This Homework Must be Uploaded onto CANVAS to Receive Credit.
Deadline: Shown in Syllabus

Name: _____

03HW-A Summary One-Page Cover Sheet

03HW-A-SP Summary of Results Omit Problem 5.4 and 5.16

Final Chemical Equation for SP03-A_A

Final Chemical Equation for SP03-A_B

Result	SP03-A_A	SP03-A_B	Comment on Reasons for Any Differences
Adiabatic Flame Temperature, [*K*]			
"*a*" for H_2O [*kgmole*]			
"*b*" for O_2 [*kgmole*]			
"*c*" for H_2 [*kgmole*]			
M [*kg/kgmole*]			
*c** [*m/s*]			

Copy of the "Reflect" Section of Your Literature Review (Paper Author Name)
Type in words here

Problems Assigned in the Syllabus from the Textbook

Upon a more detailed review of the problems selected from the textbook, I have decided to

- **Omit Problem 5.4 and 5.16**
- **Add the following three special problems**

Special Problem *SP-A*

1. Given: The example problem in the textbook (Method 1) on Complete Combustion (Starts on pg. 151)

2. Find:
   (a) Adiabatic Flame Temperature, T_c
   (b) The coefficient of the products, a
   (c) The Molecular Weight of the products, M
   (d) The gamma of the products,
   (e) Characteristic velocity of the products, c^*
   (f) Plot of specific heat of water as a function of temperature
   (g) Bonus (5 points): Plot of total enthalpy as a function of temperature (Figure 5.1 in book)

Set up and mathematically show all equations and units. Show solution steps and any iterations used to find the answer. Summarize results on front page summary.

3. Assume:
(a) adiabatic combustion, (b) no dissociation, (c) heats of formation from Table 5.1, (d) specific heat fits from Table 5.3, (e) The pressure is one atmosphere, pressure (f) the reactants are 298K

Special Problem *SP-B*

1. Given: The example problem in the textbook (Method 2) on Incomplete Combustion (Starting on Page 151)

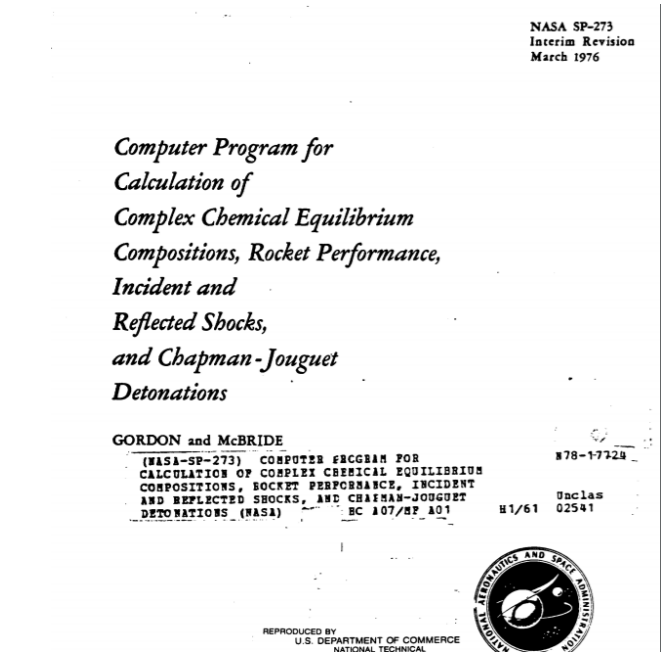
2. Find:
   (a) Adiabatic Flame Temperature, T_c
   (b) The coefficient of the products, a
   (c) The Molecular Weight of the products, M
   (d) The gamma of the products,
   (e) Characteristic velocity of the products, c^*
   (f) Plot of specific heat of water, O2, and H2 as a function of temperature
   (g) Bonus (5 points): Plot of total enthalpy as a function of temperature (Figure 5.1 in book)

Set up and mathematically show all equations and units. Show solution steps and any iterations used to find the answer. Summarize results on front page summary.

3. Assume:
(a) adiabatic combustion, (b) no dissociation, (c) heats of formation from Table 5.1, (d) specific heat fits from Table 5.3, (e) The pressure is one atmosphere, pressure (f) the reactant temperature are 298K, (g) one dissociation reaction, (h) equilibrium constants from book table (interpolated) or curve fit from Purdue Website

Special Problem *SP-C*

Read the report shown below. (Uploaded on HW Dropbox CANVAS site) and complete the attached Annotated Bibliography using the attached template. Read pages 31 to 36 and comment on that section in your write up. Skim though the rest of the report and note at least two items that interest you. Most of the modern codes are derived from this work, so it is informative to see where it started.



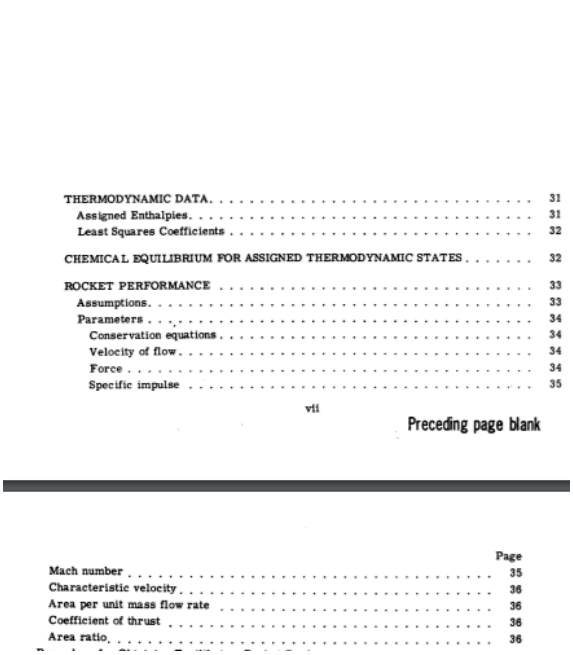
NASA SP-273
Interim Revision
March 1976

Computer Program for Calculation of Complex Chemical Equilibrium Compositions, Rocket Performance, Incident and Reflected Shocks, and Chapman-Jouguet Detonations

GORDON and McBRIDE

(NASA-SP-273) COMPUTER PROGRAM FOR CALCULATION OF COMPLEX CHEMICAL EQUILIBRIUM COMPOSITIONS, ROCKET PERFORMANCE, INCIDENT AND REFLECTED SHOCKS, AND CHAPMAN-JOUGUET DETONATIONS (NASA) BC A07/MF A01 N78-17729 Unclas H1/61 02541

REPRODUCED BY U.S. DEPARTMENT OF COMMERCE NATIONAL TECHNICAL



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Remember to upload you entire assignment in one file (including the Annotated Bibliography). If you work by hand and do not have a scanner, there are phone aps that you can use to take picture and pdf the pictures into one file. We just need to be able to clearly see all the requested homework in one file.

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General Instructions

- Uploading Assignment: The entire homework assignment must be uploaded in the CANVAS dropbox in one file. Use the filename *xxHW_Lastname_revxx.doc* when uploading to CANVAS. Your homework must be written neatly or typed. If you want to write it out, you can scan it or take pictures of it with your phone. I must be able to read the uploaded file. Submitting all solutions in one file is required.
- Uploading spreadsheets or other programs: If you use spreadsheets or other programs, put in screenshots of your graphs or pertinent tables into your homework file submission. You do not have to upload your spreadsheets, videos, or programs unless specifically requested in the assignment sheet. When using computer programs, be sure to document in your homework submission the basic equations and example calculations with units showing how the program works.
- Re-submitting homework: If you submit your package and then resubmit an update before the deadline, the newest submission will be graded.
- Grading Rubric**:** The homework grading rubric is shown on CANVAS. The completeness of the entire homework package is also a component of the homework grade.**Summarize**

Required Homework Format (See Example at end of this Syllabus)

In the solution of problems, you are required to:

1. **Name:** Provide name of the student.
2. **Given**: State briefly and concisely (in your own words) the information provided.
3. **Find:** State the information that you have to find.
4. **Schematic**: Draw a schematic representation of the system and control volume if applicable.
5. **Assumptions:** List the simplifying assumptions that are appropriate to the problem and implied by the equations used.
6. **Basic Equations**: Outline the basic equations needed to do the analysis. Use the proper symbol from the book where applicable.
7. **Analysis:** Manipulate the basic equations to the point where it is appropriate to substitute numerical values. Substitute numerical values (using a consistent set of units) to obtain a numerical answer. Include appropriate units in calculations. If multiple repetitive calculations are done on a spreadsheet for example, show at least one example calculation in detail, including all units. The significant figures in the answer should be consistent with the given data. Check the answer and the assumptions made in effecting the solution to make sure they are reasonable.
8. **Answer**. Label the answer(s) with a box and an arrow from the right-hand margin.
9. **Comment**: Write a comment at the end of the homework that reflects on the limitations of the solution, the reasonableness of the solution, or something that you learned by doing the problem.

All nine formatting elements must be specifically shown in Each HW to receive full credit unless otherwise specified.

Reference Document Examined:	List the complete citation of the reference here. Use the AIAA Journal reference format.
Reviewer:	Your Name
Source of Document:	List the source of the document (online, company, particular library, particular website, and any copyright information.
Date of Review:	Put in the date of your review
Electronic File Name:	**Put in the name of the electronic file**

Summary of Paper:

Type in your one-page summary, single space, here. This paragraph or set of paragraphs should at least complete the first page. You may include one picture (not to exceed ½ pages) in the summary.

B. Assess:

Important Facts from Document:

1. List five important facts you learned from the reference document you examined. Put them in the form of complete sentences.
2.

Key Figure from Document:

Put in one key figure from the paper with a caption (cite Paper in footnote)

Important Relationships among Parameters Described in the Paper:

1. List 2 important relationships among parameters that are described in the paper
2. For example, when the pressure in the chamber goes up, the specific impulse increases;
3. For example, when a supplier goes out of business, the rocket community must turn to commercial industries that have a larger market to sustain the products.

C. Reflect

"Once you've summarized and assessed a source, you need to ask how it fits into your research. Was this source helpful to you? How can you use this source in a research project? Has it changed how you think about your topic?" Write this in your own words.