



Unit 8 • Pressure: upthrust, Archimedes' principle and flotation

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 34

1 Key words

[4]

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

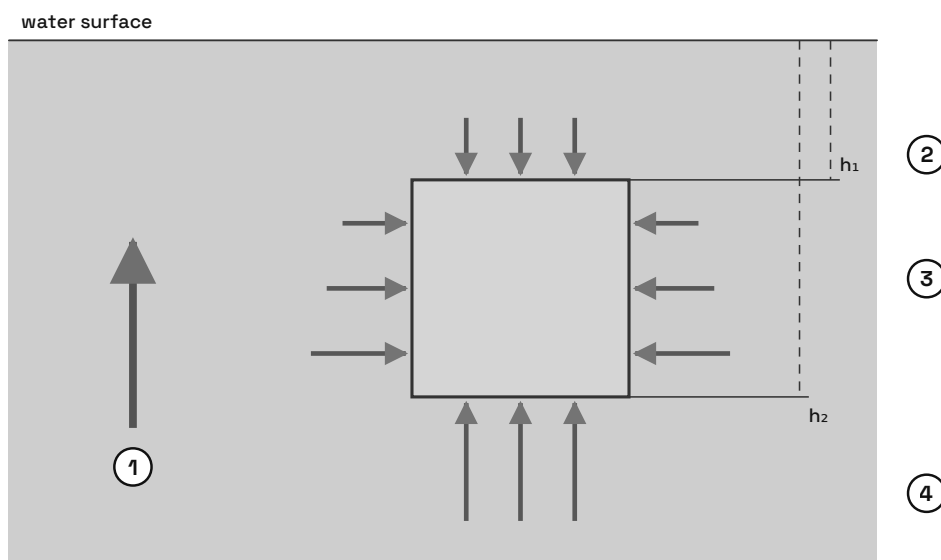
apparent weight Archimedes ballast tanks density displaced flotation hydrometer
Pascal thrust upthrust

The upward force that a fluid exerts on an object in it is called _____. The weight an object seems to have in a liquid is its _____. By _____' principle, the upthrust equals the weight of the fluid _____. The upthrust grows with the _____ of the liquid. A floating object displaces its own weight of liquid: this is the law of _____. The relative density of a liquid is measured with a _____. A submarine dives by letting water into its _____.

2 Label the diagram

[2]

The diagram shows a cube held under water. Write what the arrows or labels numbered 1 to 4 show. Each carries 0.5 mark.



1. _____ 2. _____
3. _____ 4. _____



[5]

Choose the correct option for each of the following questions.

- i. On which law or principle is a lactometer based? [1]
 - a. Pascal's law
 - b. Archimedes' principle
 - c. the law of gravitation
 - d. Newton's law
- ii. What is the condition for a hydrogen balloon to fly upwards in the air? [1]
 - a. weight of the balloon = weight of air displaced
 - b. weight of the balloon > weight of air displaced
 - c. weight of the balloon = volume of air displaced
 - d. weight of the balloon < weight of air displaced
- iii. An object hung from a spring balance weighs W_1 in air, W_2 in water and W_3 in glycerine. Which order is correct, from smallest to largest? [1]
 - a. $W_1 < W_2 < W_3$
 - b. $W_2 < W_1 < W_3$
 - c. $W_3 < W_2 < W_1$
 - d. $W_3 < W_1 < W_2$
- iv. When a ship sails from the sea into a river, it sinks deeper into the water. Why? [1]
 - a. the temperature of seawater is higher than that of river water
 - b. the density of seawater is higher than that of river water
 - c. the temperature of seawater is lower than that of river water
 - d. the density of seawater is lower than that of river water
- v. Three cubes made of different materials get the same upthrust when they are put in water. Which quantity is the same for all three? [1]
 - a. density
 - b. weight
 - c. volume
 - d. mass

[3]

Write very short answers to the following questions.

- a. State Archimedes' principle. [1]
-
-
- b. What is upthrust? [1]
-
-
- c. State the law of flotation. [1]

[6]

Write short answers to the following questions.

- a. Differentiate between the reasons a steel pin sinks in water and a steel plate floats. [2]



[2]

[2]

[4]

Write a long answer to the following question.

“A substance denser than a liquid sinks in it.” Is this statement always true? Justify with an example.

[8]

Solve the following problems. Show your working. ($g = 9.8 \text{ m/s}^2$, density of water = 1000 kg/m^3)

[2]

[illegible]

Answer:

[4]

Answer:



- c. A block of wood of volume 0.02 m^3 and density 700 kg/m^3 floats on water. What volume of the block is under the water? [2]

Answer: _____

8 Think

Think, then answer.

An object is floating just below the surface of water. If more and more salt is dissolved in the water, what will happen to the object? Explain why.

9 Activity: Checking Archimedes' principle (Activity 8.5)

(not marked)

Fill a eureka can until water drips from its spout. Weigh an empty beaker (W_3) and place it under the spout. Weigh a stone in air (W_1), then completely under water in the can (W_2). Weigh the beaker with the water that overflowed (W_4).

In air, W_1 (N)	In water, W_2 (N)	Upthrust, $W_1 - W_2$ (N)	Empty beaker, W_3 (N)	With water, W_4 (N)	Water displaced, $W_4 - W_3$ (N)

Compare the upthrust with the weight of the water displaced. What do you find?

