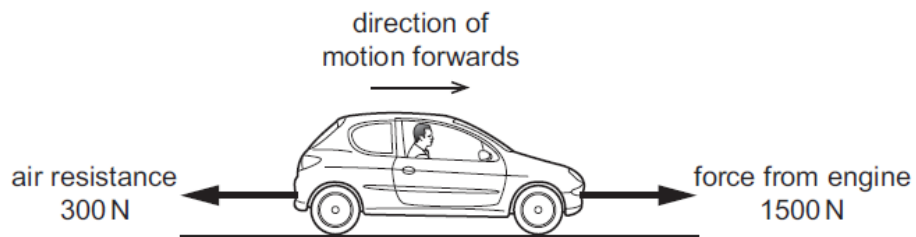


1. March/2020/Paper_12/No.7

A car travels along a horizontal road at constant speed. Three horizontal forces act on the car. The diagram shows two of these forces.

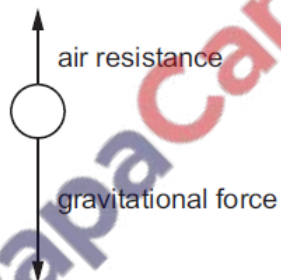


What is the size and the direction of the third horizontal force acting on the car?

- A 1200 N backwards
- B 1200 N forwards
- C 1800 N backwards
- D 1800 N forwards

2. March/2020/Paper_22/No.2

A ball falls from rest through the air towards the ground. The diagram shows two forces acting on the ball.



As the ball falls, the air resistance increases.

Which statement is correct?

- A The acceleration of the ball decreases.
- B The acceleration of the ball increases.
- C The speed of the ball decreases.
- D The gravitational force on the ball decreases.

3. March/2020/Paper_22/No.3

A compressed spring projects a ball horizontally in a vacuum chamber.

On the Earth, the ball reaches the chamber floor 4.0 m in front of the spring.

An identical experiment is done on the Moon. The gravitational field strength is lower on the Moon than on the Earth.

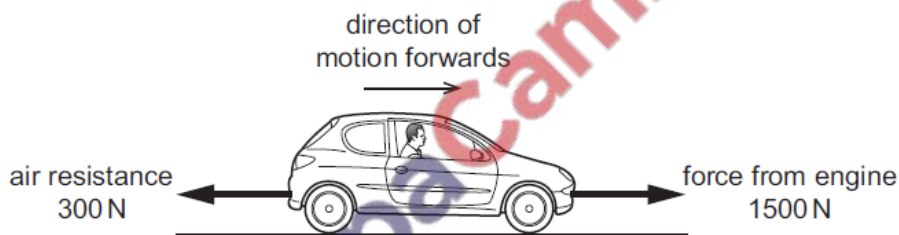
The experimental results on the Moon are compared with those on the Earth.

Which statement is correct?

- A The horizontal speed is greater on the Moon and the ball hits the floor 4.0 m in front of the spring.
- B The horizontal speed is greater on the Moon and the ball hits the floor more than 4.0 m in front of the spring.
- C The horizontal speed is the same on the Moon and the ball hits the floor 4.0 m in front of the spring.
- D The horizontal speed is the same on the Moon and the ball hits the floor more than 4.0 m in front of the spring.

4. March/2020/Paper_22/No.7

A car travels along a horizontal road at constant speed. Three horizontal forces act on the car. The diagram shows two of these forces.

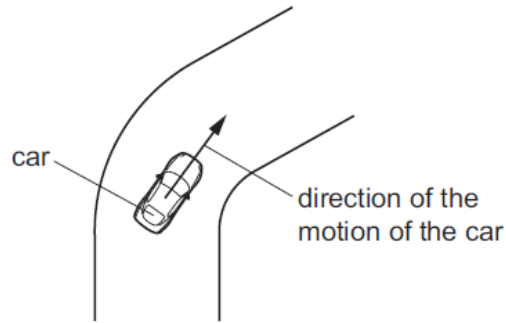


What is the size and the direction of the third horizontal force acting on the car?

- A 1200 N backwards
- B 1200 N forwards
- C 1800 N backwards
- D 1800 N forwards

5. March/2020/Paper_22/No.8

A car is driven round a bend in the road at a constant speed.



What is the direction of the resultant force on the car when it is going round the bend?

- A parallel to the motion and in the same direction as the motion
- B parallel to the motion and in the opposite direction to the motion
- C perpendicular to the motion and towards the inside of the bend
- D perpendicular to the motion and towards the outside of the bend

6. March/2020/Paper_22/No.10

An air pistol fires a pellet forwards.

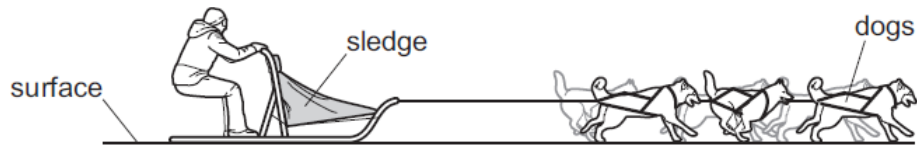
What is the motion of the air pistol?

- A The air pistol moves backwards with speed greater than the pellet.
- B The air pistol moves backwards with speed less than the pellet.
- C The air pistol moves forward with speed greater than the pellet.
- D The air pistol moves forward with speed less than the pellet.



7. **June/2020/Paper_11/No.7**

A sledge is pulled in a straight line by dogs, as shown.



The dogs produce a total horizontal driving force of 600 N.

The frictional force between the sledge and the surface is 150 N and the air resistance on the sledge is 450 N.

What is the resultant force acting on the sledge?

- A** 0 N **B** 300 N **C** 900 N **D** 1200 N

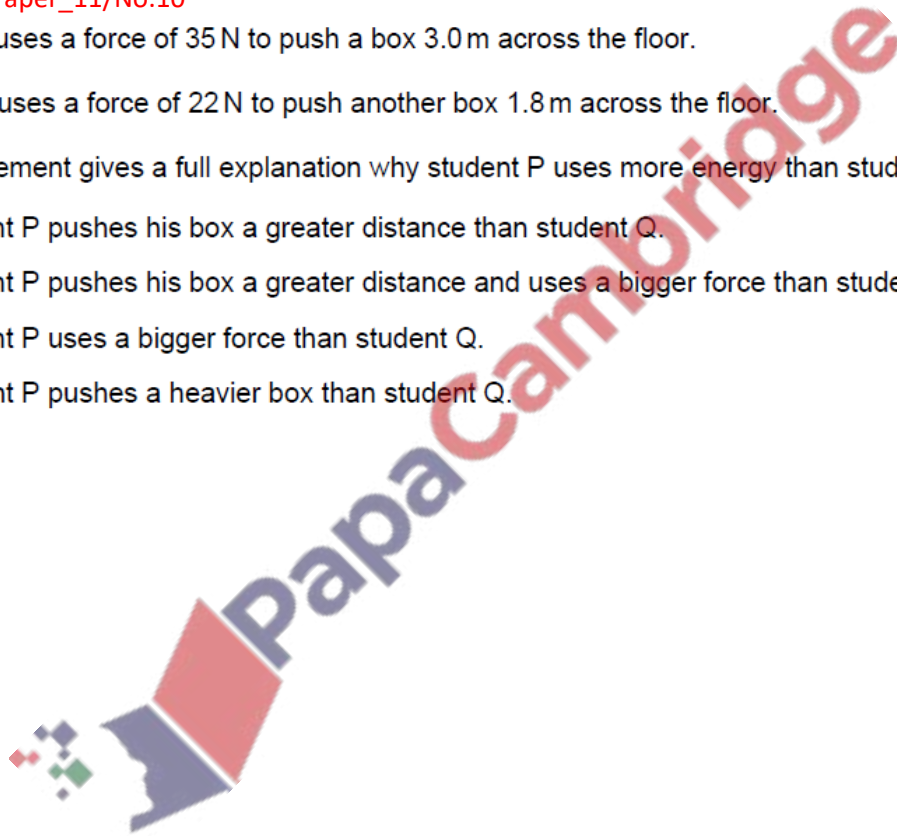
8. **June/2020/Paper_11/No.10**

Student P uses a force of 35 N to push a box 3.0 m across the floor.

Student Q uses a force of 22 N to push another box 1.8 m across the floor.

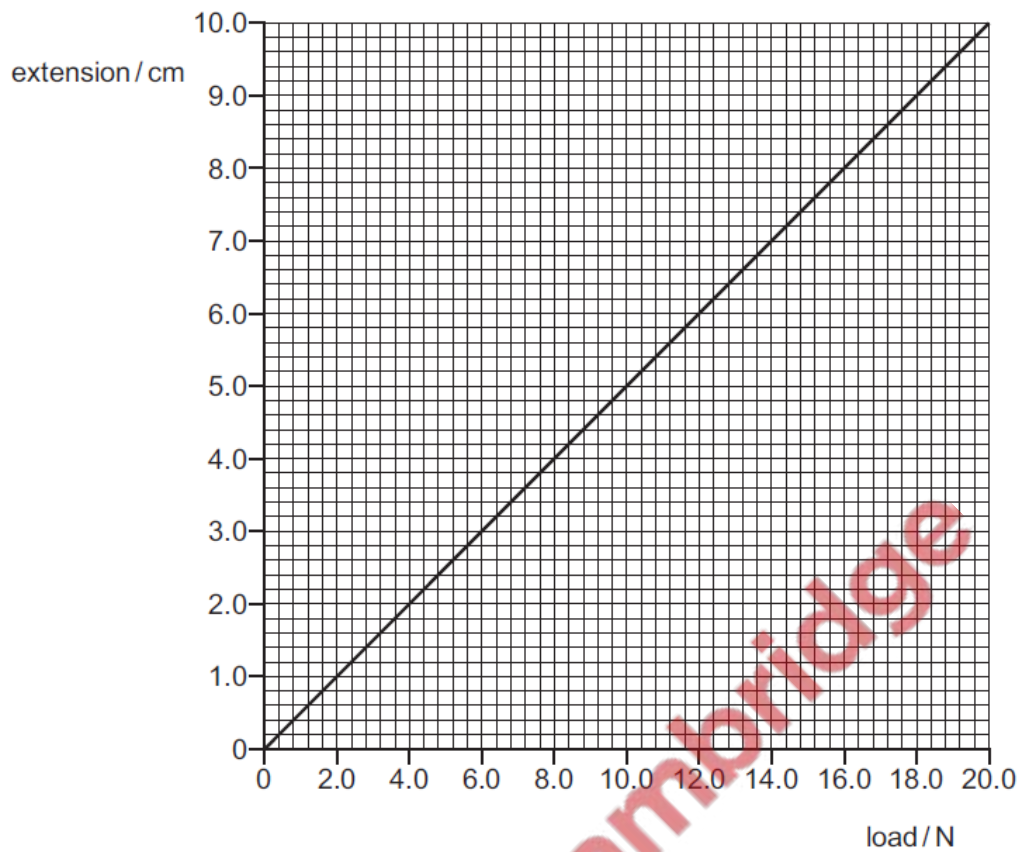
Which statement gives a full explanation why student P uses more energy than student Q?

- A** Student P pushes his box a greater distance than student Q.
B Student P pushes his box a greater distance and uses a bigger force than student Q.
C Student P uses a bigger force than student Q.
D Student P pushes a heavier box than student Q.



9. June/2020/Paper_12/No.7

The diagram shows an extension–load graph for a spring.



An empty can of weight 3.0N is suspended from the spring.

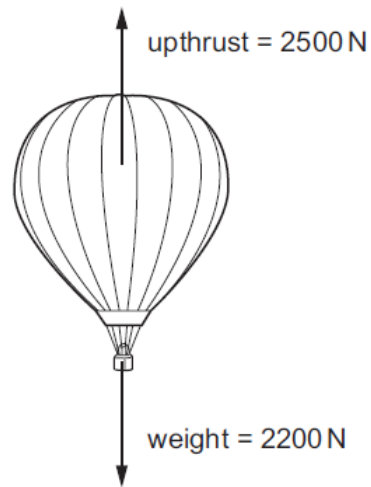
Liquid is poured into the can until the extension is 8.0 cm.

What is the weight of the liquid?

- A** 4.0N **B** 10.0N **C** 13.0N **D** 16.0N

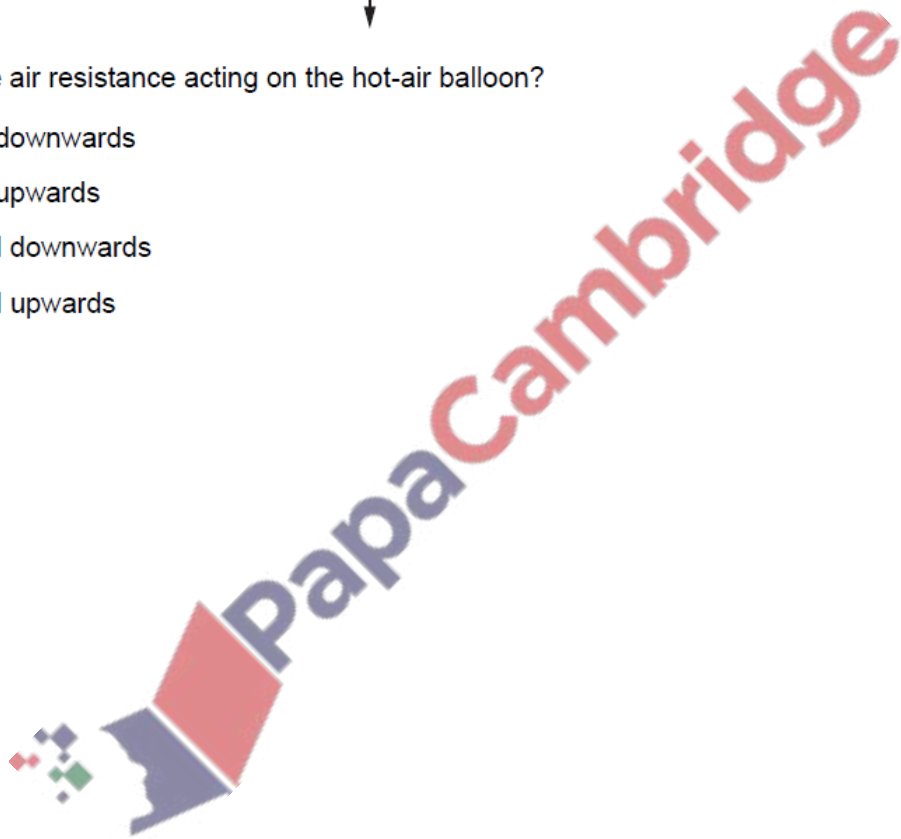
10. June/2020/Paper_13/No.7

The diagram shows two of the three vertical forces acting on a hot-air balloon. The hot-air balloon is moving upwards at constant speed.



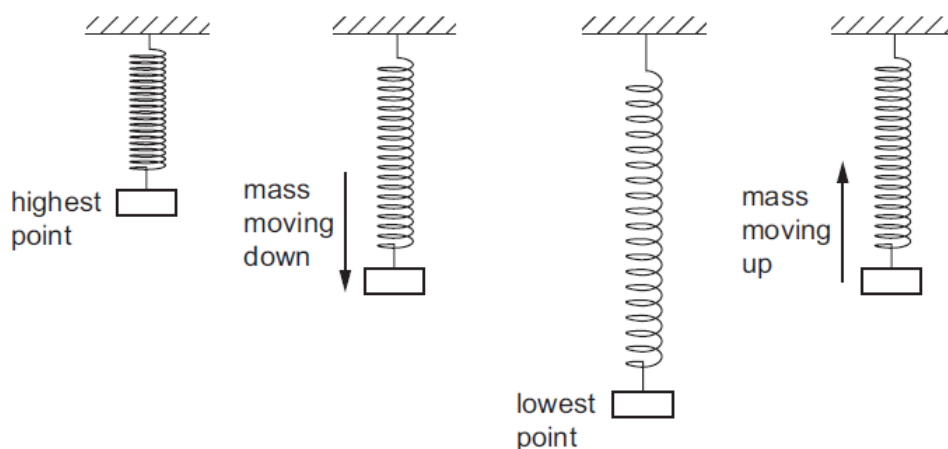
What is the air resistance acting on the hot-air balloon?

- A 300 N downwards
- B 300 N upwards
- C 4700 N downwards
- D 4700 N upwards



11. June/2020/Paper_13/No.9

A mass bounces up and down on a steel spring. The diagram shows the mass and the spring at different points during the motion.



At which point does the mass have the least gravitational potential energy and at which point is the most elastic energy stored in the spring?

	least amount of gravitational potential energy	most elastic energy stored in spring
A	mass moving down	mass moving up
B	mass moving down	lowest point
C	lowest point	mass moving up
D	lowest point	lowest point

12. June/2020/Paper_21/No.9

An object of mass 1.2 kg is moving with a velocity of 2.0 m/s when it is acted on by a force of 4.0 N. The velocity of the object increases to 5.0 m/s.

For what period of time does the force act on the object?

- A 0.90 s B 1.1 s C 1.5 s D 3.6 s

13. June/2020/Paper_22/No.7

A satellite orbits the Earth at constant speed in a circular orbit.

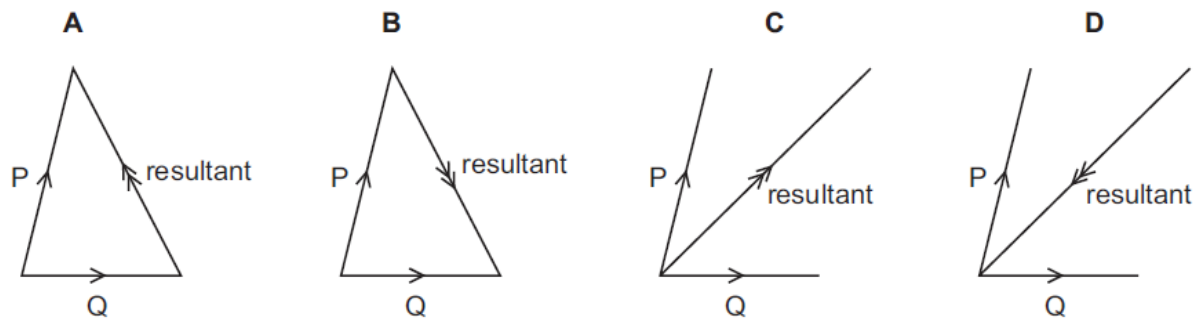
Which statement is correct?

- A The resultant force on the satellite is zero.
- B The resultant force on the satellite is towards the Earth.
- C The resultant force on the satellite is away from the Earth.
- D The resultant force on the satellite is in the direction of motion.

14. June/2020/Paper_22/No.8

Two forces P and Q act on an object.

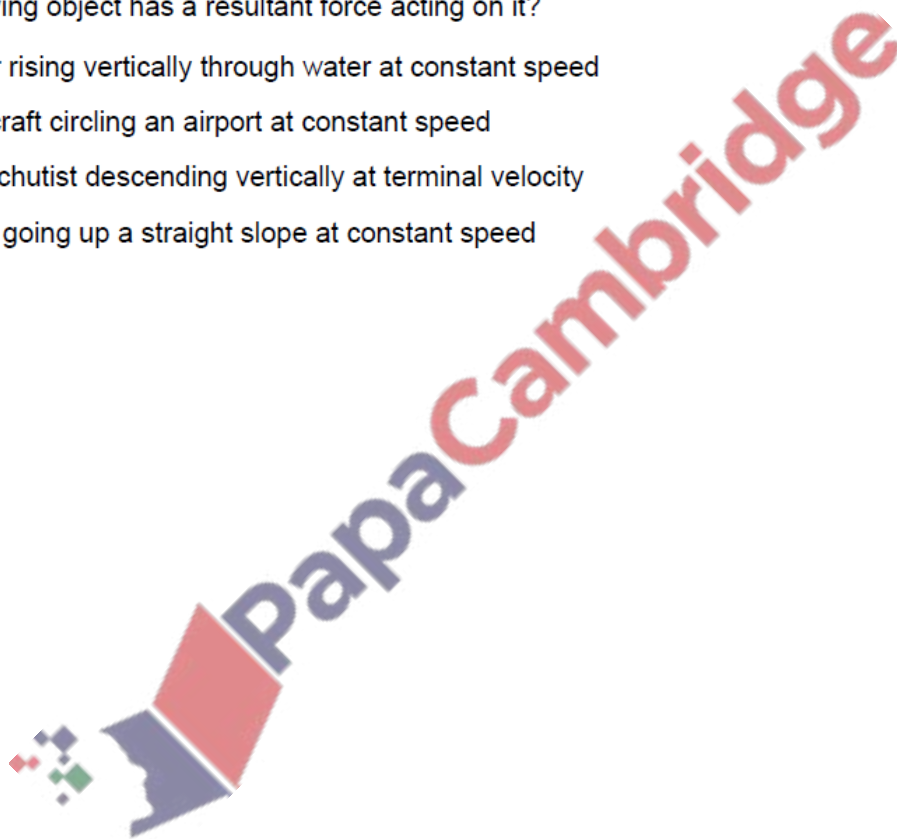
Which diagram shows the resultant of these two forces?



15. June/2020/Paper_23/No.7

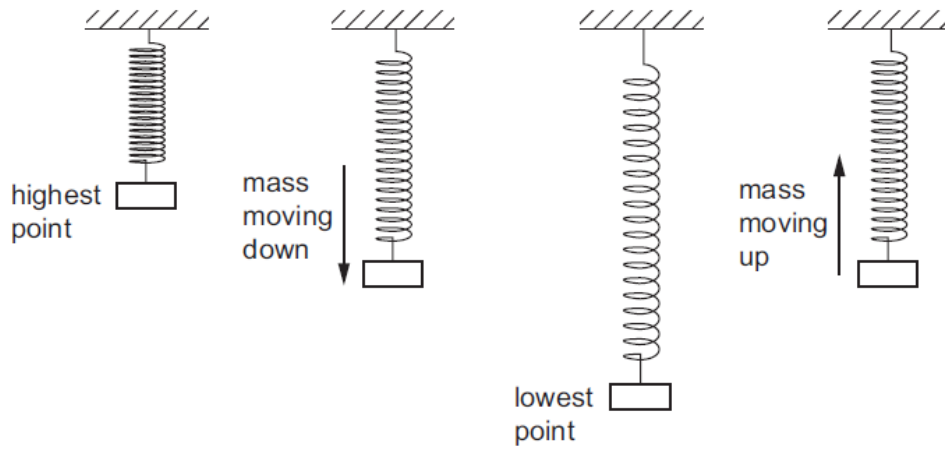
Which moving object has a resultant force acting on it?

- A a diver rising vertically through water at constant speed
- B an aircraft circling an airport at constant speed
- C a parachutist descending vertically at terminal velocity
- D a train going up a straight slope at constant speed



16. June/2020/Paper_23/No.10

A mass bounces up and down on a steel spring. The diagram shows the mass and the spring at different points during the motion.



At which point does the mass have the least gravitational potential energy and at which point is the most elastic energy stored in the spring?

	least amount of gravitational potential energy	most elastic energy stored in spring
A	mass moving down	mass moving up
B	mass moving down	lowest point
C	lowest point	mass moving up
D	lowest point	lowest point

17. June/2020/Paper_31/No.2

- (a) A student stretches a spring by adding different loads to it. She measures the length of the spring for each load. She plots a graph of the results.

Fig. 2.1 shows the graph of her results.

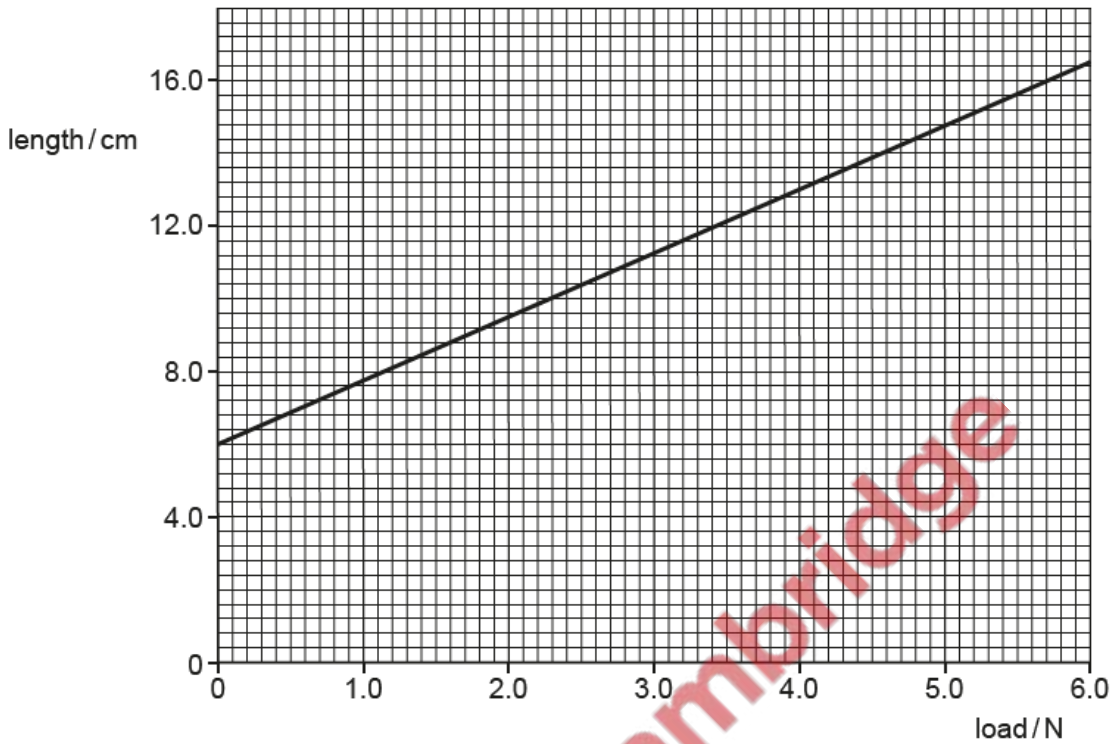


Fig. 2.1

Use the graph to determine:

- (i) the length of the spring without a load

length = cm [1]

- (ii) the length of the spring with a load of 4.0 N

length = cm [1]

- (iii) the extension due to a 4.0 N load.

extension = cm [1]

- (b) Complete the sentence about effects of forces. Choose words from the box.

colour	friction	pressure	shape	size	speed
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Stretching a spring with a load is an example of how a force can change the

..... and the of an object. [2]

[Total: 5]

18. June/2020/Paper_41/No.2

Fig. 2.1 is the extension–load graph for a light spring S.

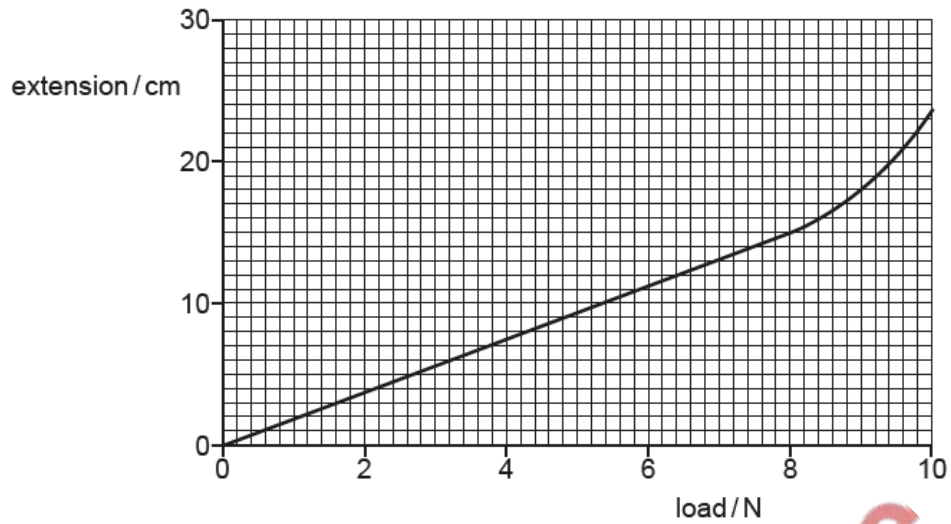


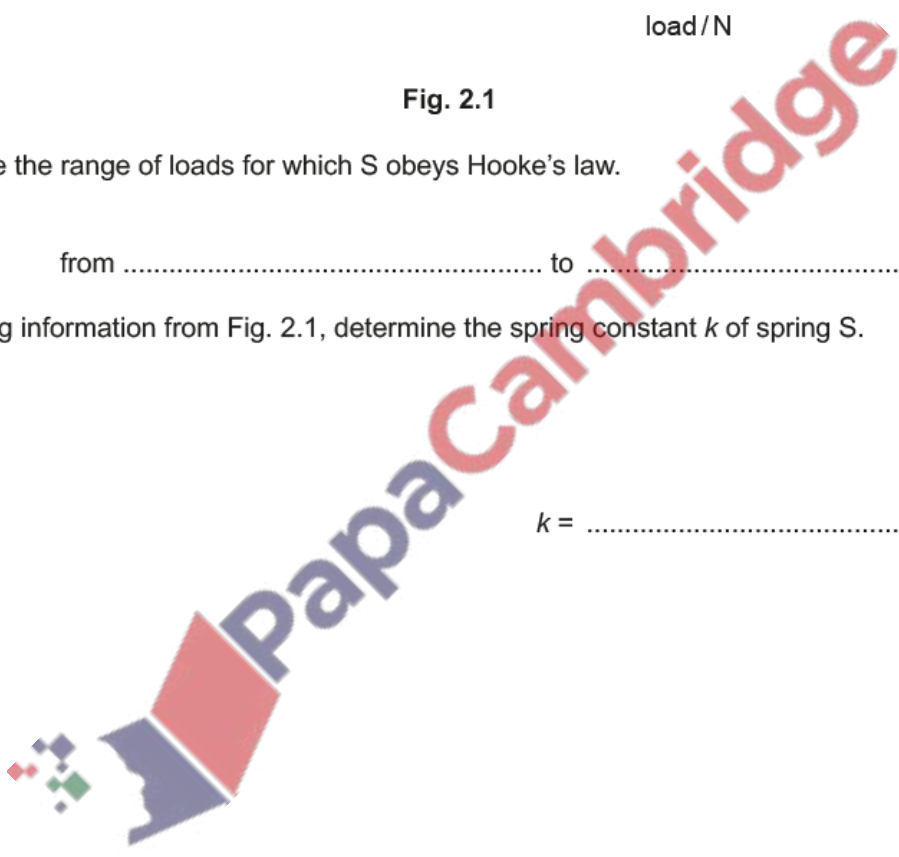
Fig. 2.1

(a) State the range of loads for which S obeys Hooke's law.

from to [1]

(b) Using information from Fig. 2.1, determine the spring constant k of spring S.

$k =$ [2]



(c) A second spring, identical to spring S, is attached to spring S. The two springs are attached to a rod, as shown in Fig. 2.2. A load of 4.0 N is suspended from the bottom of spring S. The arrangement is in equilibrium.

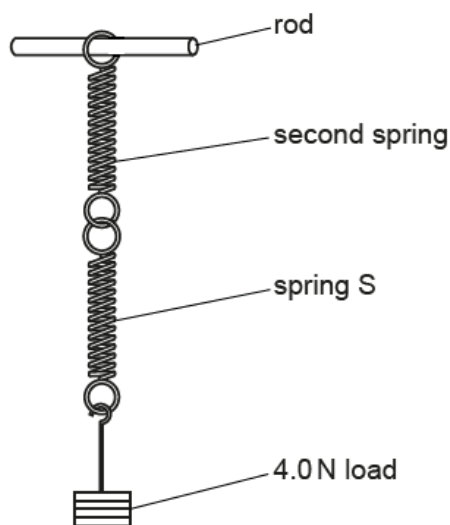


Fig. 2.2

(i) State the name of the form of energy stored in the two springs when they are stretched.
 [1]

(ii) Determine the extension of the arrangement in Fig. 2.2.

extension = cm [1]

(iii) The load is carefully increased to 6.0 N in total.

Calculate the distance moved by the load to the new equilibrium position as the load increases from 4.0 N to 6.0 N.

distance moved = [1]

[Total: 6]