

For this part of the final exam, you must **create a problem** involving the concepts covered in this course. Carefully read the instructions below to make sure your work is complete. On the second page, you will find rubric that will be used to grade this work.

Instructions:

- Your work must be completed *individually*.
- Your work must be original (*you* created it).
- The question you generate must include one or several concepts covered in this course.
 - More advanced questions will receive higher scores.
- Your question must be based on one of the scenarios proposed below.
 - You do not need to incorporate *all* the information contained in a given scenario.
- You must provide the full answer key (solution) to the question you generated.
- A visual representation or graph must be included either as part of your question OR as part of the answer key.
 - This visual representation or graph must be linked to the question.
 - Your visual representation should be clear and easy to understand. Add labels or legend to help.
- Your question must be typed in a word document (or similar software); you can **use page 3** of this document to do so. The solution can be written electronically or by hand (and then inserted below the question).
- **Your question AND answer key must fit on one page.**
- Ensure that your work is clear, well laid out, easy to follow and understand.

Possible scenarios:

Use ONE of the scenarios described below to generate your question. For each scenario, a balanced chemical reaction is provided along with some parameters. As needed, you can propose other numerical values for this fictional system (e.g. concentration, temperature, pressure, molecular weight, thermodynamic parameters, kinetic parameters, etc). You do not need to incorporate all of the information included in a given scenario.

Scenario 1: $A(g) \rightarrow 2 B(g)$

$$\Delta H_{\text{rxn}}^{\circ} = 40 \text{ kJ / mol A}$$

The reaction is first-order with respect to A.

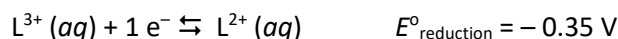
Scenario 2: $\text{Drug}(s) \rightleftharpoons \text{Drug}(aq)$ $K_{\text{sp}} = 4.3 \times 10^{-6}$



$$\text{p}K_{\text{b}} \text{ at } 25^{\circ}\text{C} = 4.5$$

$$\Delta H_{\text{rxn}}^{\circ} = -10 \text{ kJ / mol Drug}$$

Scenario 3: $M^{2+}(aq) + 2 e^{-} \rightleftharpoons M(s)$ $E_{\text{reduction}}^{\circ} = 1.23 \text{ V}$



Grading Rubric – Generating a Question & Answer Key

	Excellent	Good	Satisfac- tory	Unsatis- factory
QUESTION CONTENT: Demonstrate <u>one</u> of the course's big ideas - Equilibrium - Kinetics - Thermodynamics Complexity of the question - Question relates to more than one of the big ideas to demonstrate interconnections between the big ideas. - Question involves more than one topic within a given big idea.	3	2	1	0
Visual or graphic representation - Included either in the question or as part of the solution to the question - Could involve: - Sketch of a graph "Real" graph with made-up data - Molecular scale representation (<i>e.g. beaker and its solution, closed vessel and a gas mixture, etc</i>)	2	1.5	1	0
Solution to problem - Correct and complete solution (answer key) to the question is presented. - All relevant equations are shown - Numerical answers are correct and consistent with equation(s) - Assumptions are stated and justified. - Explanations (<i>if included</i>) follow the claim-evidence-reasoning framework.	3	2	1	0
ORGANIZATION & PRESENTATION:		Good	Satisfac- tory	Unsatis- factory
Question – <i>well presented, creative, easy to understand, complete</i>		1	0.5	0
Solution – <i>presented in a logical manner and is easy to follow</i>		1	0.5	0
TOTAL:	/ 10			

Use the space below to write your question and solution. You can copy the reaction and/or data from page 1 if desired.

Formatting: your question should be typed, using Times New Roman/Calibri/Arial or similar font, in size 11 or 12. Your solution can be typed or handwritten – if so, ensure that it is clear and easy to read.

Submission: **ONLY submit THIS ONE page containing your question & full solution** (nothing over 1-page will be assessed).

Before you submit: a) delete this instruction textbox along with pages 1 and 2 of this document and b) save your file as a PDF document.

Upload a PDF file of your complete work to the proper D2L Dropbox “final exam” folder.

Deadline to upload: Monday December 14th 6:30pm (MST)

STUDENT NAME:

UCID:

CHOSEN SCENARIO: _____

QUESTION:

SOLUTION: