

Before doing anything, fill in the following on your ParSCORE form:

- 1) Write your name
- 2) Bubble in **FORM A**
- 3) Bubble in your **PERM** number (7 digits only—no extra numbers)

Instructions: No hats or hoods allowed. No books or notes allowed. No sharing of calculators. Cell phones, iPods, headsets/headphones, and any other electronic devices must be turned off and put away.

There are a total of two pages (6 questions) on the quiz. **All questions are equal in point value.**

You may work out the problems and write your answers on this quiz; however, you must completely fill in the appropriate bubble(s) on your ParSCORE form. Turn in the ParSCORE form only. **Only the answers indicated on your ParSCORE will be graded**, so please be very careful bubbling in your ParSCORE. No credit will be awarded for an incorrectly-bubbled answer. The correct answers to the quiz will be posted on our course web page.

1. Determine what statement(s) about the following reaction is/are true: $\overset{4+}{\text{CO}_2} + 2 \overset{2+}{\text{Li}}\overset{1-}{\text{OH}} \rightarrow \overset{2+}{\text{Li}_2}\overset{4+}{\text{CO}_3} + \overset{6-}{\text{H}_2\text{O}}$

- ☒ a) CO_2 is the oxidizing agent
☒ b) CO_2 gets oxidized
☒ c) LiOH is the oxidizing agent
☒ d) Both (b) and (c) are correct
☐ e) This is not a redox reaction

E

2. A balloon initially has a volume of 4.39 L at 44°C . At what temperature (in $^\circ\text{C}$) will the balloon have a volume of 3.78 L? Assume pressure is constant.

- a) 0°C
 b) 38°C
 c) 72.9°C
 d) 273°C
 e) 546°C

A

$$\frac{PV}{T} = k \quad \frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$3.78 / \frac{4.39}{44+273} = T_2$$

3. Under certain conditions, the effusion rate of chlorine gas is 2.4×10^{-6} L/sec. What will be the effusion rate for bromine gas under the same conditions?

70

160

- a) 1.1×10^{-6} L/sec
 b) 1.6×10^{-6} L/sec
 c) 2.3×10^{-6} L/sec
 d) 3.6×10^{-6} L/sec
 e) 5.4×10^{-6} L/sec

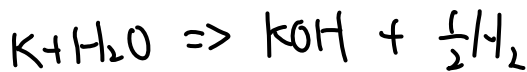
B

$$\frac{2.4 \times 10^{-6}}{\sqrt{2}}$$

$$\approx \sqrt{\frac{1}{2}}$$

k

4. Potassium metal is reacted with excess water to produce hydrogen gas and aqueous potassium hydroxide. 655 mL of hydrogen gas is collected over water at 32°C and a total pressure of 746 torr. How many grams of potassium reacted? The vapor pressure of water at 32°C is 38.3 torr.



- a) 2.93 g
b) 1.91 g
c) 18.2 g
d) 2.01 g
e) 0.953 g

B

$$2 \times \frac{\frac{746 - 38.3}{760} \times 655 / 1000}{0.08206 \times (32 + 273)} = n$$

$$n \times 39.1 \approx 1.91$$

5. A carbon-fluorine bond in a certain molecule absorbs radiation that has a frequency of $3.1 \times 10^{15} \text{ s}^{-1}$. What is the energy of this radiation in units of kJ per mole of photons?

- a) $3.41 \times 10^{-45} \text{ kJ/mol}$
b) $2.05 \times 10^{-21} \text{ kJ/mol}$
c) 1237 kJ/mol
d) 415 kJ/mol
e) $5.83 \times 10^{16} \text{ kJ/mol}$

$$E = hf$$

$$\frac{(6.626 \times 10^{-34} \times 3.1 \times 10^{15})}{1000} \times N_A$$

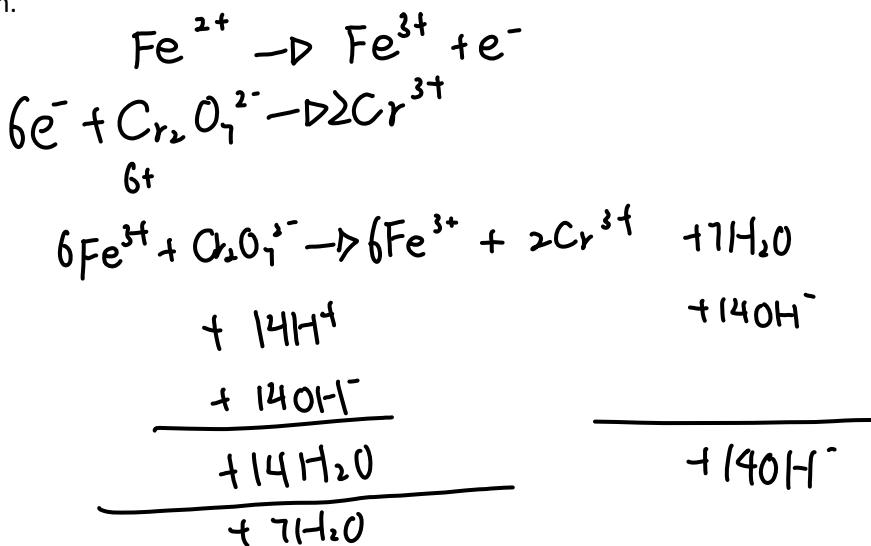
C

$$\Rightarrow 1237$$

6. The following unbalanced reaction occurs in basic solution: $Fe^{2+} + Cr_2O_7^{2-} \rightarrow Fe^{3+} + Cr^{3+}$
Complete the following statement: the coefficient for water in the balanced equation is _____, and water appears on the _____ side of the equation.

- a) 14, left
b) 14, right
c) 7, right
d) 7, left
e) none of these

D



Answers:

1) E

2) A

3) B

4) B

5) C

6) D