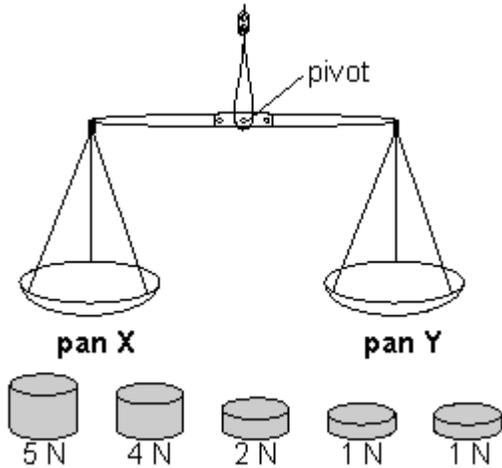


1

Ellie has a set of scales and some weights as shown below.



Ellie puts two weights in pan X and one weight in pan Y. The scales balance.

(a) Which weights could be in pans X and Y?

pan X: ..... and .....

pan Y: .....

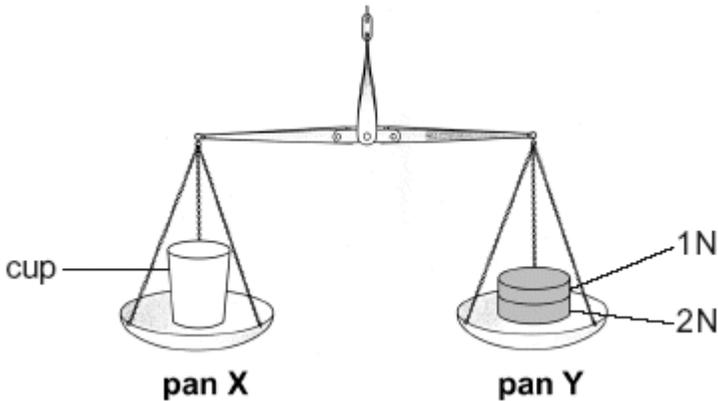
1 mark

(b) Ellie removes all the weights from the scales. She then puts a cup on pan X. In which direction will pan Y move?

.....

1 mark

(c) She puts weights into pan Y so the scales balance.

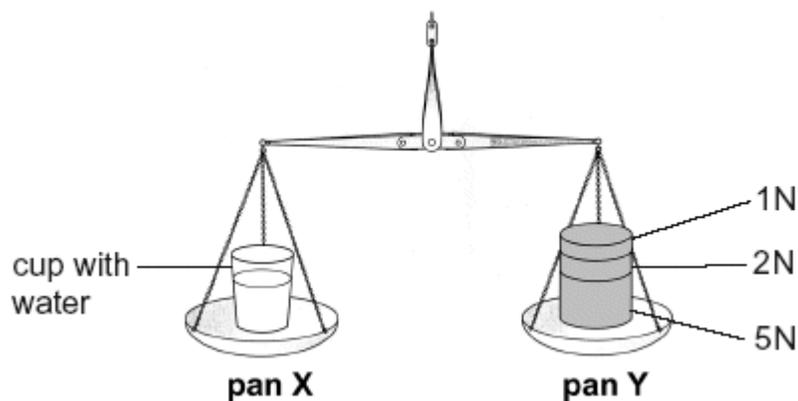


How much does the cup weigh?

..... N

1 mark

- (d) Ellie puts some water in the cup.  
She then adds some more weights to pan Y to make the scales balance.



- (i) How much do the cup **and** water weigh?

..... N

1 mark

- (ii) How much does the water weigh?

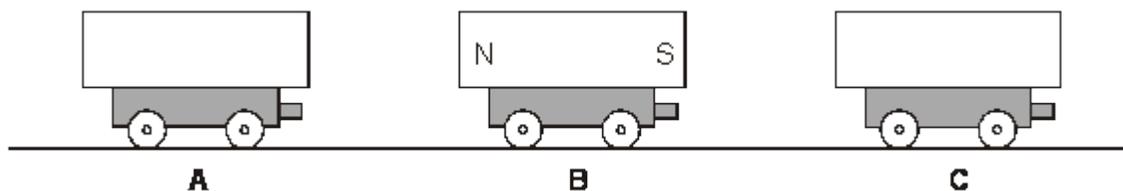
..... N

1 mark  
maximum 5 marks

**2** The diagram below shows three trolleys.  
Peter put a bar magnet on each trolley.

- (a) He pushed trolleys A, B and C together.

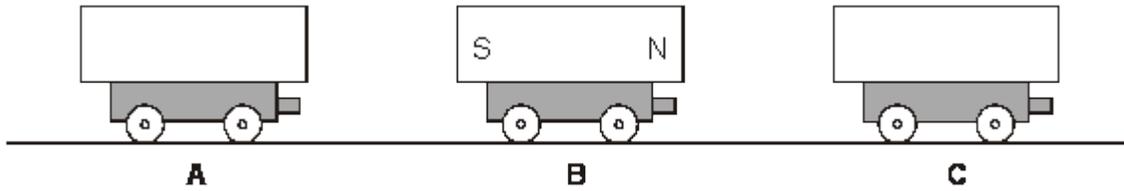
- Magnet B **attracted** magnet A.
- Magnet B **repelled** magnet C.



**On the diagram above**, label the north and south poles of magnets A and C.  
Use the letters N and S.

2 marks

(b) Peter turned trolley B around. Trolleys A and C were **not** turned around.



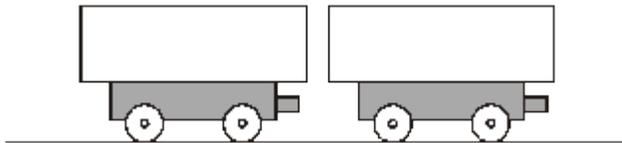
What would happen now when Peter pushed them all together?  
Use either **attract** or **repel** to complete each sentence below.

Magnet B would ..... magnet A.

Magnet B would ..... magnet C.

1 mark

(c) Peter held two trolleys close together and then let go.



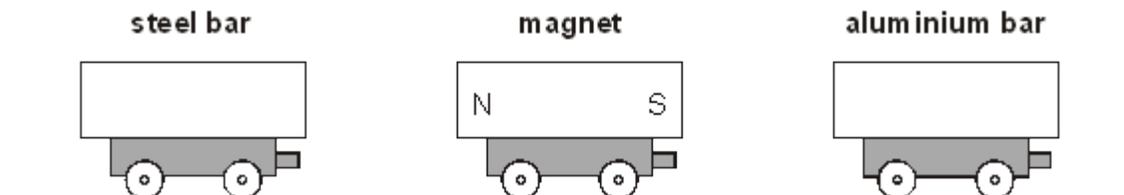
The magnets repelled each other.

**Draw an arrow** on both magnets to show which way they would move.

1 mark

(d) Peter took a magnet, a steel bar and an aluminium bar.

He put them on three trolleys as shown below.



(i) What happens to the steel bar as he moves it closer to the magnet?

.....

1 mark

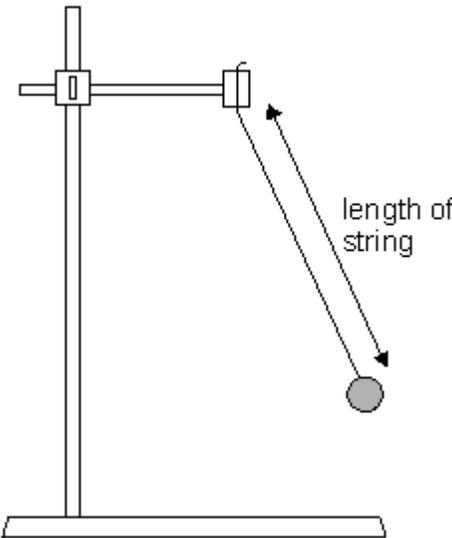
(ii) What happens to the aluminium bar as he moves it closer to the magnet?

.....

1 mark  
maximum 6 marks

3

Paula made a pendulum from a ball attached to a piece of string.



She counted the number of swings the ball made in 10 seconds. She repeated the experiment with different lengths of string.

The table below shows Paula's results.

length of string (cm)	number of swings in 10 seconds
10	16
20	11
30	9
40	8
50	7

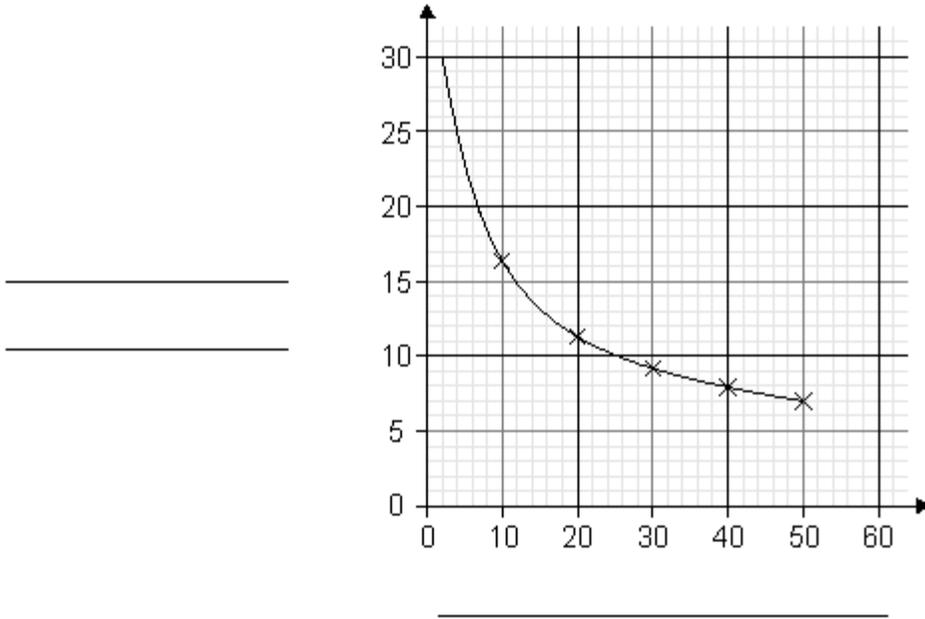
(a) What happens to the number of swings when the string gets longer?

.....

1 mark

(b) Paula drew a graph of her results.

- (i) Write the labels on **both axes** of the graph below.  
Use the table to help you.



2 marks

- (ii) Paula made a pendulum from a piece of string that was 15 cm long.  
How many times would this pendulum swing in 10 seconds?  
Use the graph to help you.

.....

1 mark

- (iii) Paula made a pendulum from a piece of string that was 60 cm long.  
Estimate the number of swings the pendulum makes in 10 seconds.  
Use the graph.  
Tick the best answer.

18       12       6       4

1 mark

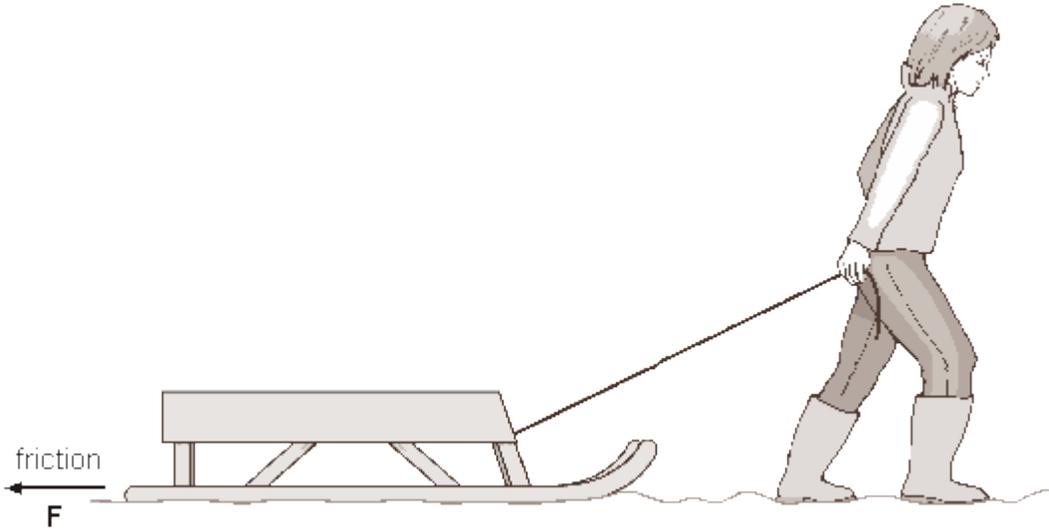
- (c) After some time the pendulum stops moving.  
What force makes the pendulum stop moving?

.....

1 mark  
maximum 6 marks

4

Sally pulls a sledge in the snow.



- (a) (i) Draw an arrow on the rope to show the direction of the force of the rope on the sledge.  
Label the arrow **R**.
- (ii) Draw an arrow on the diagram to show the direction of the force of gravity on the sledge.  
Label the arrow **G**.

2 marks

- (b) Force **F** is the friction between the sledge and the snow. Sally then pulled the sledge over a concrete path.  
Friction is less on snow than on concrete.  
Give the reason for this.

.....

1 mark  
maximum 3 marks

5

- (a) Debbie put a paper cup into a glass beaker. She glued a magnet in the bottom of the paper cup. She glued another magnet in the bottom of the beaker. The magnets repelled.

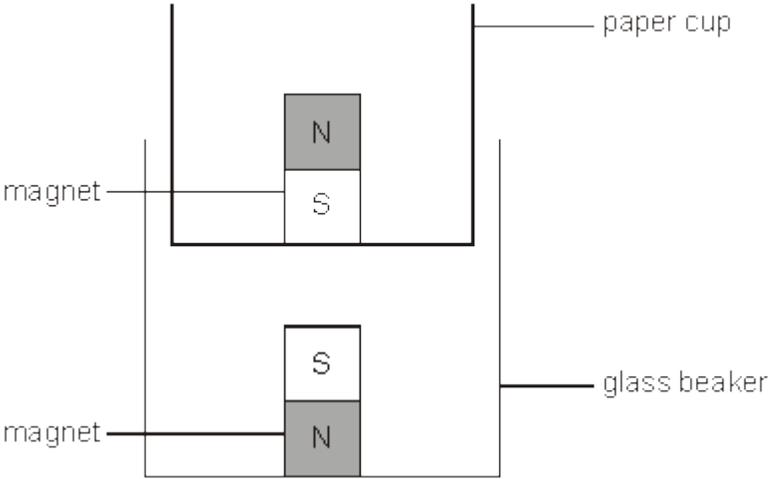


diagram A

not to scale

What **two** forces act on the paper cup and its contents to keep it in this position?

- 1. ....
- 2. ....

1 mark

1 mark

- (b) Debbie put 5 g of aluminium rivets into the paper cup. It moved down a little as shown in diagram B.

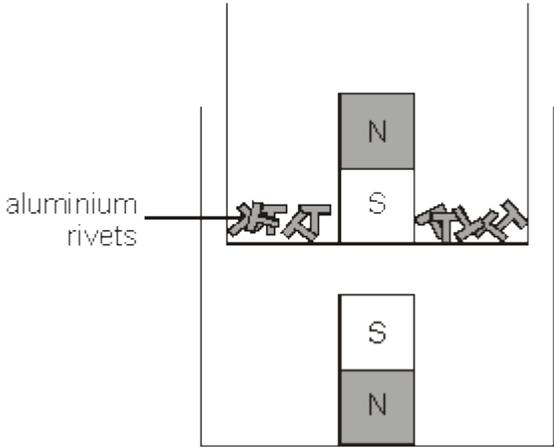
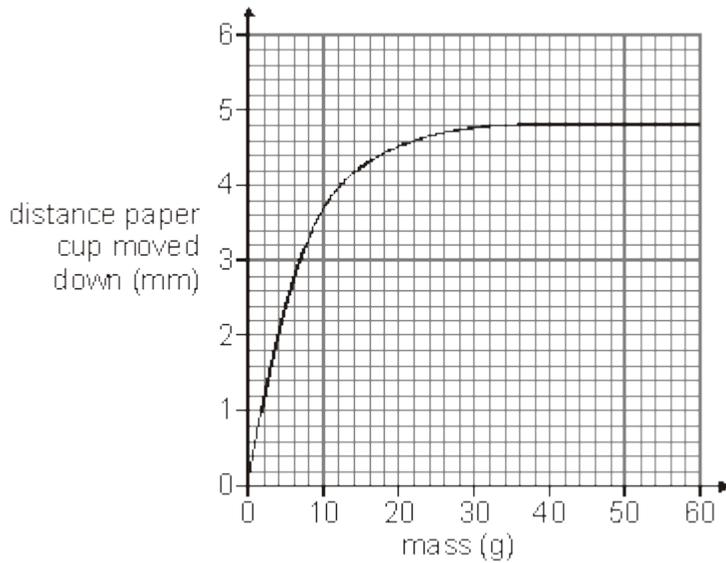


diagram B

not to scale

Debbie plotted a graph to show how the mass of aluminium rivets affected the distance the cup moved down.



(i) Use the graph to find the mass that made the cup move down 4 mm.

..... g

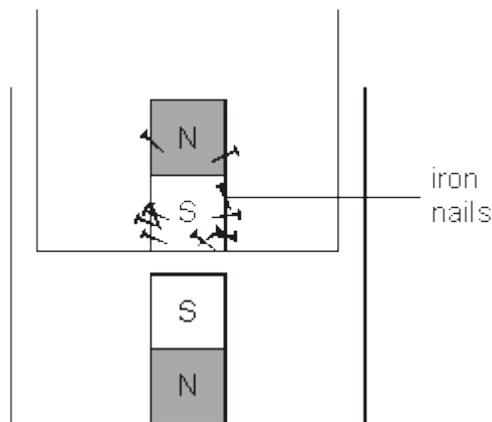
1 mark

(ii) Why did the graph stay flat with masses greater than 40 g?

.....

1 mark

(c) Debbie removed the 5 g of aluminium rivets and put 5 g of iron nails into the cup.



**diagram C**

*not to scale*

The paper cup moved down more with 5 g of iron nails than with 5 g of aluminium rivets as shown in diagram C.

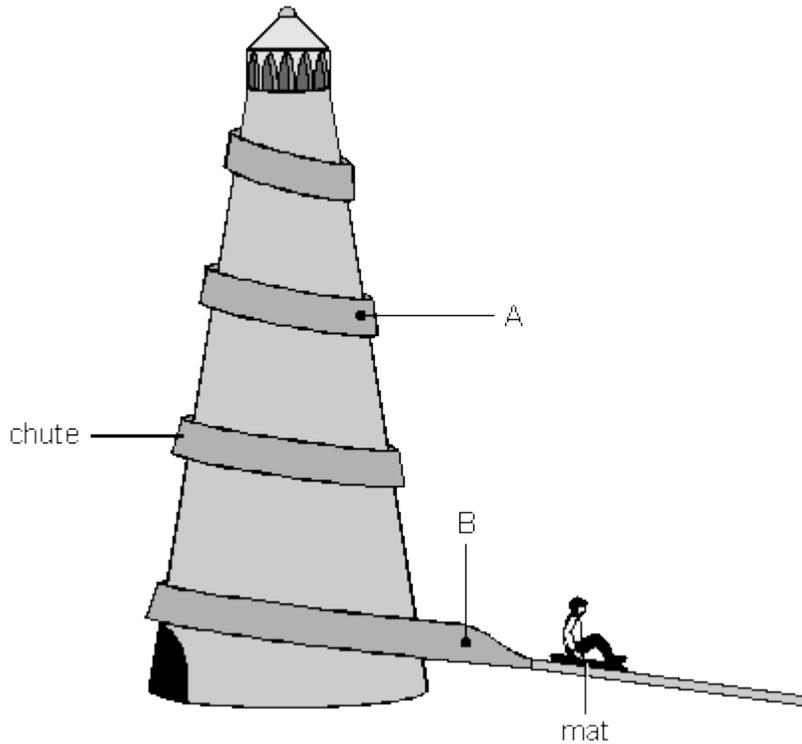
Give the reason for this.

.....  
.....

1 mark  
maximum 5 marks

6

Anil sits on a mat at the top of a helter-skelter and then slides down a chute around the outside.



(a) (i) Name **two** of the forces acting on Anil as he slides from point A to point B.

1. ....

2. ....

2 marks

(ii) As Anil slides from point A to point B, the forces acting on him are balanced.

Describe Anil's speed when the forces acting on him are balanced.

.....

1 mark

- (b) Anil goes back for a second go. This time he sits on a smooth cushion instead of a mat.

He goes much faster on the cushion. Give the reason for this.

.....

1 mark

- (c) On his third go Anil lies back on the cushion with his arms by his side.

What happens to his speed? Give the reason for your answer.

.....

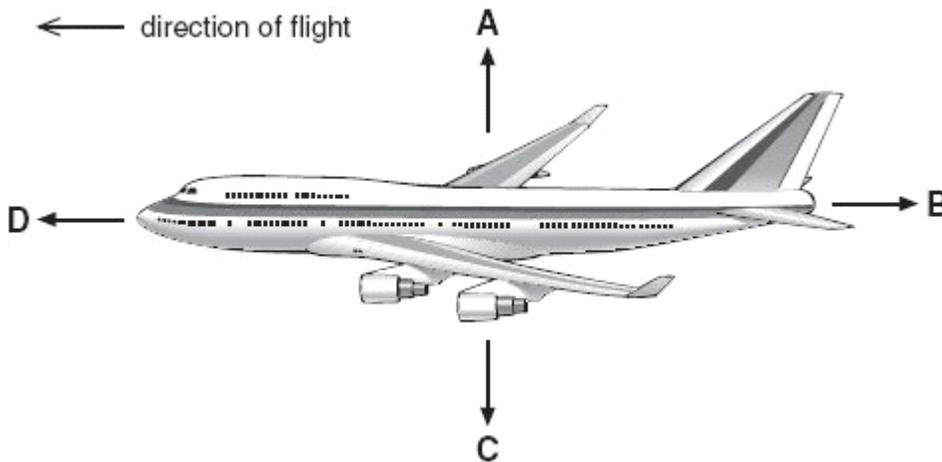
.....

.....

2 marks  
Maximum 6 marks

7

The diagram shows four forces acting on a plane in flight.



- (a) Which arrow represents air resistance?  
Give the letter.

.....

1 mark

- (b) (i) When the plane is flying at a constant height, which **two** forces must be balanced?  
Give the letters.

..... and .....

1 mark

- (ii) When the plane is flying at a constant speed in the direction shown, which **two** forces must be balanced?  
Give the letters.

..... and .....

1 mark

(c) (i) Just before take-off, the plane is speeding up along the ground.

Which statement is true?

Tick the correct box.

Force B is zero.

Force B is greater than force D.

Force D is equal to force B.

Force D is greater than force B.

1 mark

(ii) Which statement is true about the plane just as it leaves the ground?

Tick the correct box.

Force C is zero.

Force C is greater than force A.

Force A is equal to force C.

Force A is greater than force C.

1 mark  
maximum 5 marks