

GCSE Physics (9 – 1)

Pressure

Name:

Group:



Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.

For markers use	
Question	Mark
1	/3
2	/7
3	/8
4	/6
5	/6
6	/6
Total	/36
%	
Grade	

Information

- The maximum mark for this paper is 36 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.



1. Pressure is a measure of how much force is spread across a certain surface area.

For each of the following questions **circle** the letter of the correct answer.

- a) A wooden box exerts a downward force of 500 N on a floor. If the base area of the box is 2 m^2 , what is the pressure exerted on the floor?

A

B

C

D

350 Pa

250 Pa

550 Pa

450 Pa

(1 mark)

- b) A heavy cargo container of weight 38 000 N stands with all four support feet on the floor.



The average pressure on the floor due to the support feet in contact with it is 25 000 Pa.
What is the area of each support foot of the container?

A

B

C

D

0.16 m^2

0.38 m^2

0.66 m^2

1.52 m^2

(1 mark)

- c) Excavators are very heavy machines that use wide, continuous tracks to move.
These tracks help to prevent the excavator from sinking into soft mud.



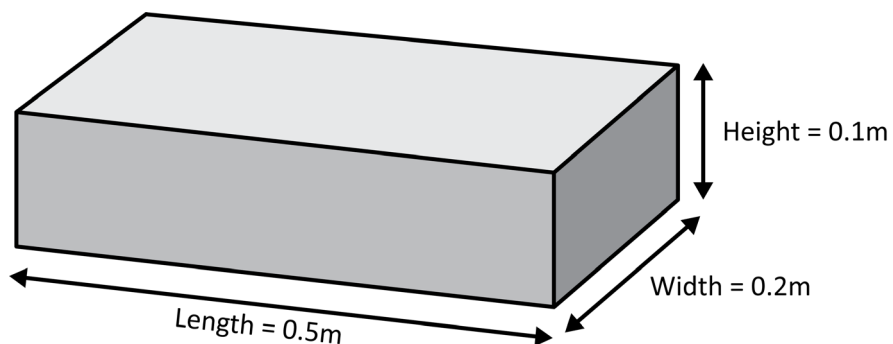
Which statement explains this?

- A** The wide tracks exert a greater force on the ground.
- B** The wide tracks exert a greater pressure on the ground.
- C** The wide tracks exert a smaller force on the ground.
- D** The wide tracks exert a smaller pressure on the ground.

(1 mark)

(Total for Question 1 is 3 marks)

2. A teacher places a concrete block on a wooden table. The figure below shows the block.



a) State the equation that links pressure, force, and area.

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(1 mark)

b) The concrete block exerts a downward force of 400 N on the table.
Calculate the pressure exerted by the block on the table when it is resting on its largest face.
Give the unit for your answer. Show your working.

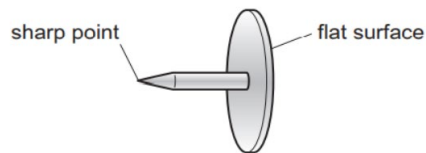
Pressure = ... unit:
(4 marks)

c) A student turns the concrete block so that it now rests on its smallest face.
State and explain what happens to the pressure exerted by the block on the table.
You may include calculations in your answer.

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(2 marks)

(Total for Question 2 is 7 marks)

3. Drawing pins are commonly used to hold up notes or ads on messaging boards.
The figure below shows a drawing pin.



- a) A student pushes the flat surface of the drawing pin into a wooden noticeboard.
They apply a force of 12 N to the flat surface.

The area of the sharp point in contact with the wood is $3.0 \times 10^{-7} \text{ m}^2$.

Calculate the pressure exerted by the sharp point on the wooden noticeboard.
Give your answer in standard form and state the unit.

Pressure = ... unit:
(5 marks)

- b) The area of the flat surface is much larger than the area of the sharp point.
Using the concept of pressure, explain why the drawing pin is designed this way.

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(3 marks)

(Total for Question 3 is 8 marks)

4. A workman uses a jack hammer to break up a section of road.



- a) The jackhammer strikes the concrete pavement with a downward force of 3200 N. The area of the chisel point in contact with the concrete is 0.0008 m^2 .

Calculate the pressure exerted by the chisel point on the concrete.
Give the unit for your answer.

Pressure = ... unit:

(4 marks)

- b) Over time, the metal chisel becomes blunt, which means the area of the point increases.

Assuming the jackhammer still strikes the ground with the same force of 3200 N, explain how this will affect the jackhammer's ability to break the concrete.

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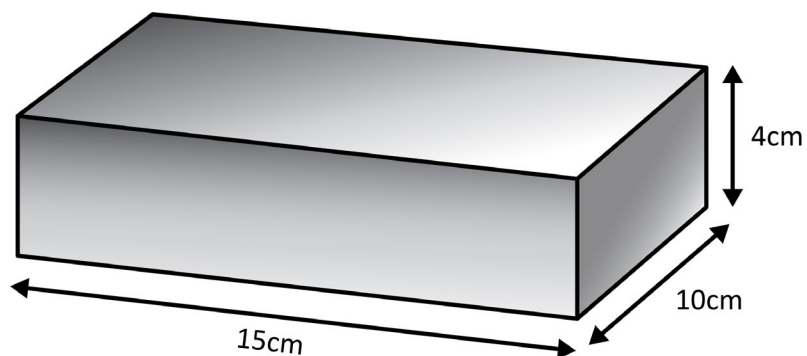
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(2 marks)

(Total for Question 4 is 6 marks)

5. A 3D rectangular solid metal block is shown.
Its three side lengths are clearly labelled: 15 cm, 10 cm, and 4 cm.



The metal block has a density of 7500 kg/m^3 . Gravitational field strength (g) = 9.8 N/kg .
Calculate the maximum pressure the metal block can exert when it rests on a horizontal table.
Give your answer to 3 significant figures.

Pressure = ... unit:

(6 marks)

(Total for Question 5 is 6 marks)

6. The figure below shows an industrial machine standing on four legs in a factory.



The total mass of the machine is 1200 kg. The diameter of each cylindrical leg is 10 cm.
Gravitational field strength (g) = 9.8 N/kg.

Calculate the pressure exerted by the machine on the concrete floor.
Give your answer in kilopascals (kPa) and to 3 significant figures.

Pressure = ... unit:

(6 marks)

(Total for Question 6 is 6 marks)