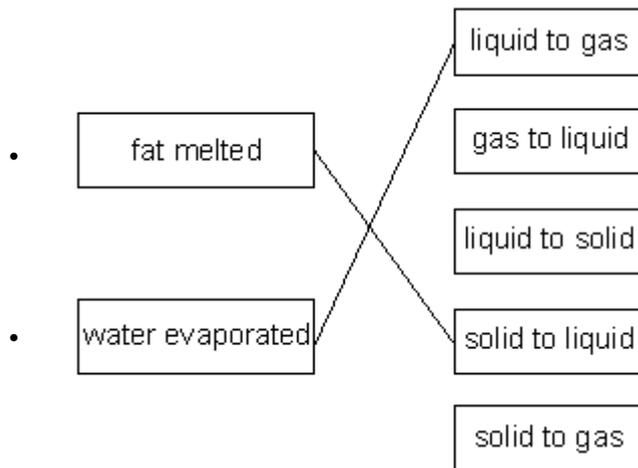


Mark schemes

Q1.

(a)



if more than one line is drawn from either 'fat melted' or 'water evaporated', award no mark for that statement

2 (L3)

(b) (i) • All fuels are sources of energy. ✓

if more than one box is ticked, award no mark

1 (L3)

(ii) • oxygen ✓

if more than one box is ticked, award no mark

1 (L4)

(c) • It is rigid. ✓

• It has a very high melting point. ✓

*if more than two boxes are ticked, deduct one mark for each incorrect tick
minimum mark zero*

2 (L4)

[6]

Q2.

(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)

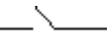
- (c) • T
accept 'the last one'
- 1 (L3)

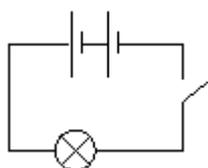
any **one** from

- 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]

Q3.

- (a) • correct bulb symbol 
- accept other symbols for a bulb e.g. 
- 1 (L4)
- correct switch symbol 
do **not** accept a closed switch 
- 1 (L4)
- components connected in series



accept circuits with the components in a different order
accept incorrect but recognisable symbols or drawings for the third marking point only
do **not** accept responses where the number of components is incorrect

1 (L4)

- (b) • cell(s)
accept 'battery'
 1 (L3)
- (c) • the bulb would be dimmer
accept 'it decreases'
accept 'it would become dimmer'
'the current is less' is insufficient
'there is less power' is insufficient
a comparative answer is required for the mark
'it would be dim' is insufficient as it does not describe the change
*do **not** accept 'it goes out'*
 1 (L4)
- (d) (i) • increase
accept 'brighter' or 'becomes bright'
accept 'stronger'
'there is more power' is insufficient
a comparative answer is required for the mark
'it is bright' is insufficient as it does not describe the change
 1 (L4)
- (ii) • bulbs would go out
accept 'no brightness' or 'no light'
accept 'it decreases'
accept 'weaker'
'not bright' is insufficient
'none' or 'nothing' are insufficient
'there is no power' is insufficient
'darker' is insufficient
 1 (L4)

[7]

Q4.

- (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]

Q5.

- (a) exactly 30 N ✓

if more than one box is ticked, award no mark

1 (L5)

- (b) • gravitational potential
• kinetic

*accept 'gravitational' or 'potential' for gravitational potential
award one mark for each correct answer
answers must be in the correct order*

2 (L5)

- (c) any **one** from

- air resistance
*accept 'drag'
'resistance' is insufficient*

- friction
*'upthrust' is insufficient as it is negligible in this case
answers must be in the correct order*

1 (L5)

any **one** from

- weight
*accept 'gravity'
'thrust' is insufficient*

- gravitational (force)

1 (L5)

- (d) any **one** from

- they cushion the impact with water
*accept 'protects organs or muscles'
'for protection' is insufficient*

- it acts as a shock absorber
accept 'to make it buoyant after the dive'

*accept 'helps them float or get back up'
'stops hurting them' is insufficient
'slows them down' is insufficient
'insulation' or 'keeps them warm' is insufficient*

1 (L6)

(e) any **two** from

- (both) require oxygen
accept 'they (both) use oxygen'
- (both) produce carbon dioxide
- (both) produce water
answers referring to energy are insufficient e.g. 'they produce heat'

2 (L6)

[8]

Q6.

- (a) (i) • distance from the (top of the) balloon to the ceiling
accept 'distance' or 'height to ceiling or roof'

and

time for the balloon to rise to the ceiling **or** roof

accept 'time'

both answers are required for the mark

the answers can be in either order

'height (of ceiling)' is insufficient as this implies the distance from the floor

'how high it goes' is insufficient

'metres' is insufficient

'seconds' is insufficient

1 (L7)

- (ii) • divide the distance by the time

$\frac{\text{distance}}{\text{time}}$, **or** $\frac{d}{t}$,
accept 'time'

'how many metres it travelled per minute or second' is insufficient

$\frac{\text{height}}{\text{time}}$,
accept 'time' if height is given in part (i)

'm/s' is insufficient

accept 'distance over time'

$\frac{\text{metres}}{\text{seconds}}$,
'seconds' is insufficient

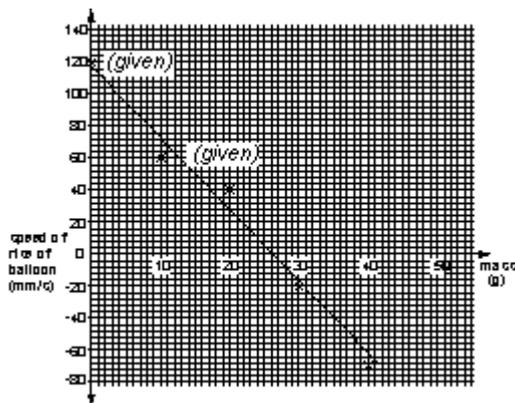
1 (L7)

(b) (i) any **one** from

- the negative numbers
- the **-20 and/or** the **-70**

1 (L7)

- (ii) • all **three** points plotted correctly as shown below



accept points plotted within $\pm \frac{1}{2}$ small square of the correct answer

1 (L6)

- an appropriate line of best fit as shown above
accept a line of best fit consistent with the plotted points

1 (L7)

- (iii) • 26 g
accept the x axis intercept ± 1 small square from the line of best fit drawn

1 (L7)

[6]

Q7.

- (a) • 10

accept $\frac{5}{0.5}$, if the answer is not evaluated

1 (L7)

- N/mm²
accept, for two marks, '10⁷ Pa'
'10⁷' is insufficient
accept 'Nmm⁻²'
do not accept 'n' for 'N'

1 (L7)

- (b) • 5
accept '10 × 0.5' if the answer is not evaluated

1 (L7)

- N cm
accept 'cm N'
do not accept 'n' for 'N'
accept, for two marks, '0.05 Nm'
'0.05' is insufficient

1 (L7)

- (c) • (weight = 200 × 0.05 =) 10
accept '(force = area × pressure =) 10'
accept, for one mark, '0.05 × 200' if not evaluated or evaluated incorrectly

award two marks for the correct numerical answer, whether or not correct working has been shown
if the answer is incorrect, award one mark for a rearranged equation showing explicitly how to calculate weight or force
e.g. 'force or weight = area \times pressure'

2 (L7)

[6]

Q8.

(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]

Q9.

(a) (i) • **no magnetic force** ✓

*if more than one box is ticked, award no mark
ignore added poles*

1 (L4)

(ii) • **attract** ✓

*if more than one box is ticked, award no mark
ignore added poles*

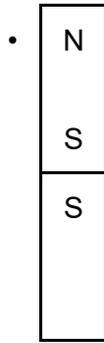
1 (L3)

(iii) • **attract** ✓

*if more than one box is ticked, award no mark
ignore added poles*

1 (L3)

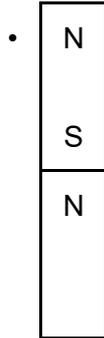
(b) (i)



all three poles are required for the mark

1 (L4)

(ii)



all three poles are required for the mark

1 (L4)

[5]

Q10.

(a) • it decreases

accept 'there are fewer swings'

accept 'there are less'

'the ball swings slower or more slowly' is insufficient

1 (L3)

(b) (i) *vertical axis:*

- number of swings in 10 seconds

accept 'number of swings' or 'how many swings' or 'swings'

'number' is insufficient

1 (L4)

horizontal axis:

- length of string in cm

accept 'length of string' or 'length' or 'cm'

'string' is insufficient

1 (L4)

(ii) • 13

accept any number from 12.5 to 13.0 (inclusive)

accept '11' if the axes are labelled in reverse for part (bi)

1 (L4)

(iii) • 6 ✓

if more than one box is ticked, award no mark

1 (L4)

(c) any **one** from

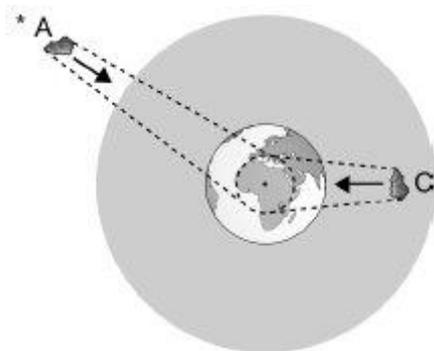
- friction
- air resistance
accept 'drag'
do not accept 'tension'

1 (L4)

[6]

Q11.

(a) (i)(ii) •



accept arrows drawn within the tolerance of half the diameter of the Earth shown by the dashed lines
do not accept arrows outside tolerances shown
award one mark for an arrow from the meteor in position A
award one mark for an arrow from the meteor in position C

2 (L5)

(iii) any **one** from

- it increases
accept 'it gets stronger'
accept 'it attracts more'
- it changes direction
'it curves round' is insufficient

1 (L5)

(b) any **one** from

- increases **or** goes up
accept 'it accelerates'
- it gets faster

1 (L5)

(c) any **one** from

- air resistance
accept 'friction'
do not accept 'wind resistance'
- drag
accept 'lift'
'resistance' is insufficient
do not accept 'weight' or 'upthrust' or 'gravity'

1 (L6)

Q12.

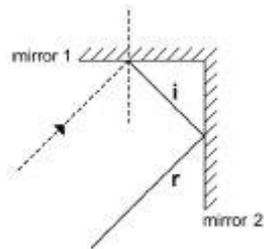
(a) •

true	false
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

*for **all four** correct, award two marks
 for **any two** or **three** correct, award one mark
 for **one** correct answer, award no marks
 if more than one box is ticked in any row, do not give credit
 for that row*

2 (L6)

(b) (i) •



*award one mark for approximately equal angles of incidence
 and reflection at mirror 1
 award one mark for a continuous ray that is reflected off
 mirror 1 and mirror 2
both rays are required for the mark rays must be drawn
 as straight lines
 ignore any arrows*

2 (L7)

(ii) • rays 'i' and 'r' correctly labelled on diagram as shown above
***both** rays, correctly labelled, are required for the mark*

1 (L7)

(c) any **two** from

- white light is a mixture of colours
- the red book absorbs all of the colours of light except red
accept 'the other colours are absorbed'
- only red light is reflected
'red light is reflected' is insufficient

2 (L7)

(d) •

	red	green	black
red filter	✓		
green filter			✓

***both** ticks are required for the mark
if more than one tick is placed in any row, award no mark*

1 (L7)

[8]

Q13.

(a) (i) • chemical

answers must be in the correct order

1 (L6)

• thermal

accept 'kinetic'

'heat' is insufficient

'movement' is insufficient

1 (L6)

(ii) any **one** from

• sound

• light

1 (L6)

(b) • kinetic
electrical

answers must be in the correct order

***both** answers are required for the mark*

'movement' is insufficient for kinetic

1 (L6)

(c) any **one** from

• the wind speed varies

accept 'it depends on the weather'

• sometimes the wind does not blow

accept 'the wind is unreliable'

• the wind cannot be controlled

accept 'it varies'

accept 'it could be too windy'

responses that do not refer to wind, such as 'they spoil the landscape' or 'they kill birds' or 'they are too noisy' or 'interfere with TV and radio signals' are insufficient

1 (L5)

(d) (i) • Sun(light)

accept 'light'

accept 'solar (energy)'

*do **not** accept 'heat'*

'photosynthesis' is insufficient

1 (L5)

- (ii) • renewable source ✓
both the correct answer and a correct explanation are required for the mark

you can grow more plants

accept *'you grow it (again)'*

do **not** accept *'you can use it again'*

'it is a biofuel' is insufficient

1 (L6)

[7]

Q14.

- (a) (i) *from a solid to a liquid*
both answers are required for the mark
answers must be in the correct order

1 (L3)

- (ii) any **one** from

- his nose is hot **or** hotter
accept *'his nose is warm'*
accept *'his body (heat) melts the snow'*
accept *'heat'*
accept *'body temperature'*
'the temperature is different' is insufficient

- the ground is colder

1 (L3)

- (iii) yes
no
no

all three answers are required for the mark
answers must be in the correct order

1 (L3)

- (b) (i) ↓

accept a downward arrow anywhere on or near the diagram
do **not** accept a response where the arrow is at a right angle to the board

1 (L4)

- (ii) friction

'air resistance' or 'drag' is insufficient
'pushing force' is insufficient

1 (L4)

[5]

Q15.

- (a)

moves to moves stays

	the left ←	to the right →	still	
(i)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 (L3)
(ii)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1 (L3)
(iii)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 (L3)
(iv)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1 (L3)

if more than one box is ticked in a row, award no mark for that row

(b) (i)



if more than one box is ticked, award no mark

1 (L3)

(ii) any **one** from

- newton meter
accept 'spring balance'
- forcemeter
'balance' is insufficient
'newtons' or 'N' is insufficient
'meter' is insufficient
'weighing scales' is insufficient

1 (L4)

[6]

Q16.

(a) (i) (the type of) material
accept 'fabric'

1 (L5)

(ii) the temperature after 20 minutes

accept 'temperature'
'temperature at start' is insufficient
accept 'temperature change'
accept 'how hot the water is'
'heat' is insufficient

1 (L5)

(b) (i) B ✓

if more than one box is ticked, award no mark

1 (L5)

(ii) beaker B was warmer (at the end than the others)

accept the converse
accept 'the temperature was higher'
accept 'it dropped the least'
accept 'it lost the least heat'
'B was 40°C at the end' is insufficient

1 (L5)

(c) any **two** from

- temperature in cold room

'temperature' is insufficient
'the person' or 'the time' is insufficient
accept 'his temperature before he went in'

- style or size of coat

accept 'amount of material'

- the clothes he wears for each test

accept '(same) underclothes'

- level of activity

accept 'he had eaten the same food before each test'

2 (L5)

(d) • do not let the volunteer's body temperature go down too far

accept 'do not let him or the room get too cold'
accept 'have a doctor nearby'
accept 'monitor or check him'
accept 'measure his heart rate or breathing rate'
accept 'wear gloves' or 'keep his head warm'
accept 'make sure the volunteer is healthy'
or 'is not allergic to the material'

1 (L5)

(e) any **one** from

- monitor the temperature from outside the room

accept 'remote sensing'
accept 'you have to open the coat to read the thermometer'

- it gives you a continuous record (of the temperature)

accept 'you do not have to write down the results'

- it is more accurate or precise

accept 'it eliminates human error'
'accurate' is insufficient

accept 'the experiment is more reliable'
'more reliable' is insufficient

1 (L5)

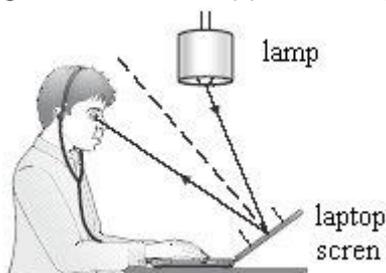
[8]

Q17.

- (a) (i) • a continuous straight line from the lamp to the screen **and** from the screen to George's eye

1 (L5)

- angle of incidence approximately equal to the angle of reflection



accept a reflection anywhere between the dotted lines
on the laptop screen

1 (L5)

- arrows in the correct direction on the incident and reflected ray
accept one arrow on a continuous ray showing reflection

1 (L5)

- (ii) the reflected ray **or** the light image misses George's eyes

accept 'the ray of light is reflected at a different angle'

accept 'it moves down'

'the lamp is not shining in his eye's is insufficient

do **not** accept responses referring to scattering

'it changes' is insufficient

do **not** accept 'the ray of light is reflected above his eye'

1 (L6)

- (b) from electrical energy to sound energy

both answers are required for the mark

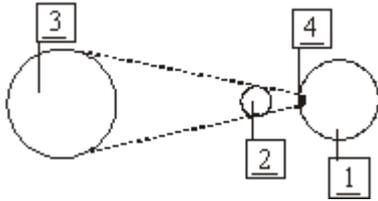
answers must be in the correct order

1 (L5)

[5]

Q18.

- (a)



for **all four** numbers in the correct place, award two marks
 for any **two** or **three** numbers in the correct place, award one mark

2 (L5)

(b) any **one** from

- 21st August
- 22nd August
- 23rd August

accept dates written in another format

1 (L5)

- 2017

1 (L5)

[4]

Q19.

(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

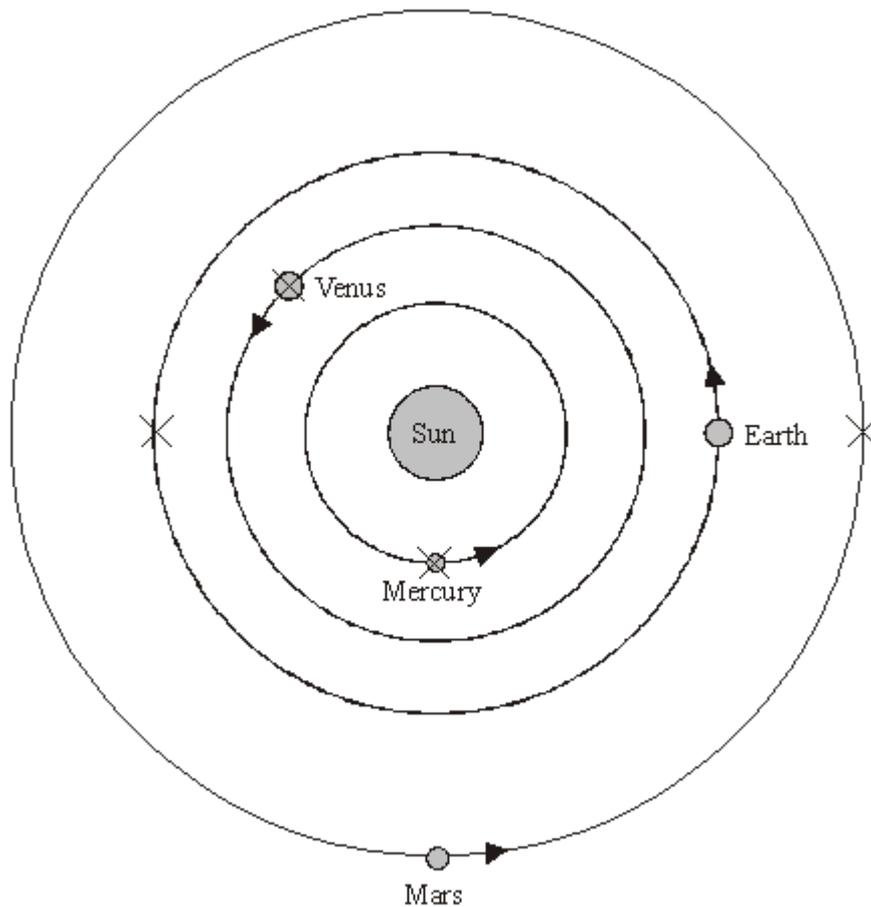
- it bends less (at 300 g)
accept 'there is a bigger gap to the bench'
'it is stronger' is insufficient
accept 'it is higher'
*accept 'bridge B is 5.6 cm and bridge A is **only** 3.0 cm'*
'bridge A was 3.0 cm, bridge B was 5.6 cm' is insufficient
- bridge A bends more
accept 'bridge A is about to break'
'it is about to break' is insufficient

1 (L6)

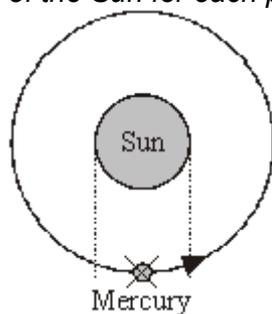
[6]

Q20.

(a)



for all **four** correct, award two marks
 for any **two** or **three** correct, award one mark
 accept a cross drawn that lies within the width
 of the Sun for each planet, e.g.



2 (L7)

(b) • 42

accept '150-108'

1 (L7)

• 258

accept '150+108'

1 (L7)

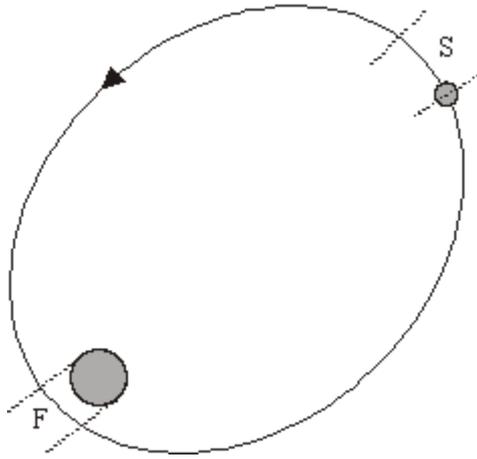
(c) 500

accept $\frac{150,000,000}{300,000}$ or $\frac{150 \text{ million}}{300,000}$

accept '8.3 minutes'
 accept 'about 8 minutes'

1 (L7)

(d) (i)



both answers are required for the mark
 accept an answer within the dotted lines
 at either end of the ellipse

1 (L7)

- (ii) attracted by the Sun's gravity
 accept 'increased gravity near to Sun'

1 (L7)

[7]

Q21.

- (a) walls

1 (L3)

- (b) (i) roof

1 (L3)

- (ii) any **one** from

- it now loses 700 (J)
 accept 'it is only 700'
 'it is 700' is insufficient
- the energy is less (than before)
 accept 'it was 3 400 (J)'
- the energy or heat is different
 accept 'it has gone down'
- all the others do not change
 accept 'insulation reduces heat loss'
 'insulation keeps heat in' is insufficient

1 (L4)

- (c) (i) coal

'solid' is insufficient
 '25 000 J' is insufficient

1 (L4)

- (ii) it is a gas

accept 'physical state'

1 (L4)

(iii) no sulphur dioxide (is given off)

accept 'it says no in the sulphur dioxide column'

*do **not** accept 'it has no sulphur dioxide in it'*

accept 'there is no sulphur in it'

1 (L4)

[6]

Q22.

(a) (i) any **one** from

- weight

accept 'gravity'

- gravitational force

1 (L4)

(ii) the rope **or** elastic

accept 'bungee'

*do **not** accept 'air resistance'*

accept 'upward force'

*do **not** accept 'upthrust'*

accept 'tension'

1 (L3)

(b) less than

1 (L3)

(c) (i) any **one** from

- light travels faster than sound

accept 'light travels faster'

'light is fast' is insufficient

- sound travels slower than light

accept 'sound travels slower'

'sound is slow' is insufficient

accept 'light is faster than sound'

'light travels before sound' is insufficient

1 (L4)

(ii) louder

1 (L3)

(iii) eardrum

accept 'drum'

accept 'hammer' or 'anvil' or 'stirrup'

accept 'small bones'

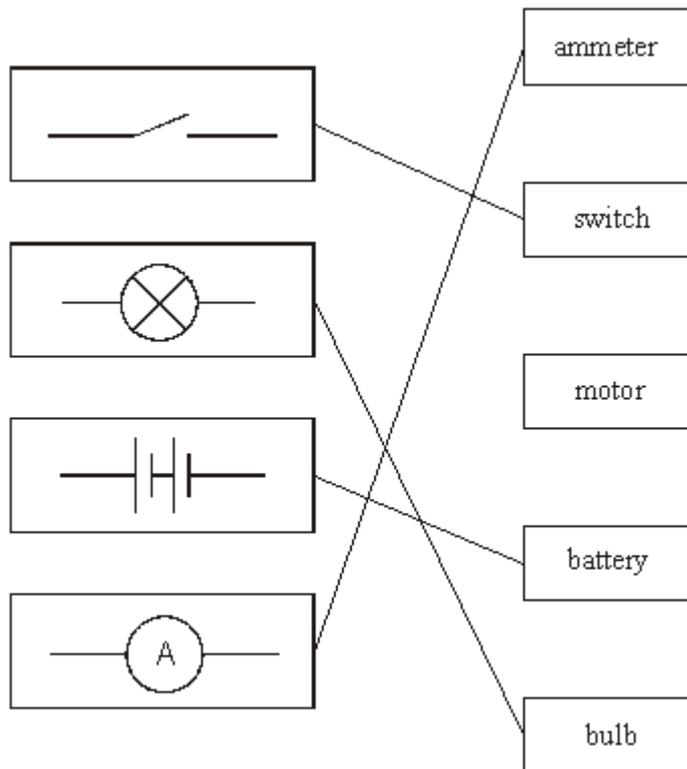
accept 'ossicles'

1 (L3)

[6]

Q23.

(a)



*all four lines are required for three marks
any three lines are required for two marks
any two lines are required for one mark
if more than one line is drawn from a symbol,
do not give credit for that symbol*

3 (L4)

(b) battery

*accept 'cell' or 'cells'
accept 'power supply' or 'power pack'*

1 (L4)

(c)

	series	parallel
circuit 1	✓	
circuit 2		✓

*both ticks are required for one mark
if more than one box is ticked in any row, award no mark*

1 (L4)

(d) copper

*accept 'aluminium'
accept 'gold'
do not accept any other metal*

1 (L4)

Q24.

- (a) • iron 1 (L6)
- nothing happens
accept 'nothing' or 'no force' or 'it does not attract or repel'
both answers are required for the mark
- copper 1 (L6)
- repel
 a magnet
accept 'move apart'
both answers are required for the mark
 do **not** accept 'magnetic' 1 (L6)
- (b) any **two** from
- more turns in the coil
accept 'more coils'
- increase the current **or** voltage
accept 'increase power'
accept 'add more cells or batteries'
'use another battery' is insufficient
accept 'use thicker wire'
'use more wire' is insufficient
- coils closer together
accept 'make the coils tighter'
'use less wire' is insufficient
'make the wire tighter' is insufficient
references to the iron rod are insufficient 2 (L6)

[5]

Q25.

- (a) (i) it orbits the Sun
accept 'it goes round the Sun'
'it has an orbit' is insufficient 1 (L5)
- (ii) any **one** from

- it is not in the same plane as the other planets
- the orbit is out of line **or** at a different angle
accept 'it is not in line with the others'
'it has a different orbit' is insufficient
*accept 'the orbit **or** it is tilted'*
*do **not** accept 'it is too small'*
as this is not shown in the diagram

1 (L6)

(b) any **one** from

- it has the smallest diameter
accept 'it is too small'
'it is very small' is insufficient
- all the other planets are bigger

1 (L6)

(c) any **one** from

- Charon is a moon **or** satellite
accept 'it is a moon'
- other planets have moons
*accept 'the Earth **or** Saturn has a moon'*
'Charon orbits Pluto' is insufficient
accept 'moons do not orbit other moons'
accept 'other planets have objects orbiting them'

1 (L6)

(d) any **one** from

- both planets and moons have atmospheres
accept 'Venus has an atmosphere and Mercury does not'
- whether or not it has an atmosphere does not make it a planet
- there is no pattern in the atmospheres
accept 'Earth's moon does not have an atmosphere and Titan does'
- some planets do not have atmospheres
accept 'Titan has an atmosphere and so does Neptune'

1 (L6)

(e) any **one** from

- scientists cannot decide on what a planet is
- if Pluto is a planet there could be more planets orbiting our Sun **or** in our solar system
- there is evidence for and against Pluto being a planet
accept specific arguments for and against
e.g. 'it goes around the Sun but it is too small'
'there are reasons for and against' is insufficient
'it has an atmosphere like the Moon but orbits

the Sun' is insufficient as atmosphere is not sufficient to classify moons or planets

1 (L6)

[6]

Q26.

- (a) (i) a number from 8.0 to 8.2 s (inclusive)

1 (L6)

- (ii) a number from 34 to 36 m (inclusive)

1 (L7)

- (iii) 4 s

accept response in the range 3.7–4.3

1 (L7)

- (b) the slope or gradient is constant

*accept 'it is a straight line'
do **not** accept 'the line is flat'
accept 'steady increase'*

1 (L7)

- (c) (i) points (0, 0) and (15, 30) joined by a straight line

accept points drawn to ± 1 mm

1 (L7)

- (ii) 50

accept $\frac{100}{2}$

1 (L7)

[6]

Q27.

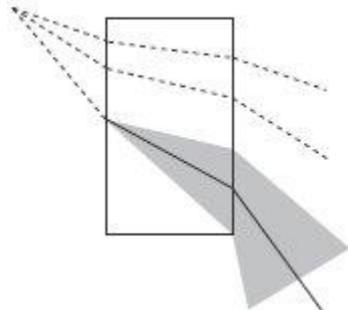
- (a) refraction **or** refracting

1 (L6)

- (b) • a ray bending towards the normal at the first surface

*accept a ray that is within the shaded area
both sections of the ray must be straight and continuous
ignore any arrows*

- an emerging ray bending away from the normal at the second surface

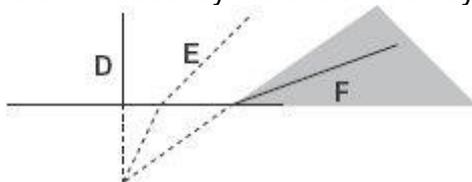


accept an emerging ray that is within the shaded area

the emergent ray does not have to be parallel to the incident ray

2 (L7)

- (c) • a continuous straight line for ray D
ignore any arrows
ignore any reflected rays
- a continuous ray F that bends away from the normal



accept a ray drawn within the shaded area
do not accept an emergent ray that does not refract

2 (L7)

[5]

Q28.

- (a) chemical

accept 'potential'
accept 'kinetic or movement'

1 (L6)

- (b) (i) 50 J

1 (L7)

- (ii) any **one** from

accept 'some energy or heat or sound is wasted'
'heat or sound or friction' are insufficient

- energy is transferred as heat
'some of the energy is lost' is insufficient
- energy is transferred as sound
- friction or air resistance slows it down
accept 'as it is still falling, some is still gravitational'

1 (L7)

- (c) any **two** from

- lift it to a greater height
accept 'make the rod longer'
'change the height or mass' is insufficient
- make the mass more streamlined **or** aerodynamic
'make the rod bigger' is insufficient
'drop it faster' is insufficient
- push the mass down
accept 'push it'

'push the rod down' is insufficient

- put grease **or** oil on the rod (to decrease friction)

accept 'make the rod smoother'

'use more force' is insufficient

'make the rod thinner' is insufficient

accept 'increase the mass'

2 (L7)

(d) A

both blade A, and the correct explanation
are required for the mark

if you divide the force by a smaller area, the pressure will be larger

accept 'it has a smaller area (at that point)'

'it is more pointed' or 'is it sharper' are insufficient

'force is more concentrated' is insufficient

accept 'the force is more concentrated on a smaller area'

*do **not** accept 'there will be more force'*

*do **not** accept responses that refer to 'concentrated pressure'*

1 (L7)

[6]

Q29.

- (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]

Q30.

- (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]

Q31.

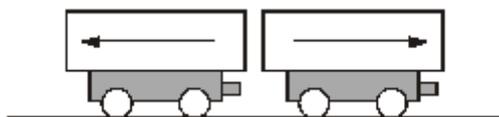
Marks may be awarded for part (a) if the magnets are correctly labelled in part (b) and no answer is given in part (a)

- (a) • Magnet A
- | | |
|---|---|
| N | S |
|---|---|
- both poles are required for the mark* 1 (L4)
- Magnet C
- | | |
|---|---|
| S | N |
|---|---|
- both poles are required for the mark* 1 (L4)
- (b) • repel
- attract
answers must be in the correct order

both answers are required for the mark

1 (L4)

(c) •



both arrows are required for the mark

1 (L4)

(d) • it is attracted

accept 'it gets faster'

1 (L4)

• nothing

accept 'it is not attracted or repelled'

accept 'it is not attracted'

accept 'it is not repelled'

'they stick together' is insufficient

do not accept 'it repels'

1 (L4)

[6]

Q32.

(a) (i) any **one** from

• add more books

accept 'use bigger books'

'change the number of books'

or 'change the size of the books' are insufficient

• make the pile of books higher

accept 'lift one end of the ramp higher'

'lift the ramp higher' is insufficient

accept 'bring the ramp closer to the books'

do not award a mark for answers implying the use of a different ramp

1 (L3)

(ii) • E

1 (L3)

(iii) any **one** from

• some results are the same

accept 'there are two 16s'

do not accept '34'

• some results do not fit the pattern

accept 'to check her results'

accept 'to make it more reliable'

accept 'in case one was an odd result'

'because there was no pattern' is insufficient

do not accept 'to make it a fair test'

1 (L4)

(b) (i) • 26 *cm*

1 (L3)

(ii) • increases
accept '*goes up*'

1 (L3)

[5]