Pressure in liquids

Physics calculations (separate Physics only) | AQA GCSE Physics 8463 only (not Combined Science) | 12 questions, 38 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- pressure due to a column of liquid = height of column × density of liquid × gravitational field strength — on the physics equation sheet
- pressure = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$ — learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 38**

1 **Higher tier**

The deep end of a swimming pool is 2.0 m deep. The density of the water is 1000 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the water at the bottom of the deep end.

(2 marks)

Answer _____

2 **Higher tier**

Mrs Nowak's garden pond is 3.5 m long, 2.2 m wide and 1.4 m deep. It is full of water of density 1000 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the water at the bottom of the pond.

(2 marks)

Answer _____

3 **Higher tier**

Kwame is snorkelling off the coast of Pembrokeshire. He dives to a depth of 6.0 m. The density of seawater is 1030 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the seawater at this depth in kPa.

Give your answer to 3 significant figures.

(3 marks)

Answer _____

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4 **Higher tier**

A tall measuring cylinder contains glycerol to a height of 35 cm. The density of glycerol is 1260 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the glycerol at the bottom of the cylinder.

Give your answer to 3 significant figures.

(3 marks)

Answer _____

5 **Higher tier**

In a hospital lab, a beaker holds ethanol to a depth of 25 cm. The density of ethanol is 0.79 g/cm^3.

1 g/cm^3 = 1000 kg/m^3

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the ethanol at the bottom of the beaker.

Give your answer to 2 significant figures.

(3 marks)

Answer _____

6 **Higher tier**

A water tank at a water treatment works is filled to a depth of 3.0 m. A pressure sensor is fixed to the side of the tank, 0.40 m above the bottom. The density of the water is 1000 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the pressure due to the water at the sensor.

(3 marks)

Answer _____

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7 **Higher tier**

A marine biologist leaves a recorder on the seabed in the Firth of Forth. The pressure due to the seawater above the recorder is 206 000 Pa. The density of seawater is 1030 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the depth of the recorder.

Give your answer to 3 significant figures.

(3 marks)

Answer _____

8 **Higher tier**

Rahul pours an unknown oil into a tall tube to a height of 0.60 m. A pressure sensor at the bottom shows that the pressure due to the oil is 4998 Pa.

Gravitational field strength = 9.8 N/kg

Calculate the density of the oil.

(3 marks)

Answer _____

9 **Higher tier**

A diver in a flooded quarry in Cumbria reads her depth gauge. It shows that the pressure due to the water above her is 294 kPa. The density of the water is 1000 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate how deep the diver is.

(3 marks)

Answer _____

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10 **Higher tier**

A scuba diver swims 18 m below the surface of the sea. The density of seawater is 1030 kg/m^3. The atmosphere presses on the surface of the sea with a pressure of 101 000 Pa.

Gravitational field strength = 9.8 N/kg

Calculate the total pressure on the diver in kPa.

Give your answer to 3 significant figures. Show your working.

(4 marks)

Answer _____

11 **Higher tier**

A rectangular fish tank has a base that is 0.80 m long and 0.50 m wide. The tank is filled with water to a depth of 0.60 m. The density of the water is 1000 kg/m^3.

Gravitational field strength = 9.8 N/kg

a. Calculate the pressure due to the water on the base of the tank.

b. Calculate the force the water exerts on the base of the tank. Show your working.

(4 marks)

Answer _____

12 **Higher tier**

The window of a small research submarine can withstand a total pressure of 5.0 MPa. The atmosphere presses on the surface of the sea with a pressure of 1.0×10^5 Pa. The density of seawater is 1030 kg/m^3.

Gravitational field strength = 9.8 N/kg

Calculate the greatest depth the submarine can safely dive to.

Give your answer to 2 significant figures. Show your working.

(5 marks)

Answer _____

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End of questions | Total 38 marks

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