

## Section A

1. Which correctly shows the equation that links pressure, force and area  
Tick ( $\checkmark$ ) one box.

Pressure = Force  $\times$  Area

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

$$\text{Pressure} = \frac{\text{Area}}{\text{Force}}$$

2. Which property of liquids makes them useful in hydraulic systems?  
Tick ( $\checkmark$ ) one box.

They cannot be compressed

They can be compressed

They do not have a fixed shape

They can flow

3. Draw a particle diagram to show the arrangement of particles in a liquid.



4. Using your particle diagram and your own knowledge, describe the movement of particles in a liquid.

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## Section B



5. The diagram shows a container filled with water. The water exerts a force of 38 N on the bottom of the container.

The bottom of the container has a surface area of  $0.005\text{ m}^2$ .

Calculate the pressure exerted by the water on the bottom of the container.

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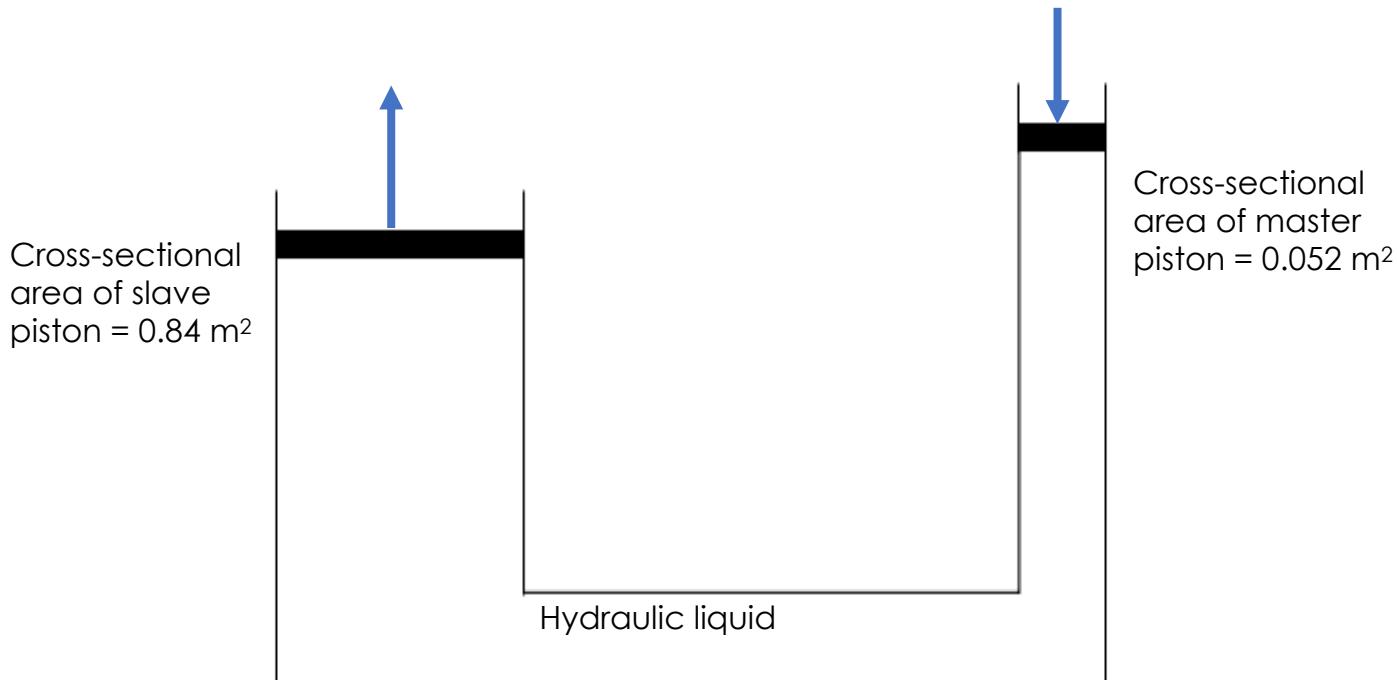
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Circle the correct unit.

$\text{m}^2/\text{N}$	Nm	Pa
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6. The diagram below shows the hydraulic system used in a car lift. An operator presses a control button which applies a force to the master piston. This makes the slave piston produce a force acting upwards, which lifts the car.



- a. When a force is applied to the master piston, it results in a much larger force acting upwards on the car. Use information from the diagram to explain why.

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- b. A force of 990 N is applied to the master piston. Calculate the force applied by the hydraulic liquid to the slave piston.
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- c. Calculate the maximum mass of a car that could be lifted by this car lift. Take gravitational field strength as 10 N/kg.
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### Section C

7. Hydraulic systems are also used in car braking systems.
- Explain why hydraulic brakes contain fluid.
  - Compare the size of the force applied by a person's foot to the brake and the force applied by the brakes on the wheels.
  - Sketch a velocity-time graph to show a car moving at a steady speed before the driver applies the brake and slows down to a stop.

