Name: _____ date: _____ period: _____

Ch. 1 density test 50 points [5 ec] ngss chemistry

In problems involving any calculation, show your work in an organized manner, include any relevant equation (or formula), conversion factor(s), and units in your work and answer.

1. A hypothetical object has a density of 4.0 g / mL; solve: [6 points; hint: ch. 1.1; 1.3.; 1.5]

   a. 44 g sample = ___ mL of the object

$44\,g \times \frac{mL}{4\,g} = 11\,mL$

3 pt @

$d = \frac{m}{v}$

$\frac{4\,g}{mL} = \frac{44\,g}{v}$

$v = 11\,mL$

   b. 68 mL sample of the object = ____ grams of the object

$68\,mL \times \frac{4\,g}{mL} = 272\,g$

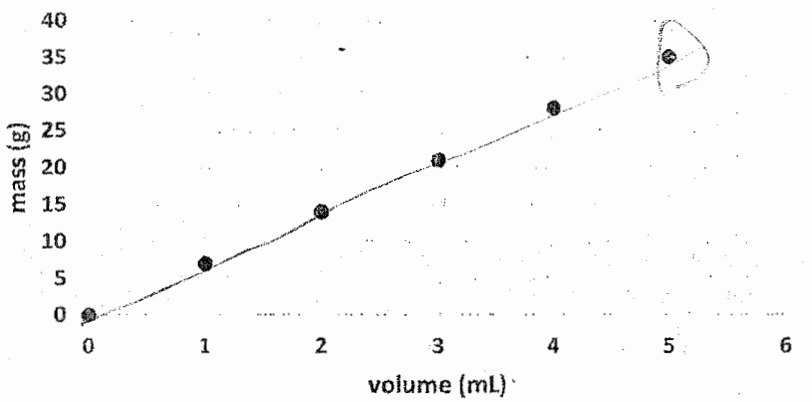
68 / 272

$d = \frac{m}{v}$

$\frac{4\,g}{mL} = \frac{x}{68}$

$x = 68(4) = 272\,g$

2. Based on the below graph of hypothetical experimental data, estimate the density of the object. Show your work, includes equation / formula. [4 points; hint: ch. 1.1; 1.3; 1.5]



2 pt

density = slope = $\frac{mass}{vol}$

$= \frac{35\,g}{5\,mL}$

$= 7\,\frac{g}{mL}$

3. Describe the reason / rationale of the below submarine movements. [10 points; hint: ch. 1.6]

a. goes from the surface to beneath the surface of the ocean

add salt H_2O to submarine
increase submarine's weight

$F_{grav} > F_{boy}$

3 + 2 pts

b. goes from the beneath the surface of the ocean to the surface of the ocean

remove salt H_2O in submarine
decrease submarine's weight

$F_{boy} > F_{grav}$

4. In the video showing that an egg sinks in water and dissolving sufficient salt into the water causes the egg to float. What is / are the reason(s) for these observations – sink versus float ? [10 points; hint: 1.1; 1.6]

T-py

add salt → ↑ density of soln

$F_{boy} = m_{disp} \cdot g$

$= \rho V \cdot g$

↑ ρ → ↑ F_{boy}

float b/c $F_{boy} > F_{grav}$

sink b/c opposite of

i.e.

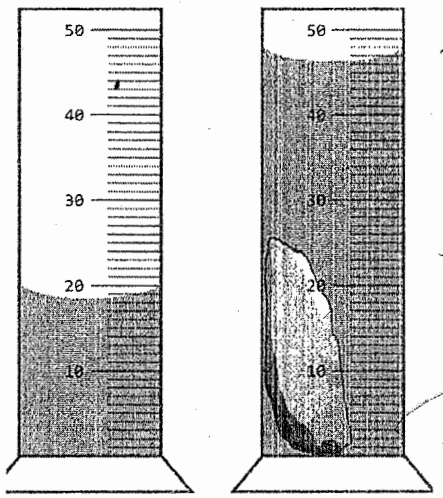
$F_{grav} > F_{boy}$

or

$F_{boy} < F_{grav}$

5.

A hypothetical object has a mass of 85 grams and was added to a graduated cylinder filled with water, which is shown on the right. Based on the information in this problem, estimate the density of the object in grams / mL. [10 points; hint: ch. 1.1; 1.2; 1.3; 1.4; 1.5]



$\Delta V =$
$46 - 18$
$= 28$ mL
3 + 2 pt

3 + 2 pt

density : $\frac{\text{mass}}{\text{volume}}$

$= \frac{85\text{ g}}{28\text{ mL}}$

$= 3.0 \frac{\text{g}}{\text{mL}}$

6. Solve. [15 points; hint: ch. 1.3; 1.4]

a. 45 feet = ___ yards

3 + 2 pt

$45 \text{ feet} \cdot \frac{\text{yard}}{3 \text{ feet}} = 15 \text{ yard}$

b. 3.25 hours = ___ seconds

$3.25 \text{ hour} \cdot \frac{60 \text{ min}}{\text{hour}} \cdot \frac{60 \text{ sec}}{\text{min}}$

$= 11,700 \text{ seconds}$

c. $\frac{45\ feet}{second} = \frac{\quad}{\quad} \frac{yards}{hour}$

$\frac{45 \text{ feet}}{\text{sec}} \cdot \frac{60 \text{ sec}}{\text{min}} \cdot \frac{60 \text{ min}}{\text{hour}} \cdot \frac{\text{yard}}{3 \text{ feet}}$

$= 54,000 \frac{\text{yard}}{\text{hour}}$