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: $CO_2 + 2\ LiOH \rightarrow Li_2CO_3 + H_2O$

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 °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

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

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

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

$\frac{2.4\times10^{-6}}{\sqrt{2}}$ vs $\sqrt{\frac{1}{2}}$

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.

$K + H_2O \Rightarrow KOH + \frac{1}{2}H_2$

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

B

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

$n \times 39.1 = 1.91$

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

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

C

$E = h\nu$

$$\frac{(6.626\times10^{-34} \times 3.1\times10^{15})}{1000} \times N_A$$

$\Rightarrow 1237$

6 14

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

$Fe^{2+} \rightarrow Fe^{3+} + e^-$

$6e^- + Cr_2O_7^{2-} \rightarrow 2Cr^{3+}$

6+

$6Fe^{3+} + Cr_2O_7^{2-} \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$

$+ 14H^+$

$+ 14OH^-$

$+ 14OH^-$

$+ 14H_2O$

$+ 14OH^-$

$+ 7H_2O$

Answers: 1) E 2) A 3) B 4) B 5) C 6) D