

## PAL Problem Set 22 for Phys 5A (Pressure and Buoyant Force)

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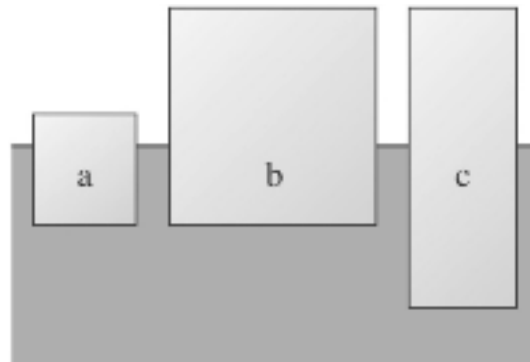
**Always explain your answers and show your work.**

**Problem 1** - Water expands when heated. Suppose a beaker of water is heated from 10 °C to 90 °C. Does the pressure at the bottom of the beaker increase, decrease, or stay the same? Explain.

**Problem 2** - When you place an egg in water, it sinks. If you add salt to the water, after some time the egg floats. Use the words *pressure*, *density*, *weight*, and *buoyant force* (or *buoyancy*) to explain why.

**Problem 3** - A 6.0 kg freshwater fish at the surface of a lake is neutrally buoyant. If the density of its body with its swim bladder deflated is  $1060 \text{ kg/m}^3$ , what volume of gas must be in the swim bladder for the fish to be neutrally buoyant? [The density of freshwater is  $1000 \text{ kg/m}^3$ ]

**Problem 4** - Rank in order, from largest to smallest, the densities of objects A, B, and C. Carefully explain.



**Problem 5** - Glycerin is poured into an open U-shaped tube until the height on both sides is 20 cm. Ethyl alcohol is then poured into one arm until the height of the alcohol column is 15 cm. The two liquids do not mix. What is the difference in height between the top surface of the glycerin and the top surface of the alcohol? Suppose that the density of glycerin is  $1260 \text{ kg/m}^3$  and the density of alcohol is  $790 \text{ kg/m}^3$ .