**Water:**     Two cups of equal size are placed one on the top of the other. The one on the top is filled with water. The one on the bottom is filled with alcohol. Through a small hole, water drips into the alcohol cup at constant rate and mixture drips at the same rate through a hole in the bottom cup. Assume that water and alcohol mix completely and instantly. What is the alcohol percentage in the bottom cup when the water cup is completely empty?

---

♣ Please **Submit** your solution to

- o   *Dr. Erol Akbas,*     eakbas@gsu.edu or
- o   *Dr. Tirtha Timsina,*    ttimsina@gsu.edu

before the deadline: **Wednesday, February 29th, 7:00PM.**

♣ The WINNER will be awarded with a $25 gift certificate and will be announced in the NEXT issue.

---

## Problem of the last month:

**Largest value:**     What is the largest possible value of $t_1 \cdot t_2 \cdot t_3 \cdots t_n$ where

$t_1 + t_2 + t_3 + \cdots + t_n = 100$   and $t_i$ is a positive integer?

**Proof:** Assume that $t_1 + t_2 + t_3 + \cdots + t_n = 100$   where each $t_i$ is a positive integer.

For the largest product $t_1 \cdot t_2 \cdot t_3 \cdots t_n$, notice that

- n has to be greater than 1.
- None of the $t_i$ is 1.
- None of the $t_i$ can be 5 or larger.
- There cannot be more than two 2s.
- There cannot be more than one 4.
- There cannot be both a 4 and a 2.

So the product $t_1 \cdot t_2 \cdot t_3 \cdots t_n$ consists of 3s, and either a 2 or a 4.

$100 = 33*3 + 1 = 32*3 + 4 \Rightarrow$ The largest product is $3^{32}*4$.

**Winner: John Hull**

**Participants with correct solutions: John Hull, Joseph Moravitz, Rachid Marsli**

---