Forces – 2022 November IGCSE 0625

1. Nov/2022/Paper_11/No.6

Which quantities, in addition to the acceleration of free fall *g*, affect the pressure at the bottom of a pond of water?

A the density of the water and the depth of the pond only

B the density of the water and the surface area of the pond only

C the depth of the pond and the surface area of the pond only

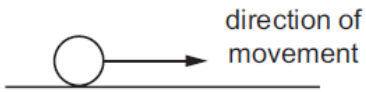
D the depth of the pond, the density of the water and the surface area of the pond

2. Nov/2022/Paper_12,13/No.6

On which ball is a non-zero resultant force acting?

A

a ball moving at constant speed on a smooth surface

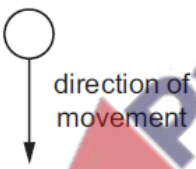


B

a ball at rest on a bench

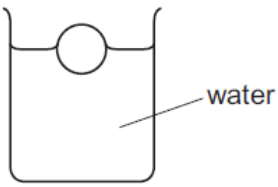
C

a free-falling ball which has just been released



D

a ball floating on water



3. Nov/2022/Paper_12/No.7

Which statements **must** be correct for an object to be in equilibrium?

1 The object is moving in a straight line.

2 There is no resultant force on the object.

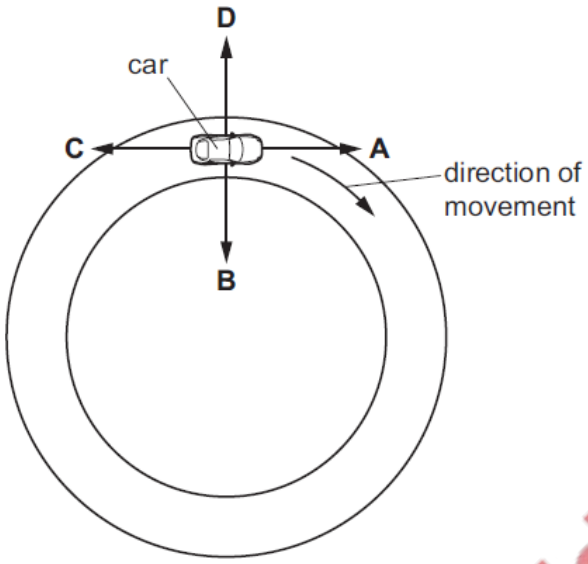
3 There is no resultant moment on the object.

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

4. Nov/2022/Paper_21/No.6

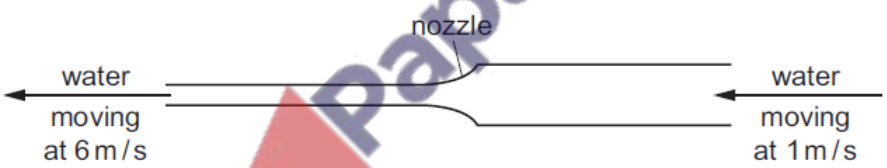
A car is travelling around a circular track at a constant speed, as shown.

In which direction is the resultant force on the car?



5. Nov/2022/Paper_21/No.7

The diagram shows part of a hose used by a firefighter.



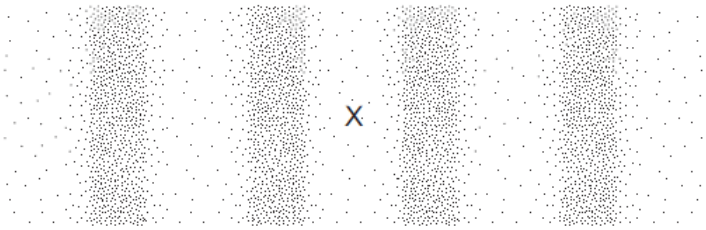
15 kg of water flows through the hose each second.

Which force is applied to the hose by the water?

A 15 N **B** 75 N **C** 90 N **D** 105 N

6. Nov/2022/Paper_22/No.6

The diagram shows the air molecules in part of a sound wave at a particular moment in time.



Which statement is **not** correct?

A Earlier, there was compression at X.

B Later, there will be a rarefaction at X.

C This part of the wave is travelling horizontally across the page.

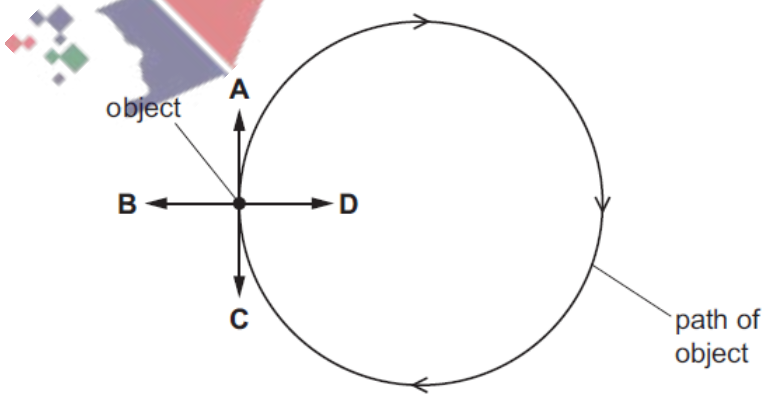
D This part of the wave is travelling towards the top of the page.

7. Nov/2022/Paper_23/No.6

The diagram shows an object moving at a constant speed in a circular path in the direction shown.

A force acts on the object to keep it in the circular path.

In which labelled direction does this force act, when the object is in the position shown?



8. Nov/2022/Paper_32/No.1(b)

(b) The weight of the skydiver is 750 N.

The weight of the skydiver acts downwards, as shown in Fig. 1.4.

While the skydiver is falling, another force acts upwards.

The upward force varies as the skydiver falls.

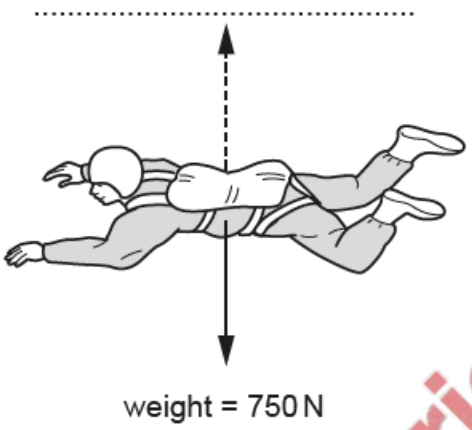


Fig. 1.4 (not to scale)

(i) On Fig. 1.4, write the name of the upward force on the dotted line above the upward force. [1]

(ii) Suggest a value for the upward force on the skydiver at time = 10 s.

..... N [1]

(iii) Determine the value of the upward force on the skydiver at time = 30 s.

..... N [1]

9. Nov/2022/Paper_41/No.2

A force is a vector quantity.

(a) (i) State **two** features of a vector quantity.

1. .....

2. .....

[2]

(ii) State the names of **two** other quantities that are vectors.

1. .....

2. .....

[2]

(b) A student suspends a spring from a clamp stand and measures the length l_0 of the spring.

Fig. 2.1 shows the apparatus.

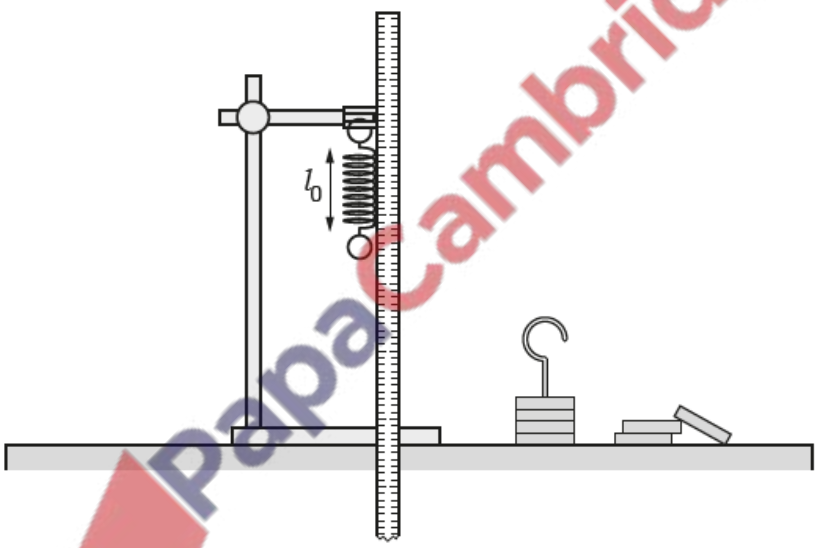


Fig. 2.1 (not to scale)

The student then suspends loads of different weights from the spring and measures the length of the spring for each load. He then plots a graph of the length of the spring against weight.

Fig. 2.2 is the graph that the student plots.

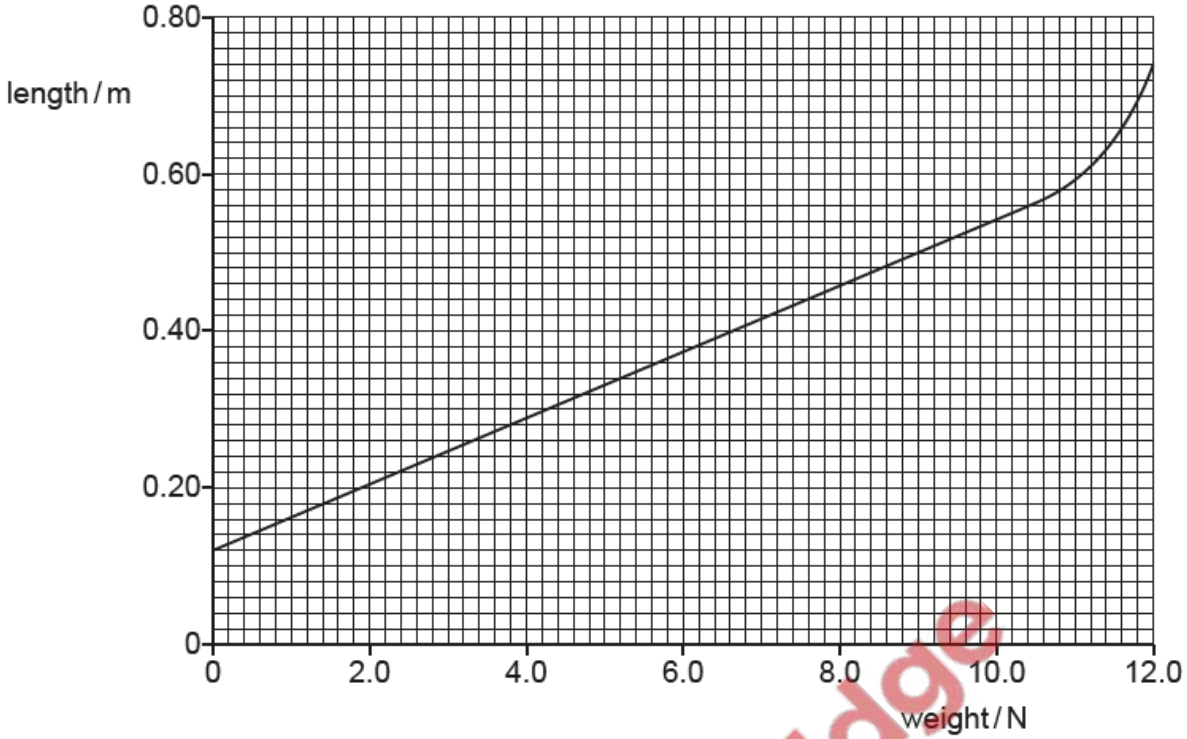


Fig. 2.2

(i) Using Fig. 2.2, determine the initial length l_0 of the spring.

l_0 = ... [1]

(ii) State what is meant by the limit of proportionality and, using Fig. 2.2, determine the weight of the load that causes this spring just to reach the limit of proportionality.

limit of proportionality .....

.....

.....

weight = ...

[2]

(iii) Using Fig. 2.2, determine the spring constant of this spring.

spring constant = ... [3]

[Total: 10]

10. Nov/2022/Paper_43/No.1(b)

(b) **(i)** Calculate the average acceleration of the aeroplane between $t = 0$ and $t = 35\,s$.

acceleration = ... [1]

(ii) The combined mass of the aeroplane, its passengers and its fuel on take-off is $1.1 \times 10^5\,kg$.

Calculate the average resultant force on the aeroplane between $t = 0$ and $t = 35\,s$.

force = ... [2]

(iii) The force provided by the engines of the aeroplane is constant.

Give **one** possible explanation for the change in acceleration of the aeroplane between $t = 0$ and $t = 35$ s.

.....

..... [1]

(iv) On Fig. 1.2, sketch a graph to show how the acceleration of the aircraft varies between $t = 0$ and $t = 35$ s.

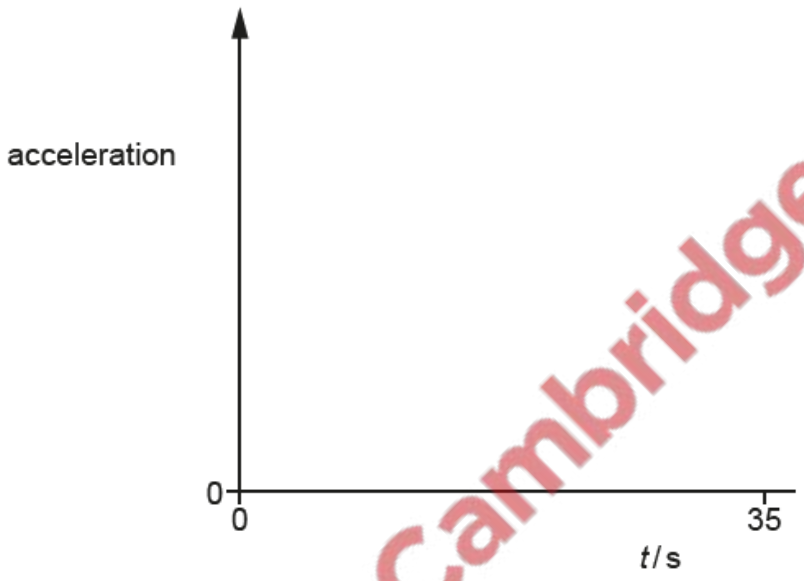


Fig. 1.2

[3]