

**Homework 2.****Due: 3:35pm, Monday September 26, 2005.**

For Problems 1-3 please use free sheets of paper (i.e. NOT paper torn from your notebook) and present your answers neatly, clearly and understandably. Follow the guidelines given on 9/12/05. Also read through Section 4.3 (page 79) of Moaveni, which documents how to layout a homework problem. I would prefer you to get into the habit of using engineering paper, but that is not a requirement.

Please use a word processor for preparing your answers to Problem 4 - 6.

**QUESTION 1.**

Using the correct number of significant digits, convert the following physical quantities to the proper SI units

- a) 645 lbm
- b) 98.2°F
- c)  $4.75 \times 10^2$  acres
- d)  $55 \times 10^2$  gal
- e)  $110.0 \times 10^3$  gal/h
- f) 88 ft/s
- g) 285 hp
- h) 2025 in
- i)  $1.255 \times 10^2$  ft<sup>3</sup>/min

**QUESTION 2.**

How many significant digits are contained in each of the following quantities?

- a) 322
- b) 3.22
- c) 0.0322
- d) 0.03220
- e)  $3.2203 \times 10^5$
- f) 0.0030
- g) 3,600 s/h
- h) 5280 ft/mi
- i)  $2.006 \times 10^4$
- j) 0.09050

**QUESTION 3.**

Perform the following computations and report the results with the appropriate number of significant digits.

- a) 648.2/14.0
- b) 436.2 nmi/1.06h
- c)  $(4.010 \times 10^2 \text{ s})/3600 \text{ s/h}$
- d) \$95.99 (0.15)
- e)  $[(4.83 * 10^3) - (14.63 * 10^2)]/136.2$

#### **QUESTION 4.**

Repeat Questions 1 and 3 using a spreadsheet.

Turn in a print out of your spread sheet. The spreadsheet should show sufficient documentation to demonstrate how answers were obtained.

Note: Answers in Question 4 should be identical to Questions 1 and 3.

#### **QUESTION 5.**

New York City used a 1.2 billion gallons of water a day<sup>1</sup>. Assuming low-consumption (1.6 gals/flush) this is equivalent to everyone (8 million people) in New York flushing a toilet **every** 15 minutes all day and night! (See New York Water.xls on the class website)

Kingwell writes:

*I have tried in vain to visualize what 1.2 billion gallons looks like – a 12 –foot deep swimming pool the size of Central Park? An aqueous version of the Empire State building? But I do know that it’s a hell of a lot.”*

Develop a visual image of how much water 1.2 billion gallons represents using a measure that someone from Delaware might relate to. Document your assumptions and sources and explain your calculation.

#### **QUESTION 6.**

Estimate the cost of lighting Kirkbride 205 for this academic semester using local electric energy rates. Clearly state your assumptions and document your calculations.

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<sup>1</sup> Kingwell, Mark, “Dihydrogen monoxide and the city” in *Nothing for granted*, Penguin, 2005.

## GRADING SHEET – HOMEWORK 2.

CIEG 125 - Introduction to Civil Engineering.

NAME: \_\_\_\_\_

**This sheet MUST be stapled to the front of your homework.**

		Points awarded	Max points
General Presentation (13 points total)	Name, Date, Assignment #		4
	Neatness		3
	Logical Presentation		3
	Spelling/Grammar		3
Question 1. (27 points total)	For each question (3 points): Correct conversion factor(s) – 1 Calculation – 1 Correct number of significant digits – 1		27
Question 2. (10 points total)	Each question – 1 point		10
Question 3. (20 points total)	For each question (2 points): Calculation – 1 Correct number of significant digits -1		20
Question 4. (10 points)	Layout		5
	Explanations		5
Question 5. (10 points)	Assumptions		2
	Sources		2
	Explanation		3
	Calculation		3
Question 6. (10 points)	Assumptions		5
	Calculation		5
TOTAL			100