**IB Physics**

**Group Quiz G**

Name

Show your work, round to the correct significant figures, circle your answers, and label them with units.

1. a. What is the buoyant force on a block of wood that is 2.95 cm x 4.50 cm x 4.50 cm submerged in fresh water? (ρ = 1000. kgm-3)

b. If the wood has a density of 362 kgm-3, what is its mass? What is its weight?

c. What downward force would you need to exert to hold it under the water?

(0.586 N, 0.0216 kg, 0.212 N, 0.374 N)

2. a. A rectangular block of wood has a density of 345 kgm-3 and measures 85.2 cm x 64.2 cm x 20.0 cm. It floats in water (ρ = 1000. kgm-3) with a large face down in the water. What is its mass? What volume of water must it displace to float? (What is the volume of water that has this mass?)

b. How far up the 20.0 cm side does the water come so that the block displaces this volume of water?

(85.2 cm x 64.2 cm x X = volume)

c. How much of the 20.0 cm dimension sticks up above the water?

(37.7 kg, 0.0377 m3, 0.069 m or 6.90 cm, or 13.1 above)

3. What downward force would you need to exert to keep a 24.0 cm radius sphere with a density of 118 kgm-3 submerged in a fluid with a density of 871 kgm-3?

4. What upward force would you need to exert on a 85.0 kg piece of basalt (2920 kgm-3) submerged in the dead sea where the water has a density of 1240 kgm-3 to keep it from sinking?

5. A 15.2 gram hydrometer is a 0.895 cm diameter tube weighted on one end so it floats upright in a liquid. If it is 24.0 cm long, but floats with 13.5 cm exposed to air, what is the density of the liquid?

6. A glass (2580 kgm-3) cylindrical stirring rod is 4.65 mm in diameter and 21.0 cm long. What force do I need to exert on it to hold it vertically at rest with the tip submerged in acetone (791 kgm-3) to a depth of 15.0 cm?

7. A rectangular piece of wood that measures 12.0 cm x 12 cm x 6.00 cm floats face down in a fluid with a density of 925 kgm-3 with 4.25 cm of the 6.00 cm dimension submerged. What is the density of the wood?

8. A 10.2 kg piece of rock can be supported by a force of 62.1 N when submerged in water with a density of 1240 kgm-3. What is the density of the rock?