

$\rho_{ice} = .92 \text{ g/cm}^3$ $\rho_{H_2O} = 1 \text{ g/cm}^3 = 1000 \frac{\text{kg}}{\text{m}^3}$

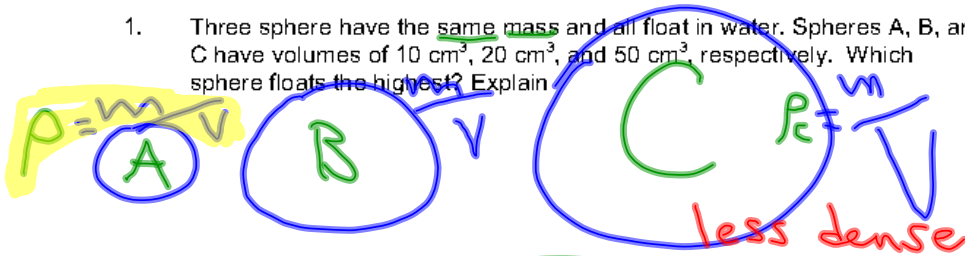
Name _____ Date _____ Per. _____

REVIEW PROBLEMS FOR TEST CH 13 **PHYSICS**

Objective: Practice problems regarding buoyancy, density, pressure, etc.

Show your work. Write the original equation. If there is a numeric answer, circle the solution.

1. Three spheres have the same mass and all float in water. Spheres A, B, and C have volumes of 10 cm^3 , 20 cm^3 , and 50 cm^3 , respectively. Which sphere floats the highest? Explain.



2. A block of plastic has a mass of 45 g and a volume of 50 cm^3 . Will the block sink or float in H_2O ? Why?

$\rho = \frac{m}{V} = .9 \frac{\text{g}}{\text{cm}^3}$ Thus, it floats

3. A piece of plastic just barely floats in water. If it has a mass of 50 g, what is its volume? (Don't forget to follow instructions - show work & original equation.)

$\rho = \frac{m}{V}$
 $1 \frac{\text{g}}{\text{cm}^3} = \frac{50 \text{ g}}{V} \Rightarrow V = 50 \text{ cm}^3$

4. A plastic bobber just barely floats in water. If it weighs 10 N in air, what is its volume?

$F = mg$
 $m = 1 \text{ kg}$
 $\rho = \frac{m}{V}$
 $V = \frac{1}{1000} 1000 \text{ cm}^3$

$F = 10 \text{ N} = \rho V g$ $\rho_{H_2O} = 1000 \frac{\text{kg}}{\text{m}^3}$
 $10 \text{ N} = (1000 \frac{\text{kg}}{\text{m}^3}) V (10 \frac{\text{m}}{\text{s}^2})$
 $.001 \text{ m}^3 = V$

5. A hollow sphere has an average density of 5 g/cm^3 and a mass of 25 g. What will the sphere weigh under water?

$\rho = 5 \frac{\text{g}}{\text{cm}^3}$ $m = 25 \text{ g} = .025 \text{ kg}$
 $V = 5 \text{ cm}^3$

$F_{\text{apparent}} = F_g - F_B$
 $= mg - \rho_{H_2O} V g$
 $= (.025 \text{ kg})(9.8 \frac{\text{m}}{\text{s}^2}) - (\frac{1 \text{ kg}}{\text{cm}^3} \cdot \frac{1}{1000})(5 \text{ cm}^3)(9.8 \frac{\text{m}}{\text{s}^2})$

$\rho = \frac{m}{V}$
 $V = \frac{25 \text{ g}}{5 \frac{\text{g}}{\text{cm}^3}} = 5 \text{ cm}^3$

Handy Conversion

$10^6 \text{ cm}^3 = 1 \text{ m}^3$
 $10^4 \text{ cm}^2 = 1 \text{ m}^2$
 $10^2 \text{ cm} = 1 \text{ m}$

$\approx .2 \text{ N}$


$1 \frac{\text{g}}{1000}$

Apparent Weight = Weight - F_{buoyant}

6. A block of metal weighs 50 N in air and 40 N in water. What is the volume of the block?

$F_g = F_{\text{apparent}}$
 $40\text{ N} = 50\text{ N} - F_B$ FIND: V

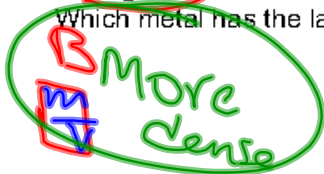
$F_B = \rho_{\text{H}_2\text{O}} V g \Rightarrow 10\text{ N} = (1000 \frac{\text{kg}}{\text{m}^3}) V (10 \frac{\text{m}}{\text{s}^2})$



7. If a block of material has a mass of 200 grams and a volume of 600 cubic centimeters, what is its density?

$$\rho = \frac{m}{V} = \frac{200\text{ g}}{600\text{ cm}^3}$$

8. A kilogram of metal A has a volume 80% larger than a kilogram of metal B. Which metal has the larger density? Explain.



9. Copper has a density of 8930 kg/m³. What is the density of copper in g/cm³?

We know

$$\rho_{\text{H}_2\text{O}} = 1 \frac{\text{g}}{\text{cm}^3} = 1000 \frac{\text{kg}}{\text{m}^3}$$

$$8.930 \frac{\text{g}}{\text{cm}^3}$$

10. What is the volume of a metallic weight with a mass of 600 g if its density is 11 g/cm³?

$$\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho}$$

11. If the density of a certain kind of wood is 0.75 g/cm³, what is the mass of 5,000,000 cm³ of the wood? Does it float? Explain

$$\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho}$$