

PHY1122A DISCUSSION GROUP#1 JANUARY 14, 2019

1. An airtight box, having a lid of area 12 in^2 , is partially evacuated. Atmospheric pressure is 15 lb/in^2 . A force of 108 lb is required to pull the lid off the box. The pressure in the box was
- A) 6 lb/in^2 .
 - B) 7.2 lb/in^2 .
 - C) 3 lb/in^2 .
 - D) 9 lb/in^2 .
 - E) 15 lb/in^2 .

Answer: A)

2. A uniform U-tube is partially filled with water. Oil, of density 0.75 g/cm^3 , is poured into the right arm until the water level in the left arm rises 3 cm . The length of the oil column is then
- A) 2.25 cm .
 - B) 8 cm .
 - C) 6 cm .
 - D) 4 cm .
 - E) the cross-sectional area of the U-tube is needed to answer this question.

Answer: B)

3. A fir wood board floats in fresh water with 60% of its volume under water. The density of the wood in g/cm^3 is
- A) 0.4 .
 - B) 0.5 .
 - C) 0.6 .
 - D) less than 0.4 .
 - E) more than 0.6 .

Answer: C)

4. A block of ice 30.5 cm thick floating in fresh water just supports a man weighing 806 N . If the specific gravity of ice is 0.917 , the smallest area the block can have is
- A) 3.25 m^2 .
 - B) 3.57 m^2 .
 - C) 2.88 m^2 .
 - D) 1.45 m^2 .
 - E) 0.269 m^2 .

Answer: A)

5. A wooden cylinder floats in water. At equilibrium the cylinder floats with a depth 10 cm submerged. When the cylinder is pushed downward a small distance and then released, it is observed that it bobs up and down periodically. Assume viscosity is negligible. The period of oscillation of the cylinder is
- A) 0.63 s.
 - B) 0.32 s.
 - C) 0.10 s.
 - D) 1.58 s.
 - E) None of the above is correct.

Answer: A)

6. A vertical tube is closed at one end and open to air at the other end. The air pressure is 1.01×10^5 Pa. The tube has a length of 0.75 m. Mercury (density = 13600 kg/m^3) is poured into it to shorten the effective length for standing waves. What is the absolute pressure at the bottom of the mercury column, when the fundamental frequency of the shortened air-filled tube is equal to the third harmonic of the original tube?

Answer: 1.68×10^5 Pa

7. Find the gauge pressure in pascals in a soap bubble 4.00 cm in diameter. The surface tension is 25.0×10^{-3} N/m.

Answer: 5.00 Pa

8. An air bubble of diameter 0.1 mm floats in water at the depth of 20 cm. The atmospheric pressure outside is 765 mm Hg. The surface tension of water is 73 dyn/cm. What is the air pressure (in mm Hg) inside the bubble?

Answer: 802 mm Hg