

Effects of Forces

Question Paper

Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Effects of Forces
Difficulty	Easy

Time Allowed	40
Score	/28
Percentage	/100

Question 1a

Fig.3.1 shows the load-extension graphs for two springs, A and B.

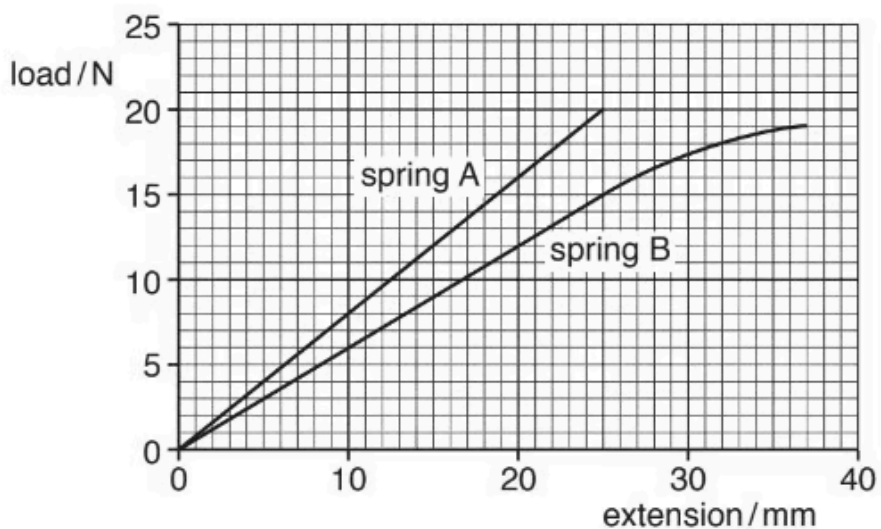


Fig.3.1

Determine the extension of spring A for a load of 10N.

extension = mm
[1 mark]

Question 1b

Extended tier only

State which spring is easier to stretch and give a reason for your answer.

[2 marks]

Question 1c

A different spring is suspended from the edge of a bench, as shown in Fig.3.2.

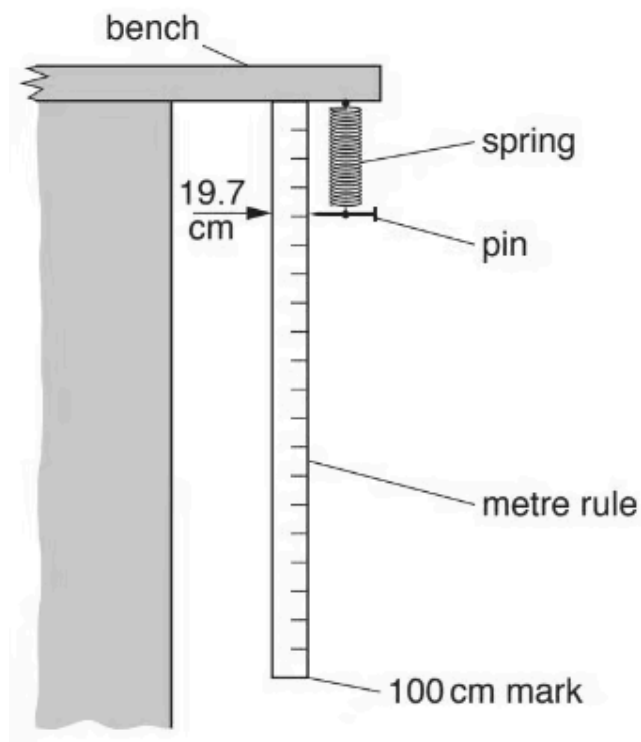


Fig.3.2

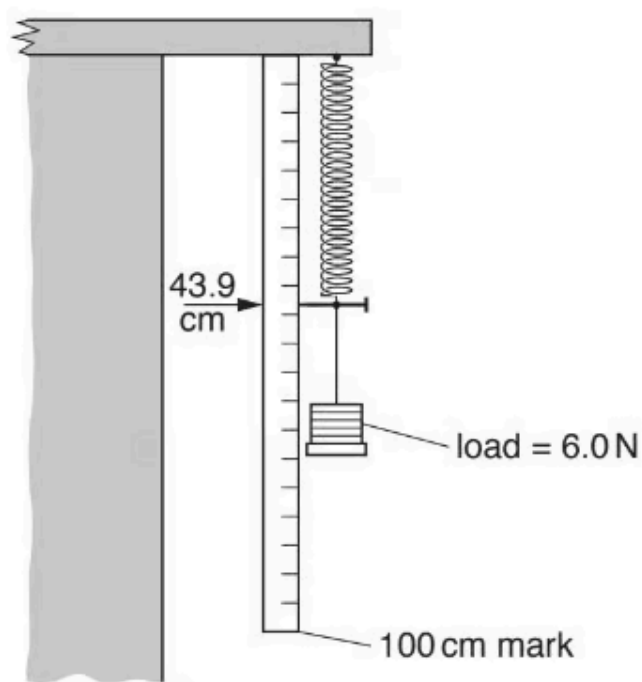


Fig.3.3

With no load on the spring, the pin points to 19.7 cm on the metre rule, as shown in Fig. 3.2.

When a load of 6.0 N is attached to the spring, the pin points to 43.9 cm, as shown in Fig. 3.3.

- Calculate the extension of this spring for a load of 6.0 N. extension = cm [1]
- Describe how a student could use the equipment in Fig. 3.2 to obtain accurate readings for a load-extension graph for this spring. [2]

[3 marks]

Question 2a

A model aircraft is flying through air. Fig. 3.1 shows the forces acting on the model aircraft. The weight of the model aircraft is 15.0 N.

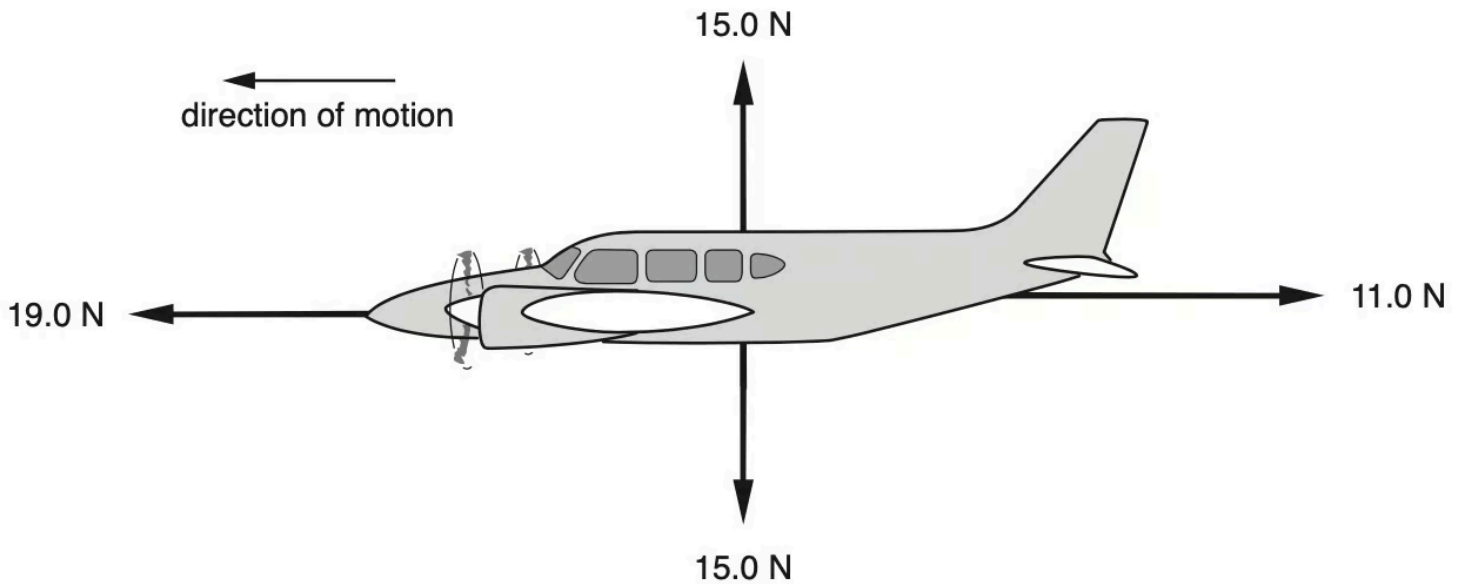


Fig. 3.1

- (i) Determine the size and direction of the resultant **horizontal** force acting on the model aircraft.

size of resultant horizontal force = N

direction of resultant horizontal force =
[1]

- (ii) Describe the change in the motion of the model aircraft.

[2]
[3 marks]

Question 2b

The horizontal forces acting on the model aircraft become balanced.

Suggest how the horizontal forces acting on the model aircraft have changed.

[1 mark]

Question 3a

State Newton's first law of motion.

[1 mark]

Question 3b**Extended tier only**

Newton's second law describes the change in motion caused by a resultant force.

State the equation which links acceleration, resultant force and mass.

[1 mark]

Question 3c

State what happens to the motion of a moving object when a resultant force is applied to it in the opposite direction to the motion.

[1 mark]

Question 3d**Extended tier only**

State what happens to the motion of a moving object when a resultant force is applied to it in a perpendicular direction to the motion.

[1 mark]

Question 4a

A truck of mass 8.0 kg is rolling down a slight incline as shown in Fig. 1.1.

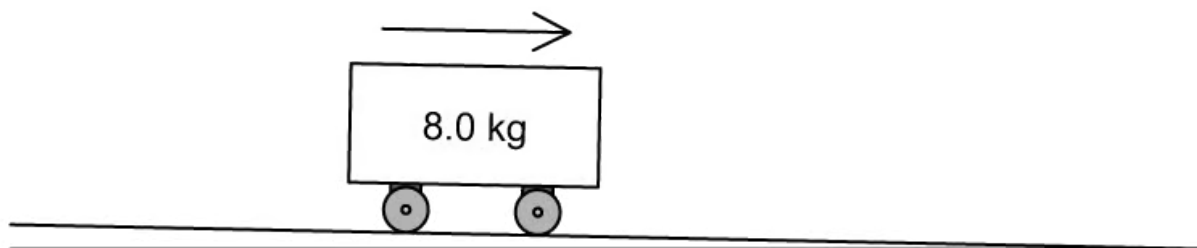


Fig. 1.1

The truck travels at a constant speed.

Explain why the truck does not accelerate, even though it is on an incline.

[2 marks]

Question 4b

The slope of the incline is increased. As a result of this, the truck now accelerates.

Explain why the truck now accelerates.

[2 marks]

Question 4c**Extended tier only**

The truck's acceleration is 2.0 m/s^2 .

Calculate the resultant force on the truck.

resultant force =
[2 marks]

Question 4d

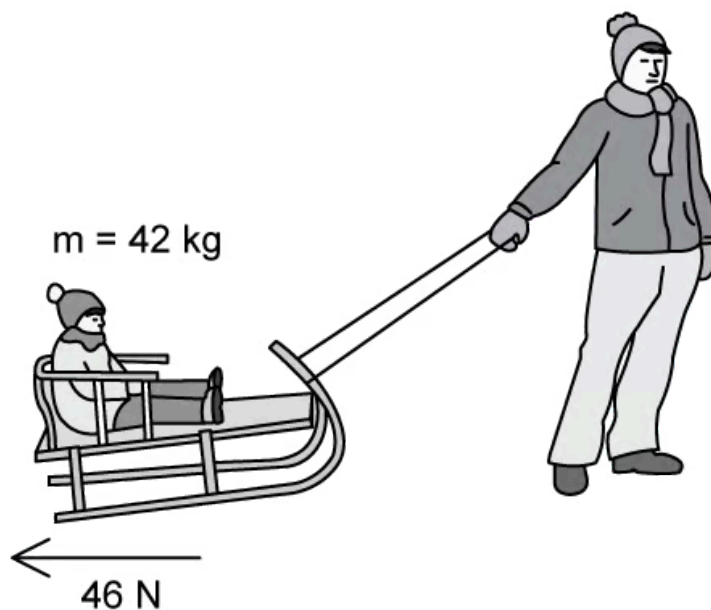
The acceleration of the truck can be increased by reducing the force of friction.

Suggest a way of reducing the friction in this investigation.

[1 mark]

Question 5a

Fig. 1.1 shows a man pulling a child on a sledge.



The mass of the child and the sledge is 42 kg .

The unbalanced force acting on the sledge is 46 N .

State the magnitude of the force that needs to be exerted by the man to make the sledge move.

[1 mark]

Question 5b

Name the force that is opposing the motion of the sledge.

[1 mark]

Question 5c**Extended tier only**

The sledge is then placed at the top of a hill and accelerates down the hill at 0.75 m/s^2 .

Calculate the resultant force acting on the sledge.

[3 marks]**Question 5d**

Assuming that the force opposing the motion of the sledge is the same, calculate the total force acting down the hill.

You may draw a diagram in your answer.

[2 marks]