CHM 1010 **GAGE**

Practice Problems for Scientific Method and Measurement **Answers**

1. An average adult has 5.5 quarts of blood. What is this volume in mL?

$$5.5\ qt \times \frac{1\ L}{1.05\ qt} \times \frac{1000\ mL}{1} = 5.2 \times 10^3\ mL$$

2. Classify each statement as law, theory, hypothesis, belief or fact:
   a. The laws of physics are the same throughout the universe.
   belief; cannot get everywhere in the universe to verify it is true
   b. Sodium is a soft, silvery metal. Fact; specific, observable
   c. The volume of any gas at a set temperature and pressure depends on its mass. law; generalized statement with no explanation for relationship
   d. The shape of a molecule is determined by electron pairs since electron pairs repel and will orient themselves to minimize repulsions.
   theory; generalized statement with an explanation for observations

3. How many cg are in 2.52 kg?

$$2.52\ kg \times \frac{1000\ g}{1\ kg} \times \frac{100\ cg}{1\ g} = 2.52 \times 10^5\ cg$$

4. Determine the number of significant figures in the following numbers:

0.250	3	2500.	4	3,000,000	1
6502	4	0.000309	3		

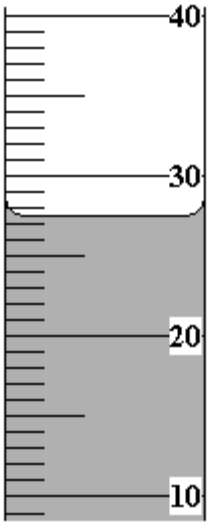
5. How many minutes does it take for light from the Sun to reach Earth if light travels at 3.00×10^8 m/s? The distance from the Earth to the Sun is 93 million miles. (1.61 km = 1 mi)

$$93 \times 10^6\ mi \times \frac{1.61\ km}{1\ mi} \times \frac{1000\ m}{1\ km} \times \frac{1\ s}{3.00 \times 10^8\ m} \times \frac{1\ min}{60\ s} = 8.3\ min$$

6. Gold is a chemically unreactive, precious metal. A gold ingot with a mass of 301grams has a volume of 15.6 cm^3. Calculate the density of the ingot.

$$D = \frac{M}{V} = \frac{301\ g}{15.6\ cm^3} = 19.3\ g/cm^3$$

7. Determine the volume in the graduated cylinder shown on the board. Be sure to consider significant figures.
27.4 or 27.5 mL



8. A drug company makes a medication with a concentration of 200. mg/L. If the normal dose is 0.15 mg/kg of body mass, how many mL should a 150. lb person receive?

$$150\ \text{lb} \times \frac{1\ \text{kg body}}{2.205\ \text{lb}} \times \frac{0.15\ \text{mg med}}{1\ \text{kg body}} \times \frac{1\ \text{L med}}{200.\ \text{mg med}} \times \frac{1000\ \text{mL med}}{1\ \text{L med}} = 51\ \text{mL med}$$