

CADET _____ SECTION _____ TIME OF DEPARTURE _____

DEPARTMENT OF CHEMISTRY & LIFE SCIENCE

CH365 AY2023-2024 - QUIZ 1

No Time Limit, 60 Points

Thermodynamics

14 August 2023

TEXT: Introduction to Chemical
Engineering

SCOPE: Standing Instructions for Students (SIS)

References Permitted: Standing Instructions for Students (SIS) only.

INSTRUCTIONS

1. Do not mark this quiz until “begin work” is given. You will have 5 minutes.
2. Solve the problems in the space provided. Show all work to receive credit.
3. There are 12 problems on 2 pages in this quiz, not counting the cover sheet.
4. Answer all questions.

(TOTAL WEIGHT: 60 POINTS)

DO NOT WRITE IN THIS SPACE

PROBLEM	VALUE	CUT
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
11	5	
12	5	
TOTAL CUT		
GRADE	60	

Cadet: _____

1. In what two ways does a thermodynamic analysis augment chemical reactor design?
2. In what way does a thermodynamic analysis enable distillation design?
3. Give two definitions of entropy.
4. (True or False) Joan's resume for the writing assignment requires a cover sheet.
5. (True or False) I must purchase a textbook for this course.
6. (Yes or No) Mitch needs AI but the only time he has is Tuesday at 0930. Can he get AI at that time? Are there any constraints on instructor availability that time?
7. How can personal laptops be used on the WPRs?

Cadet: _____

8. A problem set with ten problems is due on a Friday at 1630. Cadet Jones submits five out of ten of the problems on time and five problems were submitted separately at 0705 on Saturday morning. Of the five on-time problems, one was perfect and four had minor errors. Of the five late problems, one had minor errors, three were perfect, and one showed an answer with no work. Use the rubric and grading policy to compute the score before resubmission.

9. Cadet Jones' grade was posted on Sunday, so she resubmitted the entire problem set Monday at 1600. All problems were perfect, errors were identified, and corrections explained. Use the rubric and the resubmission policy to compute the new score.

10. Cadet Smith worked closely with Cadet Jones on the problem set so the answers were the same as described in problem 8. Cadet Smith's grade was posted on Sunday, so she resubmitted the entire problem set Monday at 1605. All problems were perfect, but she failed to identify her mistakes and how she repaired them. Use the rubric and the resubmission policy to compute the new score.

11. Cadet Halsey submitted all ten problems on Friday at 1635, answers were all perfect, and detailed work was provided. Use the rubric to compute his score.

12. Calculate the total heat (in J) required to raise the temperature of 125 g of water from -10°C to 90°C at constant pressure of 1 atm (101.3 kPa). Use $q = n\Delta H_{\text{fus}}^{\circ}$ (where n is the number of moles) to calculate the heat of fusion of water, and use $q = mC_s\Delta T$ to calculate the heat associated with temperature changes of liquid and solid water. Add these heats to determine the total change in enthalpy. The specific heat capacity (C_s) of solid water is $2.09 \text{ J/g}\cdot\text{K}$ and $\Delta H_{\text{fus}}^{\circ}$ of water is 6.09 kJ/mol .

Enter final answer only, with SF and units.