Checking a Float Between Two Liquid Layers

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A display has two liquids that remain in separate layers. A solid float stays fully submerged with part of its volume in each liquid. The model ignores surface tension and treats the float as unchanged by the liquids. At rest, the mass of the two displaced portions of liquid adds up to the float’s mass.

Quantity	**Value**
Float mass	12.0 g
Float volume	12.0 cm^3
Top liquid density	0.80 g/cm^3
Bottom liquid density	1.20 g/cm^3

1 Which observation is consistent with the float staying at the boundary?

(1) Its density is lower than both liquids.

(2) Its density is higher than both liquids.

(3) Its density lies between the two liquid densities.

(4) Both liquids have the same density.

2 Show that having 6.0 cm^3 of float in each layer accounts for its full mass in this model. [1]

Answer and work

A second display uses the same float and top liquid but increases the bottom liquid density to 1.40 g/cm^3. The liquids still stay in separate layers.

3 Predict whether more or less of the float’s volume must be in the bottom layer. Support your answer with the displaced masses. [1]

Answer and work

4 Use the new densities to show whether 4.0 cm^3 in the bottom layer gives a balance. [1]

Answer and work