

This print-out should have 8 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Ocean Pressure

001 (part 1 of 2) 10.0 points

Calculate the pressure at an ocean depth of 954 m. The acceleration of gravity is 9.8 m/s^2 , atmospheric pressure is $1.01 \times 10^5 \text{ Pa}$, and the density of the sea water is 1024 kg/m^3 .

Correct answer: $9.67458 \times 10^6 \text{ Pa}$.

002 (part 2 of 2) 10.0 points

Calculate the total force exerted on the outside of a circular submarine window of diameter 48.2 cm at this depth.

Correct answer: $1.76529 \times 10^6 \text{ N}$.

Car Lift

003 (part 1 of 2) 10.0 points

In a car lift used in a service station, compressed air exerts a force on a small piston of circular cross-section having a radius of 3.14 cm. This pressure is transmitted by a liquid to a second piston of radius 16.6 cm.

What force must the compressed air exert in order to lift a car weighing 11500 N?

Correct answer: 411.473 N.

004 (part 2 of 2) 10.0 points

What air pressure will produce this force?

Correct answer: $1.32841 \times 10^5 \text{ Pa}$.

Serway CP 09 33

005 10.0 points

An empty rubber balloon has a mass of 0.0128 kg. The balloon is filled with helium at a density of 0.185 kg/m^3 . At this density the balloon has a radius of 0.535 m.

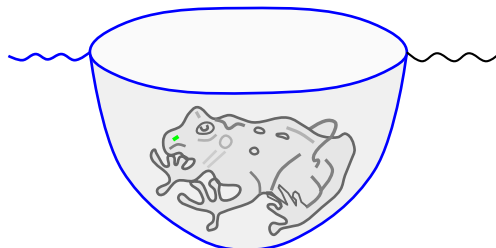
If the filled balloon is fastened to a vertical line, what is the tension in the line? The acceleration of gravity is 9.8 m/s^2 .

Correct answer: 6.82062 N.

Serway CP 09 26

006 10.0 points

A frog in a hemispherical pod finds that he just floats without sinking in a fluid with a density of 1.37 g/cm^3 .



If the pod has a radius of 5.63 cm and negligible mass, what is the mass of the frog?

Correct answer: 0.512041 kg.

Serway CP 09 35

007 (part 1 of 2) 10.0 points

A sample of an unknown material appears to weigh 310 N in air and 224 N when immersed in alcohol of specific gravity 0.708.

What is the volume of the material? The acceleration of gravity is 9.8 m/s^2 .

Correct answer: 0.0123948 m^3 .

008 (part 2 of 2) 10.0 points

What is the density of the material?

Correct answer: 2552.09 kg/m^3 .