

Problem 1 (5 pts)

In problem 3 of Homework 4 we considered a hazardous material incinerator. Write a short report (1 page) describing the problem and your solution of it. Be sure to include the following:

- A description of the problem, including the known variables.
- The equations required to solve the problem, including the stoichiometry equation, the basic molar balance equations, and the matrix form of these equations.
- Your basic approach to solving the problem.
- The answers obtained from your Matlab script. You do not need to submit your Matlab script.

Submit your solution as either a Word file (.doc or .docx) or as a PDF file (if you use a different word processor).

Problem 2 (5 pts)

Using the data from wikipedia: http://en.wikipedia.org/wiki/World_population, create a document illustrating:

1. The world's population as a function of time from 1800 to the present. Use a logarithmic scale on the y (population) axis.
2. On a separate figure, show the *percentage* of the world's population residing in Africa, Asia, Europe, North America, and South America as a function of time from 1800 to the present. Provide a brief discussion of the trends you observe. For example, is there a population shift (by percentage) from one continent to another?
3. On a separate figure, show the *change* in the population of Africa, Asia, Europe, North America, and South America as a function of time from 1800 to the present. (Hint: if you are using Matlab, you may want to use the "diff" function - try "help diff" for more information).

You must submit this as a brief report (no more than one page). Submit the file as either a Word file or as a PDF file (if you use a different word processor).

You may create the plots in either Excel or Matlab. Also submit the Excel or Matlab file that you used to generate the plots in your document.

Problem 3 (5 pts)

Revisit Homework 3, problem 1. Write a short report describing the projectile motion equations, and then provide plots of the height of the projectile as a function of time for $\theta = 20, 45$ and 70 degrees and an

initial speed of $v_0 = 10 \frac{\text{m}}{\text{s}}$. You do not need to submit your Matlab code or Excel file - only the report that describes the problem (with the appropriate equations) and shows your results.

Submit your report as either a Word file or as a PDF file (if you use a different word processor).