INSTRUCTIONS: Use a soft, #2 pencil. Your marks must be dark to be counted correctly.

Bubble in Form A on your Scantron Form
Write your perm number and bubble in your perm number. Correct perm = 2 points!

Each question is worth 3 points, you will not lose more than 3 points for incorrect answers.

You may work out the problems and write your answers on this quiz. Turn in the Scantron form only. Keep the quiz so you can check your work and your answers later. The answers to the quiz will be posted on the web.

www.chem.ucsb.edu

Go to “course pages”, then to Chem. 1A, General Chemistry (Van Koppen), select “quiz answers”
The quizzes will be graded by Thursday and your score will be posted on the web. Only you can check your score. To check your quiz score go to “student accounts” to set up a new account. You will need to enter your perm number and a 4-digit pin (choose any 4 digits that you will remember to sign on in the future). It will ask you for your email address. This will allow me to send messages to you and the rest of the class.

1. How many electrons are there in \(^{59}\text{Ni}^{2+}\)?
   a) 28
   b) 59
   c) 57
   d) 26
   e) 30
   \[28 - 2 = 26 \text{ electrons}\]

2. What is the correct formula for aluminum sulfate?
   a) AlSO\(_4\)
   b) Al\(_3\)(SO\(_4\))\(_2\)
   c) Al\(_2\)(SO\(_4\))\(_3\)
   d) Al\(_2\)SO\(_4\)
   e) Al(SO\(_4\))\(_3\)

3. Gaseous ammonia reacts with oxygen gas to produce nitrogen monoxide and water. What is the stoichiometric coefficient in front of H\(_2\)O when equation for this reaction is correctly balanced using integer coefficients?
   a) 1
   b) 2
   c) 3
   d) 4
   e) 6
   \[2 \text{NH}_3 + \frac{5}{2} \text{O}_2 \rightarrow 2\text{NO} + 3\text{H}_2\text{O}\]
   \[4 \text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}\]
4. Consider the reaction: \[ 2 \text{H}_2\text{S} + \text{SO}_2 \rightarrow 3 \text{S} + 2\text{H}_2\text{O} \]

How many moles of sulfur are produced if 4 moles of \( \text{H}_2\text{S} \) react with 3 moles of \( \text{SO}_2 \)? Assume 100% yield in the reaction.

a) 3
b) 6
c) 9
d) 12
e) 15

5. The following equation describes the oxidation of ethanol to acetic acid by potassium permanganate:

\[ 3 \text{C}_2\text{H}_5\text{OH} + 4 \text{KMnO}_4 \rightarrow 3 \text{CH}_3\text{COOH} + 4 \text{MnO}_2 + 4 \text{KOH} + \text{H}_2\text{O} \]

5.0 g of \( \text{C}_2\text{H}_5\text{OH} \) reacts with excess \( \text{KMnO}_4 \) producing 5.9 g of \( \text{CH}_3\text{COOH} \). What is the percent yield?

a) 100%
b) 91%
c) 67%
d) 30%
e) 5.9 g of \( \text{CH}_3\text{COOH} \) is impossible because it is greater than 100% yield.

\[ \frac{5.9 \text{ g C}_2\text{H}_5\text{OH}}{6.5} \times 100 = 91\% \]

6. Iron is produced from its ore by the reactions:

\[ 2 \text{C (s)} + \text{O}_2 \rightarrow 2 \text{CO (g)} \]

\[ \text{Fe}_2\text{O}_3 \ (s) + 3 \text{CO (g)} \rightarrow 2 \text{Fe (s)} + 3 \text{CO}_2 \ (g) \]

How many moles of \( \text{O}_2 \) (g) are needed to produce 1 mol of \( \text{Fe} \) (s)?

a) 0.5 moles
b) 0.75 moles
c) 1 moles
d) 1.5 moles
e) 3 moles