TESTING STRATEGIES

MC AND FR
2019

GENERAL INFORMATION

- WEDNESDAY, MAY 8TH –
- GO TO BED EARLY – GET A GOOD NIGHT'S REST
- LAY OUT ALL OF YOUR SUPPLIES FOR THE TEST
  - CALCULATOR (2 IF YOU WANT); EXTRA BATTERIES? OR MAKE SURE CALCULATOR IS CHARGED
  - SHARPENED #2 PENCILS
  - PENS
  - WATCH
  - LIGHT SWEATER OR JACKET (testing rooms often cold)

GENERAL INFORMATION

- THURSDAY, MAY 9TH – 8:00 AM TEST BEGINS
- SET YOUR ALARM EARLIER THAN NORMAL – GIVE YOURSELF TIME TO SHOWER
- EAT A GOOD BREAKFAST HIGH IN PROTEIN (BRAIN FOOD)
- LEAVE EARLY FOR TESTING SITE – PLAN ON ARRIVING ABOUT 30 MINUTES EARLY - YOU CAN FIND YOUR ROOM; RELAX FOR A FEW MINUTES BEFORE YOU BEGIN

MULTIPLE CHOICE

- 90 MINUTES
- 60 QUESTIONS
- NO CALCULATOR
- PERIODIC TABLE
- FORMULA SHEET
- 4 CHOICES
- NO GUESSING PENALTY

MULTIPLE CHOICE

- EACH QUESTION COUNTS THE SAME
- BUBBLE AS YOU GO –
- TAKE 3 SWEEPS THROUGH THE TEST
- UNDERLINE IMPORTANT INFORMATION AS YOU GO; SET UP MATH WORK IN THE MARGIN
- FIRST TIME THROUGH:
  - ANSWER ALL OF THE QUESTIONS THAT YOU KNOW HOW TO DO
  - MARK QUESTIONS THAT YOU KNOW HOW TO DO BUT THAT WILL TAKE A WHILE WITH A *****; MARK QUESTIONS THAT YOU HAVE NO IDEA ABOUT WITH AN **X**

MULTIPLE CHOICE

- SECOND TIME THROUGH
  - GO BACK AND ANSWER ALL OF THE QUESTIONS THAT YOU STARRED, BUBBLING AS YOU GO
- THIRD TIME THROUGH
  - GO BACK THROUGH AND TRY AND ELIMINATE CHOICES AND CHOOSE SOMETHING FOR ALL OF THOSE QUESTIONS THAT YOU MARKED WITH AN **X**
  - **DO NOT LEAVE ANYTHING BLANK!**

FREE RESPONSE

- 105 MINUTES
- 7 QUESTIONS –
  - 3 LONG (10PTS EACH) (about 20 min each)
  - 4 SHORT (4 PTS EACH) (about 7 min each)
- PERIODIC TABLE
- FORMULA SHEETS
- CALCULATOR

FREE RESPONSE

- QUICKLY SCAN THROUGH ALL OF THE QUESTIONS AND PLAN YOUR ATTACK
  - UNDERLINE IMPORTANT TERMS, NUMBERS, ETC AS YOU READ; THIS MAY HELP YOU DECIDE WHERE TO BEGIN
- SHOW ALL OF YOUR WORK IN THE LINED SPACES FOR EACH QUESTION
- NO WORK = NO CREDIT!

FREE RESPONSE

- BE SURE TO INDICATE WHICH PART OF THE QUESTION YOU ARE ANSWERING (YOU DO NOT HAVE TO ANSWER QUESTIONS OR QUESTION PARTS IN ORDER)
- RE-READ THE QUESTION AND MAKE SURE THAT YOU ANSWERED THE QUESTION THAT WAS ASKED BEFORE LEAVING THE QUESTION
- CHECK YOUR UNITS FOR PROBLEMS – DID YOU CONVERT WHEN NEEDED?

FREE RESPONSE

- BE SURE TO BALANCE ALL EQUATIONS WITH MASS AND CHARGE
- LEAVING OFF CHARGES WHEN NEEDED WILL RESULT IN GRADERS LEAVING OFF POINTS
- IF YOU GIVE THE GRADER CHOICES – WE ALWAYS CHOOSE THE **WRONG** CHOICE!
- MAKE SURE TO ATTEMPT EVERY SINGLE PART OF A QUESTION. DON'T GIVE UP AFTER THE FIRST PART

FREE RESPONSE

- LOOK FOR EASY POSSIBLE CHOICES EVEN IF YOU HAVE NO IDEA – GREATER THAN, LESS THAN OR EQUAL TO …(YOU HAVE 33% CHANCE!)
- REMEMBER TO USE **CER** – CLAIM, EVIDENCE AND REASONING IN YOUR RESPONSE.
- USE THE DATA GIVEN IN THE QUESTION IN YOUR RESPONSE.

MC questions:

Many will be regular type of MC with 4 answer choices. Not likely to see many recall questions; typically the question will require that you apply knowledge and terms and formulas.

Math Estimation Skills

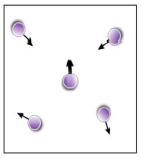
- Look at answer choices before you start calculating. Eliminate any answer choices that are not logical. Often the answer choices are far enough apart that no calculations are really necessary (or only very rough calculations are needed).
- Round off numbers to make the math easier.
- Remember that logarithmic values can be estimated, too. For example, the pH of a solution with $[H^+]$ of 2.0×10^{-3}, will be a little less than 3. The pH of a solution with $[H^+]$ of 9.5×10^{-3} will be a little greater than 2.

1. The atomic mass of copper is 63.55. Given that there are only two naturally occurring isotopes of copper, ^{63}Cu and ^{65}Cu, the natural abundance of the ^{65}Cu isotope must be approximately

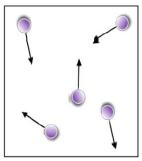
(A)90% (B)70% (C)50% (D)25%

2. Each of the following diagrams represent the same sample of helium gas at a different Kelvin temperature. Which of the following diagrams corresponds to the helium sample having the highest temperature?

A)



C)



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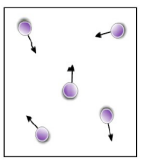
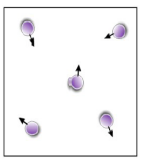


D)



3. The concentration of Ca^{2+} in impure tap water can be determined by the addition of Na_2CO_3 to a water sample to produce insoluble $CaCO_3$. Excess sodium carbonate solution is added to a 1.0 L sample of tap water and the precipitate that formed was filtered, dried, and had a mass of 0.1001 g. What was the concentration of calcium in the original water sample?

(A) $1.0 \times 10^{-1}\ M$

(B) $1.0 \times 10^{-2}\ M$

(C) $1.0 \times 10^{-3}\ M$

(D) $1.0 \times 10^{-4}\ M$

4. Which of the following reactions involves the transfer of electrons from one species to another?

(A) $HCl + NaOH \rightarrow H_2O + NaCl$

(B) $CaO + CO_2 \rightarrow CaCO_3$

(C) $Mg + CuSO_4 \rightarrow Cu + MgSO_4$

(D) $Pb(NO_3)_2 + 2HCl \rightarrow PbCl_2 + 2HNO_3$

Sample #	Mass of Fe	Mass of O	Attracted to a Magnet?
1	28 g	8 g	No
2	14 g	4 g	No

5. Two different samples, obtained in two different countries but appearing the same, were analyzed. The results of the analysis are shown in the table above. What can best be concluded from the data?

(A) One sample is a mixture and the other is a compound.
(B) The samples have different compositions because they are both mixtures.
(C) Both are the same compound because the ratios of the elements are the same.
(D) The samples represent two different compounds because the masses of each element are different.

$2Al(s) + 3Cl_2(g) \rightarrow 2AlCl_3(s)$

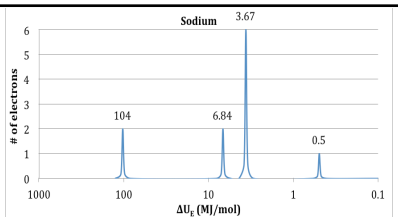
6. Which expression gives the volume of Cl_2 consumed, measured at 1 atm and 273 K, when 25 g Al reacts completely with Cl_2 according to the above equation?

(A) $25.0 \times \frac{3}{2} \times \frac{22.4}{2}$

(B) $25.0 \times \frac{27}{1} \times \frac{3}{2} \times \frac{22.4}{1}$

(C) $25.0 \times \frac{1}{27} \times \frac{3}{2} \times \frac{22.4}{1}$

(D) $25.0 \times \frac{1}{27} \times \frac{2}{3} \times \frac{22.4}{1}$



7. The diagram shown above is the photoelectron spectroscopy (PES) graph for sodium. How would you expect the PES graph for the most common ion of sodium to differ from the above graph?

(A) The graphs would be the same because they are for the same element.

(B) The graphs would have the same number of peaks, but the energy of each peak would be higher on the sodium ion graph.

(C) The graph for the sodium ion would have one less peak, but the remaining peaks would have the same energies.

(D)The graph for the sodium ion would have one less peak and the energies of all of the peaks would differ.

8. Based on the following reaction, the information provided and your knowledge of thermodynamic properties, which statement is correct regarding the reaction?

$C_2H_5OH(g) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$

$\Delta H° = -1371$ kJ/mol

A) Thermodynamically favored at all temperatures

B) Thermodynamically favored only at high temperatures

C) Thermodynamically favored only at low temperatures

D) Not thermodynamically favored at any temperature

Set questions:

These sets will give data and/or other information that applies to several questions. The questions often come from various topics. This type of question sometimes takes longer to answer because of more reading involved.

$5Br^-(aq) + BrO_3^-(aq) + 6H^+(aq) \rightarrow 3Br_2(l) + 3H_2O(l)$

The reaction between bromide ions and bromate ions in acidic water solution occurs according to the equation above, the rate law for this reaction is known to be:

Rate = $k[Br^-][BrO_3^-][H^+]^2$

7. Which of these statements is most likely correct concerning this reaction?

(A) The reaction involves the simultaneous 3-body collision of a bromide, bromate and hydrogen ion.

(B) The reaction involves a 4-body simultaneous collision (bromide, bromated and two hydrogen ions)

(C) The reaction occurs in a series of steps, involving intermediates.

(D) The rate determining step of the mechanism includes Br^-, BrO_3^- and H^+.

$5Br^-(aq) + BrO_3^-(aq) + 6H^+(aq) \rightarrow 3Br_2(l) + 3H_2O(l)$

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Rate = $k[Br^-][BrO_3^-][H^+]^2$

8. The overall order for this reaction is

(A) 2

(B) 3

(C) 4

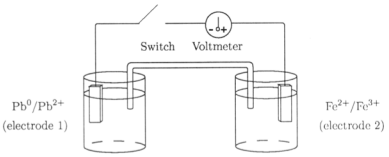
(D) 6

9. What is the effect of increasing $[H^+]$ in this reaction system?

(A)The value of the rate constant increases.
(B) The rate of the reaction decreases.
(C) The number of collisions between H^+ and other species increases.
(D) The effectiveness of the collisions between H^+ and other species increases.

The diagram below represents a standard Fe^{2+}/Fe^{3+} half cell connected to a standard Pb/Pb^{2+} half cell. The electrodes are numbered for purposes of identification.

$Pb^{2+}(aq) + 2e^- \rightarrow Pb(s)$ $E° = -0.13$ volts
$Fe^{3+}(aq) + e^- \rightarrow Fe^{2+}(aq)$ $E° = +0.77$ volts



11. Which correctly describes the materials used for the construction of the Fe^{2+}/Fe^{3+} half cell?

(A) The electrode is made of iron metal which is oxidized in the reaction.
(B) The electrode is made of Fe^{2+}, which is oxidized in the reaction.
(C) The electrode is inert and could be made of platinum metal.
(D) A platinum or graphite electrode is used and is reduced.

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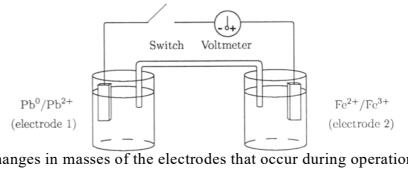

12. Which gives the changes in masses of the electrodes that occur during operation of the cell?

	Mass of Electrode #1	Mass of Electrode #2
(A)	Decreases	increases
(B)	Decreases	remains the same
(C)	Remains the same	decreases
(D)	Increases	remains the same

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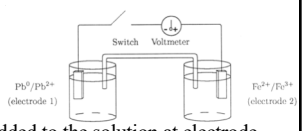

13. When a 0.1 M solution of KI is added to the solution at electrode #1, a bright yellow precipitate is formed. What happens to the voltage of the cell?

(A) The voltage decreases.
(B) The voltage increases.
(C) The voltage does not change.
(D) The voltage becomes zero.

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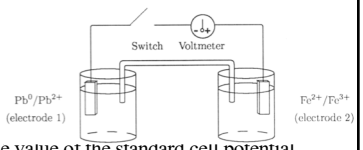

14. Which expression gives the value of the standard cell potential for the reaction?

(A) 0.77 – 0.13
(B) 0.77 + 0.13
(C) 2(0.77) + 0.13
(D) 2(–0.77) + 0.13