

NAME:

SECTION:



1. A layer of oil with density  $800 \text{ kg/m}^3$  floats on top of a volume of water with density  $1,000 \text{ kg/m}^3$ . A block floats at the oil-water interface with  $1/4$  of its volume in oil and  $3/4$  of its volume in water, as shown in the figure above. What is the density of the block?

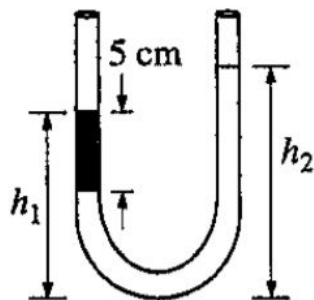
- (A)  $200 \text{ kg/m}^3$
- (B)  $850 \text{ kg/m}^3$
- (C)  $950 \text{ kg/m}^3$
- (D)  $1,050 \text{ kg/m}^3$
- (E)  $1,800 \text{ kg/m}^3$

2. Water flows in a horizontal pipe that is narrow but then widens and the speed of the water decreases. The pressure in the water moving in the pipe is

- a) greater in the wide part.
- b) greater in the narrow part.
- c) the same in both parts.
- d) greater where the speed is higher.
- e) greater where the speed is lower.

3. You hold a piece of wood in one hand and a piece of iron in the other. Both pieces have the same volume, and you hold them fully under water at the same depth. The moment you let go of them, which one experiences the greater buoyancy force?

- a) The piece of wood.
- b) The piece of iron.
- c) They experience the same buoyancy force.
- d) They experience no buoyancy force.
- e) More information is needed.



An open-ended U-tube of uniform cross-sectional area contains water (density  $1.0 \text{ gram/centimeter}^3$ ) standing initially 20 centimeters from the bottom in each arm. An immiscible liquid of density  $4.0 \text{ grams/centimeter}^3$  is added to one arm until a layer 5 centimeters high forms, as shown in the figure above. What is the ratio  $h_2/h_1$  of the heights of the liquid in the two arms?

- (A)  $3/1$
- (B)  $5/2$
- (C)  $2/1$
- (D)  $3/2$
- (E)  $1/1$