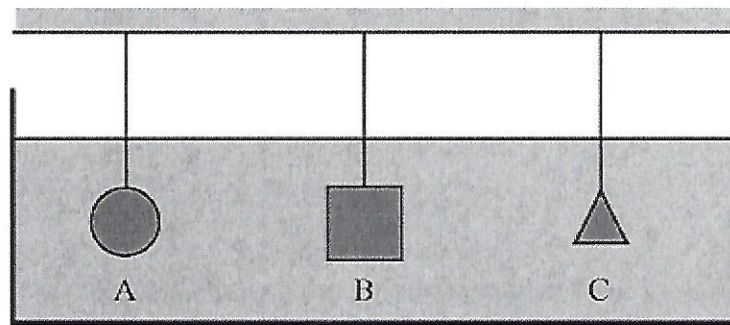


AP Review # 6



5. (10 points)

Three objects of identical mass attached to strings are suspended in a large tank of liquid, as shown above.

(a) Must all three strings have the same tension?

___ Yes ___ No

Justify your answer.

Object A has a volume of $1.0 \times 10^{-5} \text{ m}^3$ and a density of 1300 kg/m^3 . The tension in the string to which object A is attached is 0.0098 N .

(b) Calculate the buoyant force on object A.

(c) Calculate the density of the liquid.

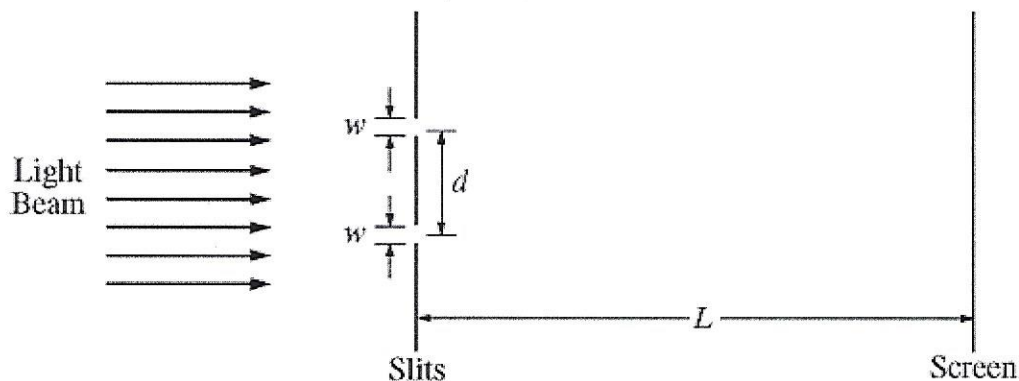
(d) Some of the liquid is now drained from the tank until only half of the volume of object A is submerged. Would the tension in the string to which object A is attached increase, decrease, or remain the same?

___ Increase ___ Decrease ___ Remain the same

Justify your answer.

6. (10 points)

In a classroom demonstration, a beam of coherent light of wavelength 550 nm is incident perpendicularly onto a pair of slits. Each slit has a width w of $1.2 \times 10^{-6}\text{ m}$, and the distance d between the centers of the slits is $1.8 \times 10^{-5}\text{ m}$. The class observes light and dark fringes on a screen that is a distance L of 2.2 m from the slits. Your notebook shows the following setup for the demonstration.



Note: Figure not drawn to scale.

- (a) Calculate the frequency of the light.
- (b) Calculate the distance between two adjacent dark fringes on the screen.

The entire apparatus is now immersed in a transparent fluid having index of refraction 1.4 .

- (c) What is the frequency of the light in the transparent fluid?
- (d) Does the distance between the dark fringes increase, decrease, or remain the same?

_____ Increase _____ Decrease _____ Remain the same

Explain your reasoning.