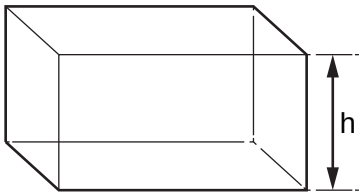
## Question 1

The diagram shows a tank full of water.




The mass of water in the tank is m.

The density of the water is ρ.

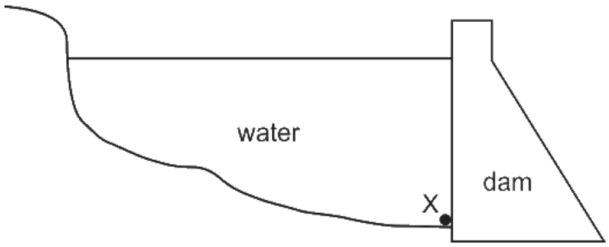
The height of water in the tank is h.

Which equation gives the pressure p due to the water at the bottom of the tank?

**A** $p = h\rho g$ **B** $p = mgh$ **C** $p = m\rho g$ **D** $p = m\rho h$

## Question 2

The diagram shows a deep reservoir formed by a dam.




On what does the pressure at X depend?

**A** the depth of the water at X

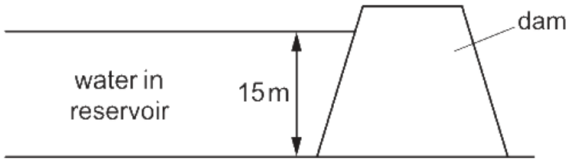
**B** the length of the reservoir

**C** the surface area of the water

**D** the thickness of the dam wall

## Question 3

A dam holds water in a reservoir. The height of the water in the reservoir is 15 m.




The density of water is 1000 kg / m$^3$.

What is the pressure due to the water at the bottom of the dam?

**A** 6.8 Pa **B** 1500 Pa **C** 15000 Pa **D** 150000 Pa

## Question 4

The density of sea water is 1030 kg / m$^3$.

The gravitational field strength on the Earth is 9.8 N / kg.

Atmospheric pressure is 101000 Pa.

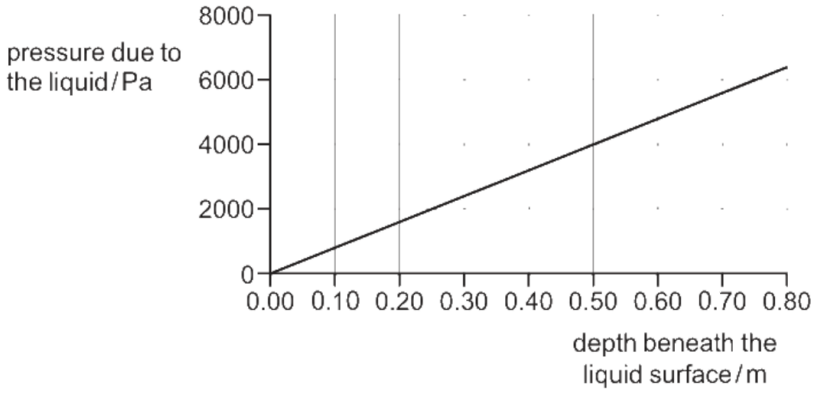
At which depth in sea water is the total pressure due to the atmosphere and the water equal to 513000 Pa?

**A** 40.8 m **B** 50.8 m **C** 400 m **D** 498 m

## Question 5

The graph shows how the pressure due to a liquid varies with the depth beneath the liquid surface.

The gravitational field strength *g* is 9.8 N / kg.




What is the density of the liquid?

**A** 200 kg / m$^3$ **B** 820 kg / m$^3$ **C** 2000 kg / m$^3$ **D** 8200 kg / m$^3$

## Question 6

**8** The equation $\Delta p = \rho g \Delta h$ can be used for a liquid.

What is the meaning of the term $\rho$?

**A** pressure due to the liquid

**B** density of the liquid

**C** total pressure due to the liquid and the air above the liquid

**D** density of an object placed in the liquid

## Question 7

**8** An object taken underwater will be damaged if the total pressure acting on it is greater than 2.1 MPa.

What is the maximum depth that the object can be taken underwater before it breaks?

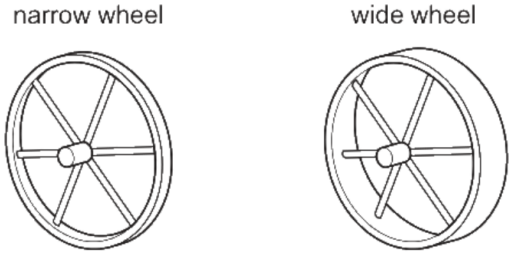
atmospheric pressure = 101 000 Pa

density of water = 1000 kg / $m^3$

**A** 10.3 m **B** 204 m **C** 214 m **D** 225 m

## Question 8

**9** A farmer has two carts. The carts have the same weight, but one has four narrow wheels and the other has four wide wheels.




Which cart wheels sink less into soft ground and what is the reason?

| | cart wheels | reason |
|---|---|---|
| **A** | narrow | greater pressure on the ground |
| **B** | narrow | less pressure on the ground |
| **C** | wide | greater pressure on the ground |
| **D** | wide | less pressure on the ground |

## Question 9

**9** A whale dives to a depth of 3000 m in sea water.

In addition to the gravitational field strength, which variables determine the pressure on the whale due to the water at a depth of 3000 m?

**A** depth, water density and mass of the whale only

**B** depth and water density only

**C** depth, surface area of the whale and mass of the whale only

**D** depth and surface area of the whale only

## Question 10

A research submarine is at a depth of 10 000 m below the surface of the sea.

The average density of the water above the submarine is 1030 kg/m$^3$.

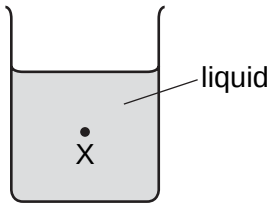
The atmospheric pressure at the surface of the sea is 103 000 Pa.

How many times greater is the pressure due to the sea water than the atmospheric pressure?

A 10 **B** 100 **C** 1000 **D** 100000

## Question 11

A student calculates the pressure due to the liquid at point X.




The student takes four measurements.

1 density of the liquid

2 temperature of the liquid

3 depth of point X below the surface of the liquid

4 surface area of the liquid

Which measurements must the student use in her pressure calculation?

**A** 3 and 4 **B** 1 and 3 **C** 1 and 2 **D** 2 and 3