the net equation for the following unbalanced reaction (hint: The lead(II) chloride is insoluble) (3 pts)



15) What is the freezing point of an aqueous solution when enough NaCl has been added to create a 0.25 m solution? The K_f value for water is $1.858^\circ C/m$. (3 pts)

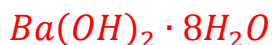
$$\Delta T_f = i \cdot m \cdot k_f$$

$$\Delta T_f = 2 \times 0.25 \times 1.858 = 0.93^\circ C$$

$$\Delta T_f = 0 - 0.93 = -0.93^\circ C$$

Bounce questions:

1) Write formula for Barium hydroxide octahydrate: (2 pts):



2) Write a balanced equation for the following reaction:
Sodium metal with water (2 pts)

