Fluid pressure: exercises

Solve the following guided exercises.

Exercise 1.

Determine the pressure at a point 5,0 m below the surface of fresh water of density 1000 kg/m^3.

GUIDED SOLUTION

Drawing of the situation

h =

d =

P = ?

STEVINO'S PRINCIPLE …….

Put in numbers……

Exercise 2.

A stone is dropped into a lake. Calculate the increase in pressure on the stone caused by the water when it sinks from 1 m deep to 6 m deep. (The density of water is 1000 kg/m^3 and gravitational field strength is 9.8 N/kg).

GUIDED SOLUTION

Drawing of the situation

h1 =

h2 =

d =

ΔP = ?

Pressure of depth h1 = P1 = ...

Pressure of depth h2 = P2 = ...

ΔP = P2 - P1 =.....

Now try these problems on your own!

1. What is the pressure experienced at a point on the bottom of a swimming pool 9 meters in depth? The density of water is 1.00×10^3 kg/m^3.

2. The interior of a submarine located at a depth of 45 meters is maintained at normal atmospheric conditions. Find the total force exerted on a 20 cm by 20 cm square window. The density of sea water is 1020 kg/m^3.

3. How many atmospheres is a depth of 100 meters of ocean water?

Homework

4. An airplane in level flight whose mass is 20,000 kg has a wing area of 60 m^2. What is the pressure difference between the upper and lower surfaces of its wing? Express your answer in atmospheres.