

Pre-Laboratory Questions

1. A metal sphere weighing 9.48^m g is added to 21.27 mL water in a graduated cylinder. The water level rises to 24.78 mL. Calculate the density of the metal.

$$v = 3.51 \text{ mL}$$

$$d = m/v \rightarrow 9.48 / 3.51$$

$$= 2.70 \text{ g/mL}$$

2. An empty beaker weighs 32.4257^m g. A 10.00 mL sample of unknown liquid is transferred to the beaker. The total mass of the beaker and liquid sample was 39.4507 g. Calculate the density of the unknown liquid.

$$m \text{ of the unknown liquid} = 7.025 \text{ g}$$

$$d = m/v \rightarrow 7.025 / 10.00$$

$$= 0.7025 \text{ g/mL}$$

3. A term that is easily confused with density is **specific gravity**. What is meant by specific gravity? What are the units of specific gravity?

unitless, the density of ~~the~~ anything over density of water

Results and Calculation

A. Determination of the Density of Pure Liquid

Pure water	Trial (I)		Trial (II)	
Mass of beaker	34.41	g	34.39	g
Mass of beaker + water	42.60	g	44.34	g
Mass of water	8.19	g	9.95	g
Volume of water	10.00	mL	10.00	mL
Temperature of water	19.0	°C	19.5	°C
Density	0.819	g/mL	0.995	g/mL
Average density	0.907			g/mL
Handbook density	0.9983			g/mL
Unknown liquid				
Unknown Number	A			
Mass of beaker	34.39	g		g
Mass of beaker + unknown liquid	44.81	g		g
Mass of unknown liquid	10.42	g		g
Volume of unknown liquid	10.0	mL		mL
Density of unknown liquid	1.042 g/mL			g/mL

B. Density of Solutions

	Trial (I)	Trial (II)
Mass of beaker	34.35 g	34.35 g
Volume of solution	10.0 mL	
Mass of beaker + solution	44.45 g	
Mass of solution	10.1 g	
Temperature of solution	22.0 °C	
Density of solution	1.01 g/mL	

C. Density of Solids

	Trial (I)	Trial (II)
Mass of beaker	34.40 g	
Mass of beaker + solid pieces	44.92 g	
Mass of solid pieces	10.52 g	
Initial water level in the graduated cylinder	70 mL	
Final water level in the graduated cylinder	75 mL	
Volume of solid pieces	5 mL	
Density of the solid substance	2.05 g/mL	

Questions

1. What error would be introduced into the density of the metal pellets if you had not shaken the pellets to remove adhering air bubbles? Would the density be too high or too low?

~~high~~ personal error, too low

2. The density of silver is 10.5 g/cm^3 and the density of platinum is 21.45 g/cm^3 . If equal masses of silver and platinum were transferred to equal volumes of water in graduated cylinders, which graduated cylinder would have the highest volume reading? Explain.

Ag, because the density is cross-proportional with volume. The lowest volume ~~the higher density~~ density have the higher volume.

$$\text{cm}^3 = \text{ml}$$