

NOTE: Use engineering format for problems 1 and 2. This is an individual assignment.

1. While at the beach, the contact lens in your left eye starts to bother you; unfortunately, you didn't bring any contact solution. A quick internet search shows that contact solution is essentially a water and salt mixture consisting of 0.9% NaCl. Fortunately, you brought some mineral water which you determine from the nutrition label to have a 0.111% wt NaCl. If you fill $\frac{1}{4}$ of a 20-ounce bottle with ocean water (3.5% NaCl), how much mineral water would you have to add to the bottle to obtain the desired salt concentration for a contact cleaning solution. Please provide your answer in ounces, and indicate whether or not the mixture would fit in the bottle.
16.4 oz
2. A group of friends decide to start a company that produces dehydrated fruit snacks. One of the company's founders is a chemical engineer. He is performing an analysis that will determine how many fruit snacks can be created per day on the watermelon line which will be included in the business plan that will be presented to potential investors. The process for dehydrating watermelon is a continuous one where watermelon is placed on a conveyor and air dried under heat lamps before entering a long dehydration machine. Watermelon initially contains 92% water, and after air drying under the heat lamps, the water content drops to 85%. The watermelon then moves into dehydration machine where it exits as a delicious snack consisting of 3% water. If the watermelon enters the air-drying area at a rate of 140lbs/hr, find
 - a. The rate that the watermelon enters the dehydration machine. **74.67 lb/hr**
 - b. The rate that the final watermelon product leaves the dehydration machine. **11.56 lb/hr**
 - c. The rate that the water leaves the air-drying section. **65.33lb/hr**
 - d. The rate that the water leaves the dehydration machine. **63.12lb/hr**
 - e. If the line runs for 7 hours each day, how many pounds of watermelon snacks can the company process each day? **80.85lb/day**
3. Prepare your team's fishtank system to achieve intelligent control of salinity while also controlling temperature. The evaluation sheets can be found in the materials for Class 14.
4. **(Due class after next)** Group presentation for fishtank project:
 - a. Time: Six minutes with 2 minutes for questions (8 minutes total)
 - b. Participation: All team members must present
 - c. Dress: Professional (business casual) attire
 - d. Presentation should include
 - i. Title slide with project title and the names of each team member
 - ii. Project overview
 - iii. Temperature control system
 - iv. Salinity control system
 - v. Overall system operation
 - vi. Discussion of what worked well and what could be improved
 - vii. Conclusions
 - e. Consider including these topics in your presentation. You are not limited to these topics
 - i. Overview of operation (pictures)
 - ii. Description of system components (pictures, specifications, cost)
 - iii. Circuit diagram and explanation (power supply, transistor, relay, interface to Arduino)
 - iv. Calibration steps and equations for the conductivity sensor and thermistor
 - v. Programming and control
 - vi. Reliability issues