

Application for CHEM 1211 - Honors General Chemistry I

*Email this application as a single PDF file to Prof. Steele at ryan.steele@utah.edu
Review of applications will begin **July 12** but will be accepted until enrollment is full*

Course Information

CHEM 1211 is the Honors Section of General Chemistry and requires the lab course (CHEM 1240) as a co-requisite. The lecture section will be taught by Prof. Ryan P. Steele, and the lab section will be taught by Dr. Sushma Saraf. Students are also encouraged (but not required) to additionally complete the online Preparation for General Chemistry CHEM 1208 course prior to the fall semester.

Lecture section meets M,T,W,Th,F, 9:40-10:30am (CSC 205)

Co-Requisite CHEM 1240 – Honors General Chemistry Lab I

The “lab lecture” meets online, and the lab itself meets T or W 12:55-3:55pm (HEB 1317)

Student Information

Name: _____ ID# _____

Major: _____ Upcoming Year at U (circle): 1 2 3 4 5+

Are you a member of the Honors College? (circle) Yes No I will join this year.

Please rank your preferred laboratory times by circling your choices (1 = highest preference):

Tuesday 12:55-3:55pm 1 2 3

Wednesday 12:55-3:55pm 1 2 3

Please provide any of the following information that is applicable to you:

SAT scores: Reading/Writing _____ Mathematics _____

ACT scores: Math _____ Science _____ English _____ Reading _____ Writing _____

Overall high school GPA: _____ (out of _____)

Name and city of high school: _____

Name of high school chemistry instructor: _____

High school courses passed (circle all that apply, and provide an Advanced Placement score, if appropriate):

Algebra Biology AP ____

Geometry Chemistry AP ____

Pre-Calculus Physics AP ____

Calculus I AP (A/B) ____ Botany

Calculus II AP (B/C) ____ Biochemistry AP ____

Calculus III Computer Programming

Other math: _____ Other science: _____

Explain why you would like to join the Honors section of General Chemistry:

Problems

Write your answer in the space provided. If you do not know the answer, respond "unknown".

1. Sketch the Lewis structure and molecular structure of the SF_4 molecule. Provide the name of its molecular shape.

2. Simplify the following expressions:

(a) $2^8 =$ _____ (b) $10^{-3} =$ _____

(c) $e^2 e^3 =$ _____ (d) $\sqrt{10^8} =$ _____

3. Solve for the indicated variable:

(a) $3x = 72$ $x =$ _____ (b) $\log_{10} x = -1$ $x =$ _____

(c) $4xy = 17y^2$ $x =$ _____ (d) $\sin(x) = 0$ $x =$ _____

4. Determine the result of the following expressions:

(a) $\sin\left(\frac{\pi}{2}\right) =$ _____ (b) $\left[\cos\left(\frac{\sqrt{2}}{2}\right)\right]^{-1} =$ _____

(c) The (x, y) coordinates of $\theta = 150^\circ$ on the unit circle are _____ .

5. Determine the result of the following expressions:

(a) The (x, y) vector $(1, 2)$, when rotated 90 degrees counterclockwise, becomes _____.

(b) The (x, y, z) vector $(0, 2, 1)$, when reflected through the xz plane, becomes _____.

6. A load of garden mulch, with a volume of 4.0 cubic yards, is delivered to your home. In cubic inches, what is the volume of this delivery?

Volume = _____ in^3

7. The drive from Salt Lake City, UT to Denver, CO is 525 miles by interstate highway. At an average speed of 65 miles per hour—and without bathroom breaks—how many minutes would this drive take?

Time = _____ minutes

8. A diatomic nitrogen molecule—the dominant component in air—has a mass of 4.65×10^{-26} kg. At room temperature, its average speed is 515 m/s. In SI units, determine the average momentum of N_2 .

Momentum = _____

9. In the elementary chemical reaction $A \rightarrow B$, the rate of the reaction depends on the concentration of species B , denoted $[B]$, as _____. (Select one answer.)

(a) $\frac{d[B]}{dt}$ (b) $-[B]$ (c) $[B]^2$ (d) 0 (e) $[B](t)$

10. A combustion reaction drives most modern automobile engines. Is the combustion of octane (gasoline) exothermic, endothermic, or cannot be determined? In one complete sentence, explain your reasoning.