

Mark schemes

- 1** (a) point A: south pole ✓
if more than one box in the row is ticked award no mark 1 (L3)
- point B: south pole ✓
if more than one box in the row is ticked award no mark 1 (L3)
- (b) (i) The magnet attracts the iron block. ✓
if more than one box in the row is ticked award no mark 1 (L3)
- (ii) The iron block attracts the magnet. ✓
if more than one box in the row is ticked award no mark 1 (L3)
- 2** (a) (i) • ↓ ✓
if more than one box is ticked, award no mark 1 (L3)
- (ii) • ↑ ✓
if more than one box is ticked, award no mark 1 (L3)
- (b) • B
accept 'the middle or second one' 1 (L3)
- any **one** from
- it hangs down the most
accept 'the spring is wider apart'
 - it stretches the spring most
accept 'it stretches more'
 - the spring is longer
accept 'it stretched the longest'
this mark cannot be awarded if the response conflicts with the first part of (b)
a comparative answer is required for the mark
non-comparative answers such as 'it is long' are insufficient 1 (L3)

[4]

(c) • T

accept 'the last one'

1 (L3)

any **one** from

- the spring was pushed down the most amount

accept 'it squashes more'

- the cube pushed it down the most

accept 'the spring is the tightest'

- the spring is shorter

accept 'it is shortest'

this mark cannot be awarded if the response conflicts with the first part of (c)

a comparative answer is required for the mark

non-comparative answers such as 'it is short' are insufficient

1 (L4)

[6]

3

(a) (i) • C

accept 'down'

1 (L3)

(ii) • A

accept 'up'

1 (L3)

(b) (i) • increases ✓

if more than one box is ticked, award no mark

1 (L3)

(ii) any **one** from

- there are two people on the same **or** Jo's trapeze

- the weight is greater

- there is Sara as well

accept 'Sara is pulling on Jo'

this mark cannot be awarded if the response given conflicts with part (b)(i)

'the force is greater' is insufficient

'it is heavier' is insufficient as 'it' refers to force

1 (L4)

- (c) • it decreases
accept 'it is less'
accept 'there is less weight on it'
accept 'there is no force' or 'it becomes zero'
'it springs back up' is insufficient

1 (L4)

[5]

4

(a) any **one** from

- the forces are balanced
ignore references to gravity if the answer is in terms of balanced forces
- the forces are equal **or** the same
'the sides are equal' is insufficient
- the forces are both 1000 N
accept 'the forces are both 1000'
accept 'the newtons are even'
*do **not** accept 'both teams weigh 1000 N'*
- they pull with the same force **or** equally hard
accept 'both teams have the same strength'

1 (L4)

(b) an arrow drawn to the right

accept an arrow drawn to the right anywhere on the drawing

1 (L3)

(c) any **one** from

- team A pulled harder than team B
accept 'team A pulled harder' or 'team A pulled more'
or 'they pulled harder'
accept the converse
- team A was stronger
accept 'they used more strength'
- team A was pulling with more than 1000
- team B was pulling with less than 1000
- there was more force to the left
accept 'there are more newtons to the left'

1 (L4)

(d) 1200 N ✓

if more than one box is ticked, award no mark

1 (L4)

(e) friction

1 (L4)

[5]

5

(a) (i) • an arrow labelled R, to the right, drawn on the rope
accept a labelled arrow to the right, drawn parallel to the rope

1 (L3)

(ii) • an arrow labelled G, vertically downwards

1 (L4)

(b) any **one** from

• snow is smoother

• snow is more slippery

accept 'snow is slippery'

*accept 'concrete **or** the path is rough'*

*'snow is soft' **or** 'concrete is hard' are insufficient*

1 (L4)

[3]

6

(a) (i) • 60 cm³

1 (L3)

(ii) • 10 cm³
accept '60 – 50'

1 (L3)

(b) (i) • lead weight

*accept 'lead' **or** 'weight'*

'800 g' is insufficient

1 (L3)

(ii) • wood puzzle

*accept 'wood' **or** 'puzzle'*

'500 cm³' is insufficient

1 (L3)

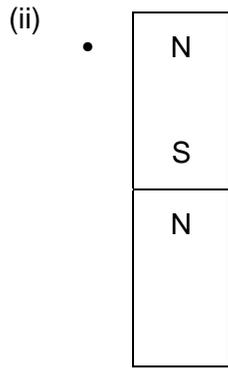
- (c) (i) any **one** from
- it has a low density
accept 'it is light'
 - it does not rust
*do **not** accept 'it does not rust as easily as other metals'*
accept 'it does not bend'
accept 'it is strong'
- 1 (L4)
- (ii) • friction
- 1 (L4)

[6]

7

- (a) **either**
- *pan X: 1N and 1N*
pan Y: 2N
- or**
- *pan X: 4N and 1N*
pan Y: 5N
- 1 (L3)
- three** weights are required for the mark*
units are not required for the mark
the weights in pan X can be in either order
- (b) • up
- accept '↑'*
'X will go down' is insufficient
- 1 (L3)
- (c) • 3 N
- 1 (L3)
- (d) (i) • 8 N
- 1 (L3)
- (ii) • 5 N
- accept the answer to (di) minus the answer to (c)*
accept '8-3'
- 1 (L4)

[5]



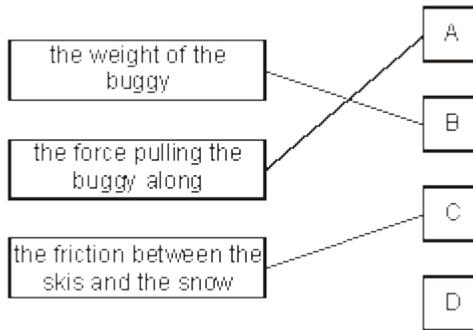
all three poles are required for the mark

1 (L4)

[5]

10

(a)



if more than one line is drawn from any one force award no mark for that force

3 (L3)

(b) 800

accept '80 x 10'

1 (L4)

(c) any **one** from

- it weighed more
- the mass was greater
accept 'it was heavier'
- it weighed less at the end
accept 'it only weighed 130 at the end'
accept 'there was more food or fuel or supplies'
accept 'more pressure'

1 (L4)

(d) any **one** from

- they spread out the weight
accept 'they do not sink into the snow'; 'wheels sink'
- they have a bigger surface **or** area
- they can slide easily
accept 'they reduce the pressure'; 'less friction'
'they are bigger'; 'it can slide' is insufficient

1 (L4)

(e) any **one** from

- there is a bigger surface **or** area
- there is a bigger force
- it catches more air **or** wind
*do **not** accept 'there is more air resistance'*

1 (L4)

[7]

11

(a) any **two** from

- same type of cardboard
accept 'same cardboard or box'
- same width (of cardboard)
- same length (of cardboard)
- same thickness of cardboard pieces
accept, for one mark, 'the same sized bridge'
if not given with 'width' or 'length' or thickness
accept 'equal-sized cardboard pieces'
- loaded in the centre
- same (height of) blocks
accept 'same height at the start'
'same height of bridge' is insufficient
- same distance between blocks
- measure in the same place
accept 'leave masses on for the same amount of time'
accept 'masses of the same shape or type'

2 (L5)

- (b) (i) • *bridge A: any number from 0.0 to 2.9*
bridge B: any number from 5.1 to 5.5
***both** answers are required for the mark*
- 1 (L5)

- (ii) any **one** from
- it collapsed
 - it broke
 - it folded
 - it reached the bench
- 1 (L5)

- (c) (i) • bridge A ✓
if more than one box is ticked, award no mark
***both** the bridge and a reason are required for the mark*
- any **one** from
- it bends less (at 200 g)
accept 'there is a bigger gap to the bench'
'it is stronger' is insufficient
 - bridge B bends more
accept 'it is higher'
accept 'bridge A is 7.0 cm and bridge B is only 6.5 cm'
'bridge A is 7.0 cm and bridge B is 6.5 cm' is insufficient
- 1 (L6)

- (ii) • bridge B ✓
if more than one box is ticked, award no mark
***both** the bridge and a reason are required for the mark*
- any **one** from
- it bends less (at 300 g)
accept 'there is a bigger gap to the bench'
'it is stronger' is insufficient
accept 'it is higher'
*accept 'bridge B is 5.6 cm and bridge A is **only** 3.0 cm'*
'bridge A was 3.0 cm, bridge B was 5.6 cm' is insufficient
 - bridge A bends more
accept 'bridge A is about to break'
'it is about to break' is insufficient
- 1 (L6)

[6]

12

(a)



both poles are required for the mark S

1 (L4)

(b) (i) repel

1 (L4)

(ii) it moved upwards **or** returned to its original position
accept 'it would move up and down'

1 (L4)

(c) decreased

accept 'got smaller'; accept 'moved closer'

1 (L4)

(d) any **one** from

- it was attracted to the base
accept 'the magnets are attracting'
accept 'the N and S poles attract'
- it moved down
accept 'it would not float'
- it sank
accept 'it would stick to the base'

1 (L4)

[5]

13

(a) (i) • the height the ball was dropped from

accept 'height'
*do **not** accept 'depth'*
accept 'height in cm'
'cm' is insufficient

1 (L5)

(ii) any **one** from

- he repeated it
accept 'he got more results'
accept 'he did it twice'
'it was a fair test' is insufficient
- he could get an average
accept 'he would notice odd results'
- it was more reliable
accept 'more accurate'

1 (L5)

(b) • the greater the height, the deeper the crater

- accept the converse*
accept 'there is a positive correlation (between the variables)'
accept 'bigger' for 'deeper' only when it refers to the crater size
a comparative answer is required for the mark
'when the ball was dropped from a high height, a larger crater formed' is insufficient
'the bigger, the deeper' is insufficient as 'bigger' is ambiguous

1 (L5)

(c) any **two** from

- (use the same) ball
*accept 'the size **or** mass **or** weight **or** volume **or** material of the ball'*
*do **not** accept 'density of ball'*
- depth of sand
*accept 'same amount of sand' **or** 'the (same) sand'*
- the conditions of the sand
*accept 'how damp the sand was' **or** 'the type of sand'*
accept 'how flat the sand surface is'
'the sand tray' is insufficient
- where **or** how the depth is measured
accept 'keep the ruler in the same position'
'use the same ruler' is insufficient
- the way the ball is released
accept 'release the ball with the same force'
'same person' is insufficient

2 (L5)

- (d) (i) • there is less disturbance to the sand
accept 'he might push the ball further in'
accept 'your finger could push it further in, but the magnet lifts it'
'it would be more accurate' is insufficient
accept 'it lifts the ball out cleanly'
'it lifts the ball out' is insufficient

1 (L5)

(ii) any **one** from

- less chance of human error
accept 'the ball would fall the same way each time'
*do **not** accept 'there is less chance of something going wrong'*
- the electromagnet would drop it cleanly
accept 'the ball would not be dropped differently'
'it lands in the same place' is insufficient
accept 'it drops at the same angle'
'it is easier to adjust height' is insufficient
accept 'the ball would be released from the same height each time'
- the height would be more accurate
'it is more accurate' is insufficient
'so it is a fair test' is insufficient
accept 'they could push the ball (slightly) if they use their hands'
*do **not** accept 'he can change the force of the electromagnet'*
'it stays steady' is insufficient

1 (L6)

[7]

14

(a) (i) 12.5 m/s

accept ' $\frac{400}{32}$, m/s'

*accept 'metres per second' **or** 'ms⁻¹ for m/s*

the unit is required for the mark

*do **not** accept 'mps'*

1 (L7)

(ii) they are equal **or** the same

accept 'they are balanced'

1 (L7)

- (b) the forward force is greater than the backward force
accept the converse
accept 'the forward force is greater'
or *'the backward force is smaller'*
do not accept 'the forward force becomes greater
or *increases'*

1 (L7)

any **one** from

- because air resistance **or** drag is smaller **or** reduced
accept 'less friction'
- because there is a smaller surface area
'she is more streamlined' is insufficient
as it is given in the question

1 (L7)

[4]

15

- (a) gravity

accept 'weight'

1 (L5)

magnetic force **or** magnetism

accept 'repulsion' or 'upthrust'
answers may be in either order
do not accept 'air resistance'

1 (L5)

- (b) (i) 12

1 (L5)

(ii) any **one** from

- the paper cup stopped moving
accept 'it hit the bottom'
- the paper cup reached the bottom magnet
accept 'the paper cup could not go any further'

1 (L6)

(c) any **one** from

- iron is magnetic

accept 'aluminium is not magnetic'

- iron nails are attracted to a magnet

accept 'the rivets are not attracted to a magnet'

- there is a magnetic force on the iron

*do **not** accept 'aluminium **or** rivets are less magnetic'*

*do **not** accept 'iron **or** nails are more magnetic than aluminium **or** rivets'*

1 (L6)

[5]