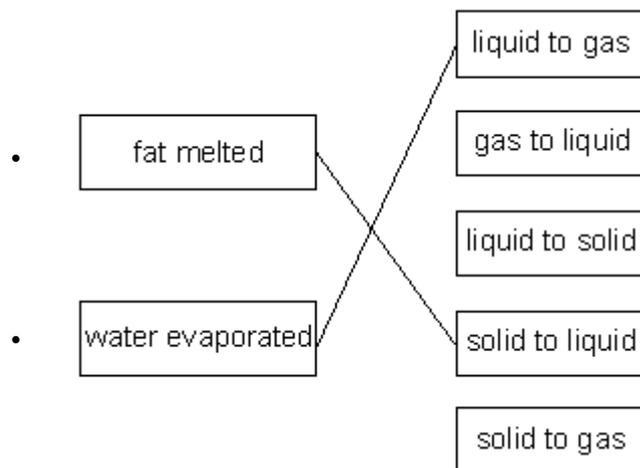


Mark schemes

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) any **one** from

- the colour had changed
- the water was brown **or** darker **or** grey

accept 'the colour'

*do **not** accept 'the coffee disappeared'*

1 (L3)

(b) (i) • D

1 (L3)

(ii) • P

*accept 'the filter paper'
'the filter' is insufficient*

accept 'the paper'

1 (L3)

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

- to cool the water vapour
accept 'to cool the steam **or** gas'
- to condense the water vapour
accept 'to condense the steam **or** gas'
- change gas **or** vapour back to water
accept 'to cool it **or** the glass tube'
do **not** accept references to liquid coffee condensing

1 (L3)

(ii) • from a liquid into a gas

2 (L4)

• evaporation

1 (L4)

• condensation

1 (L4)

award one mark for each correct word in the correct place

[8]

Q3.

(a)

soil	pH of soil	acidic	neutral	alkaline
A	4.5	✓		
B	5.5	✓		
C	6.3	✓		
D	7.0		✓	
E	7.8			✓

for all **five** ticks correct, award two marks
for any **three** or **four** ticks correct, award one mark
for any **one** or **two** ticks correct, award no marks
if more than one tick is placed in any one row, do not credit that row

2 (L5)

(b) • yes ✓

as pH increases the flowers become darker pink **or** less blue

accept 'as pH **or** acidity changes the flower colour changes'

accept 'acid soil has blue flowers and alkaline soil has pink flowers'

both the tick box **and** a consistent explanation are needed for the mark

or

- no ✓

any **one** from

- there is no change between pH 5.5 – 6.3
- there is insufficient data

1 (L6)

(c) any **one** from

- type of hydrangea
accept 'type of plant'
accept 'size or age of plant'
- amount of water **or** rainfall
'how much it is watered' is insufficient
- amount of light **or** shade
accept 'light'
- soil composition
accept 'type of soil'
'the acidity or pH of the soil' is insufficient
- nutrients **or** minerals **or** ions in the soil
accept named nutrients, minerals or ions
- weather **or** temperature
accept 'climate'
accept 'pH of rain'

1 (L5)

(d)

- | |
|--------|
| blue |
| violet |
- | |
|--------|
| violet |
|--------|

accept 'purple' for violet

2 (L6)

[6]

Q4.

(a) • N₂

do not accept 'N2' or '2N' or 'N + N' or 'N²'

1 (L6)

- 

do not accept shaded circles for O₂
ignore size of circles

1 (L6)

- water (vapour) **or** steam H₂O
accept 'hydrogen oxide'
accept 'OH₂'
both answers are required for the mark

1 (L7)

- (b) • particles are separate **or** not joined **or** spread out
accept 'molecules' for 'particles'
'atoms' or 'elements' are insufficient in place of particles
'they are separate' is insufficient

1 (L7)

- (c) • decreases
stays the same
increases
answers must be in the correct order
***all three** answers are required for the mark*

1 (L7)

- (d) any **one** from
- water **or** argon would be solid **or** frozen
 - nitrogen would be a gas
 - ice would form
'air is a mixture of different gases' is insufficient

1 (L7)

[6]

Q5.

- (a) • stopwatch
accept 'stopclock'
accept 'timer'
'timer' is accepted here and not in Paper 1 question 1, as
'time' is not mentioned in this question
accept 'clock with a second hand'
'clock' is insufficient

1 (L3)

- (b) any **two** from
- same length of rods
accept for one mark 'the rods are the same
*'same temperature **or** volume **or** container **or** rod' is*
insufficient
 - same thickness of rods
*size' if not given with either 'same length' **or** 'same thickness'*
 - same sized balls **or** same metal balls
 - same amount of wax
 - same type of wax
 - the ends of all rods (in the water) are at the same temperature
accept 'same length (of rod) in water'
 - she put the water in after sticking the balls on

2 (L4)

- (c) • copper ✓
if more than one box is ticked, award no mark 1 (L4)
- (d) • iron ✓
if more than one box is ticked, award no mark 1 (L4)

[5]

Q6.

- (a) (i) • C and E
*both answers are required for the mark
 answers may be in either order* 1 (L5)
- (ii) • A 1 (L5)
- (b) • Cu ✓
if more than one box is ticked, award no mark 1 (L6)

- (c) •

<i>number of atoms of iron</i>	<i>numbers of atoms of oxygen</i>
1	1
2	3

*for all **four** numbers correct, award two marks
 for **two** or **three** numbers correct, award one mark
 for **one** number correct, award no marks*

2 (L5)

[5]

Q7.

- (a) any **three** from
- copper
 - oxygen
 - sulphur
 - hydrogen
- accept chemical symbols
 'Cu'
 'O'
 'S'
 'H'
 do **not** accept 'O₂' or H₂'* 3 (L6)
- (b) (i) • they both contain oxygen
accept 'they both have O in them'

do **not** accept 'they have O₂ in them'

1 (L6)

(ii) any **one** from

- hydrochloric acid does not contain oxygen
accept 'it does not contain oxygen'
'he was wrong' is insufficient
- hydrochloric acid is not formed from oxygen
accept 'not all acids contain oxygen'
accept 'no oxygen'

1 (L6)

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

- they both produce hydrogen (when they react with metals)
- different metals produce the same gas
accept 'there is hydrogen left at the end'
'they contain hydrogen' is insufficient
'hydrogen is in the equation' is insufficient

1 (L6)

(ii) • iron chloride
hydrogen

accept 'FeCl₂' or 'FeCl₃' or 'Cl₂Fe'
accept 'H₂'

both answers are required for the mark
answers may be in either order
do **not** accept 'iron + chloride'

1 (L6)

[7]

Q8.

- (a) • C
D
C
A
C

accept 'metamorphic'
accept 'igneous'
accept 'metamorphic'
accept 'sand and mud'
accept 'metamorphic'

for all **five** correct answers, award three marks
for any **four** correct answers, award two marks
for any **two** or **three** correct answers, award one mark
if only **one** correct answer, award no marks

3 (L6)

(b) (i) **physical weathering name**

- freeze-thaw

accept 'erosion'

a name can be awarded a mark in either the process or
name cell if it is not contradicted elsewhere
the process named must match the description given

1 (L7)

description of process

- it can freeze and crack the rock
accept a description of erosion for physical weathering where 'erosion' has been named
e.g. 'rain hits the rocks and bits break off'
'the rain wears away or erodes rock' is insufficient

1 (L7)

(ii) **chemical weathering name**

- acid rain
a name can be awarded a mark in either the process or name cell if it is not contradicted elsewhere
the process named must match the description given

1 (L7)

description of process

- reacts with rock
accept 'the rock corrodes'
'it changes the rock' is insufficient
'the rock changes colour' is insufficient
*do **not** accept 'it erodes the rock'*

1 (L7)

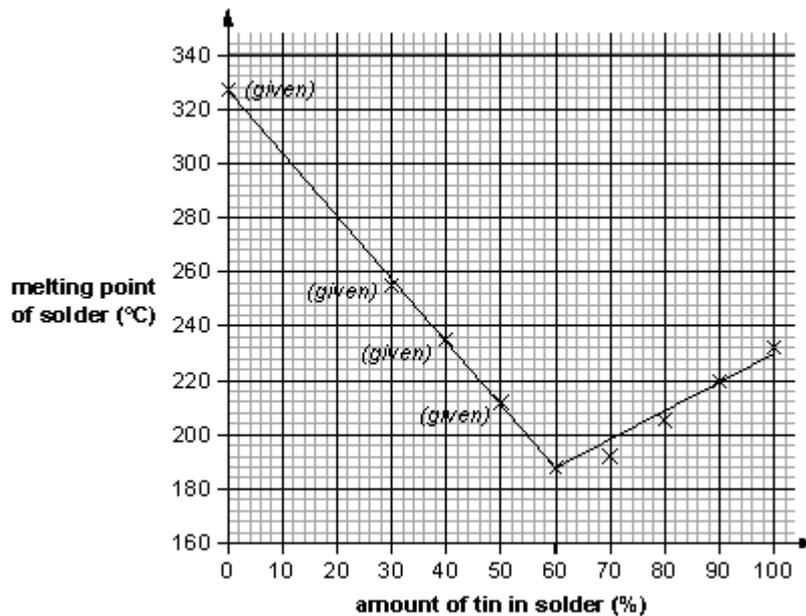
[7]

Q9.

- (a) (i) • 327 °C

1 (L6)

- (ii) •



for all five points correctly plotted, award two marks
for any three or four points correctly plotted, award one mark
for any one or two points correctly plotted, award no marks
accept a tolerance of ±½ small square

2 (L7)

- two straight lines of best fit which meet

accept a curve of best fit for plotted points

1 (L7)

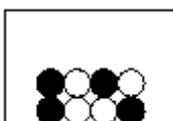
- (b) • any number from 60–66 inclusive
accept a number consistent with the drawn line of best fit ± 1 square

1 (L7)

- (c) • with more tin, the melting point goes down and then increases
accept 'it goes down and up'
- (minimum) at 60–66% tin **or** 180–189°C
accept a number consistent with the drawn line ± 1 square

2 (L7)

- (d) •



if more than one box is ticked, award no mark

1 (L7)

[8]

Q10.

- (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

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]

Q11.

- (a) • roof tile *accept 'slate'*
statue *accept 'marble'*

***both** answers are required for the mark
answers may be in either order*

1 (L3)

- (b) any **two** from

- greenhouse or frame *accept 'aluminium'*
- gate *accept 'iron'*
- watering can *accept 'steel'*

***two** correct answers are required for the mark
answers may be in either order*

1 (L3)

- (c) (i) • oxygen

*accept 'water vapour or steam'
'water' is insufficient*

1 (L4)

- (ii) paint it

*accept 'galvanise it'
'use another metal' is insufficient
accept 'oil or grease it'
accept 'varnish it' or 'put polish on it'
'polish it' is insufficient
accept 'wax it'
accept 'coat it in plastic'
'put a protective covering over it' is insufficient*

1 (L4)

- (d) • iron ✓
• steel ✓

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

2 (L4)

[6]

Q12.

- (a) • 7

- orange

- an answer in the range 1–3 *accept '1–3'*

- purple

*for all four rows correct, award two marks
for any two or three rows correct, award one mark
answers must be in the correct column and row in the table*

2 (L3)

(b) any **one** from

- they are corrosive
- they burn **or** irritate

*accept 'they can damage your skin or eyes'
'in case it touches your skin' is insufficient
it is harmful **or** poisonous' is insufficient
'it can kill you' is insufficient
'wear gloves' is insufficient
do **not** accept 'it is flammable'*

1 (L4)

(c) (i) • time, in days

*accept 'time'
accept 'days'
do **not** accept 'hours' or 'minutes'*

1 (L4)

(ii) it goes down or decreases

*accept 'it becomes acidic'
'it goes red' is insufficient
accept 'it goes from 6.5 to 2.5'
accept 'the acid gets stronger'
'it goes sour' is insufficient
if the label for X is incorrect in part (ci),
do not penalise again in part (cii)*

1 (L4)

[5]

Q13.

(a) (i) feathers

*accept 'wings'
'it could fly' is insufficient
accept 'beak'
accept 'hollow or thin bones'*

1 (L3)

(ii) scales

1 (L4)

(b) any **one** from

- only the imprint of feathers **or** bones are left or seen

*accept 'they do not know whether it had feathers or scales'
'they do not know if it is a reptile or bird' is insufficient*

accept 'no feathers were found'
accept 'its flesh or skin is not there'
or *'only its bones are there'*

- not enough evidence **or** proof
'no evidence or proof' is insufficient
- it is now extinct
accept 'there are no animals like it around today'
accept 'they have not seen one'
'they do not know what it looked like' is insufficient
'they do not know what colour it was' is insufficient

1 (L4)

(c) fossils

1 (L4)

(d) it is too hot

accept 'they burn or melt'
'they are destroyed' is insufficient
accept 'it is hot'
accept 'heat'

1 (L3)

[5]

Q14.

- (a) •

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

*for **all three** correct boxes ticked, award two marks*
*for any **two** correct, award one mark*

2 (L6)

- (b) • evaporate the water **or** evaporation
accept 'heat it'
accept 'it goes from liquid to gas'
accept 'boiling'
*do **not** accept an incorrect use of evaporation,*
e.g. 'she evaporates salt from sand'

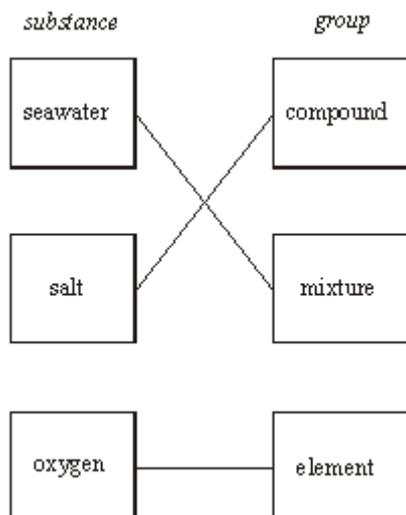
1 (L5)

- condense the water vapour **or** condensation
accept 'it goes from gas to liquid'
*do **not** accept 'it condenses to water vapour'*

1 (L5)

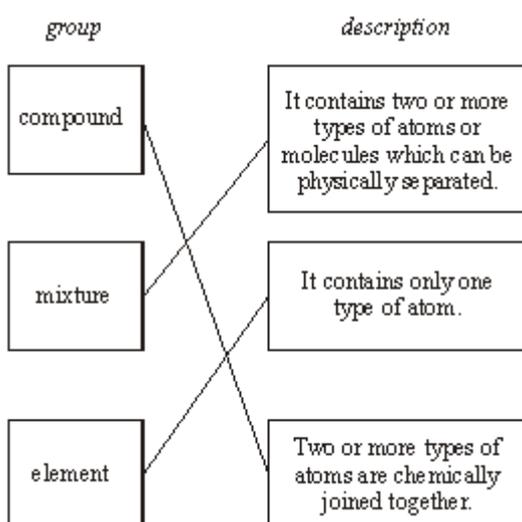
*accept, for two marks, 'distil **or** distillation'*
accept, for one mark, 'condensation then evaporation'

(c)



*all **three** lines are required for one mark
if more than one line goes from any one box,
do not award the mark*

1 (L5)



*all **three** lines are required for one mark
if more than one line goes from any one box,
do not award the mark*

1 (L6)

[6]

Q15.

- (a) • B ✓
C ✓

***both** answers are required for the mark
if more than two boxes are ticked, award no mark*

1 (L6)

- (b) any **two** from
- it conducts electricity

- it conducts heat
one mark may be awarded for 'it is a good conductor' if a reference to heat or electricity is not given
 - it is ductile or malleable
'it bends' is insufficient
 - it has a high melting **or** boiling point
accept 'it is shiny'
accept 'it is sonorous'
accept 'it forms basic oxides'
'it is strong or hard' is insufficient
- 2 (L5)
- (c) copper oxide
accept 'CuO'
*do **not** accept 'copper dioxide'*
- 1 (L6)
- (d) The atoms have combined in a different way to make a new substance. ✓
*if more than **one** box is ticked, award no mark*
- 1 (L6)

[5]

Q16.

- (a) (i) sodium carbonate
'Na₂CO₃' is insufficient
- 1 (L7)
- (ii) 18
- 1 (L7)
- (iii) 88
- 1 (L7)
- (b) (i) carbon dioxide sinks
accept 'the density of carbon dioxide is greater'
'carbon dioxide is heavy' is insufficient
'carbon dioxide is heavier than air' is insufficient
- 1 (L7)

any **one** from

- it prevents oxygen reaching the fire
accept 'fire is starved of oxygen'
*do **not** accept 'air' in place of oxygen*
- carbon dioxide displaces (air containing) oxygen
'it takes away oxygen' is insufficient
'the carbon dioxide keeps oxygen away from the fire' is insufficient as this implies it is an active process
*'it suffocates **or** covers the fire' is insufficient*

1 (L7)

- (ii) energy **or** heat is needed to evaporate the water
accept 'taking heat out of the fire'
'it makes the temperature less' is insufficient
'water cools the fire down' is insufficient

1 (L7)

[6]

Q17.

- (a) (i) 200 g

1 (L3)

- (ii) it decreased
accept 'it went down'

1 (L3)

- (iii) any **one** from
- the mass stayed the same **or** constant
'the graph or line is flat' is insufficient
 - it does not go down on day 7
accept 'it is the same on day 7'
'it stays the same' is insufficient

1 (L4)

- (b) any **one** from

- it is flammable
accept 'it is inflammable'
'it explodes' is insufficient
- it catches fire (easily)
accept 'it will burn'
'do not put it near the fire' is insufficient
accept 'it is a fire hazard'

1 (L4)

- (c) it dissolves ✓
*if more than **one** box is ticked, award no mark*

1 (L4)

- (d) it evaporated ✓
*if more than **one** box is ticked, award no mark*

1 (L4)

[6]

Q18.

- (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]

Q19.

- (a) lemonade
- accept '4.4'*
- 1 (L5)
- (b) (i) any **one** from
- it is less acidic
accept 'it is weaker'
*do **not** accept 'it has become more alkaline'*
accept 'it decreases'
 - its pH has increased
accept 'it has gone from 1.0 to 2.5'

do **not** accept 'it increased'
do **not** accept 'the acidity changed by pH 1.5'

1 (L5)

(ii) any **one** from

- ethanoic acid is less acidic than the hydrochloric acid
accept the converse
'ethanoic acid is pH 3' is insufficient
accept 'it is less acidic'
'ethanoic acid is weak' is insufficient
- ethanoic acid has a higher pH
accept 'partially neutralised'
'it is weaker' is insufficient
- it has a pH of 3 compared with 1
- it is a weaker acid

1 (L6)

(c) (i) hydrogen

'H₂' or 'H' are insufficient

1 (L6)

(ii) • sulphur

1 (L6)

• oxygen

1 (L6)

'S' or 'O' or 'O₂' are insufficient
answers can be in either order

(iii) 5

1 (L6)

[7]

Q20.

(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]

Q21.

(a) any **one** from

- there is a colour change
*accept 'it goes green **or** orange'*
'the colour' is insufficient
- a new metal is formed
accept 'the iron filings change colour'

1 (L5)

(b) (i) copper

accept 'Cu'

1 (L5)

(ii) iron sulphate

accept 'FeSO₄'

1 (L6)

(iii) • no ✓✓

any **one** from

- iron is more reactive than copper
accept 'iron is higher on the reactivity series'
- copper is less reactive than iron
accept 'copper does not displace iron'
***both** an indication that the reaction does not happen
and the explanation are required for the mark*

1 (L6)

(c) • calcium ✓

potassium ✓

*if more than two boxes are ticked, award no mark
both answers are required for the mark*

1 (L6)

[5]

Q22.

(a) carbon dioxide

accept 'CO₂'

1 (L6)

(b) between 0 s and 30 s ✓

if more than one box is ticked, award no mark

1 (L6)

(c) (i) any answer from 41 to 45

1 (L7)

(ii) 33 g

accept '176 – 129 – 14'

accept '176 – 143'

*do not accept incorrect calculations,
e.g. '176 – 129 – 14 = 34'*

1 (L7)

(d) when the balls get wet the chemicals will react (and destroy the ball)

accept 'they are biodegradable'

accept 'they will dissolve'

accept converse answers regarding normal golf balls

accept 'the products are harmless'

1 (L7)

(e) calcium citrate
carbon dioxide

accept 'CO₂'

*both answers are required for the mark
answers can be in either order*

1 (L7)

[6]

Q23.

(a) • a ruler

accept 'a metre rule'

accept 'a tape measure'

'cm' is insufficient 'a measuring stick' is insufficient

1 (L3)

(b) (i) • 30

do **not** accept '30 seconds'

1 (L3)

- (ii) • A to B: any number from 5 to 15
accept a range such as '5 to 10'

1 (L4)

- D to E: any number from 45 to 80
accept a range such as '50 to 60'

1 (L4)

(c) any **one** from

- you can measure smaller intervals of time
accept 'each section burns for a shorter time'
accept 'it is more precise **or** accurate'
'it is easier to read' is insufficient
- the lines are closer
accept 'the lines are close'
accept 'the lines are further apart on candle 1'
accept 'the lines are 1 cm apart on candle 1
and 0.5 cm apart on candle 3'
accept 'there are more lines **or** smaller spaces
or smaller segments'
accept 'more sections **or** rings'
'the lines are smaller' is insufficient

1 (L4)

[5]

Q24.

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

- bubbles
- fizzing
accept 'effervescence'
- gas is given off
'metal goes into solution **or** turns into a salt'
and 'there would be a rise in temperature'
are insufficient answers as they are
not shown in the drawings

1 (L3)

- (ii) • magnesium
accept 'Mg'
- zinc
accept 'Zn'
 - iron
accept 'Fe'
 - copper
accept 'Cu'

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

- (b) (i) • copper
accept 'Cu' 1 (L4)
- (ii) • iron
accept 'Fe' 1 (L3)
- 1 (L4)

[4]

Q25.

- (a) (i) • mercury
accept 'Hg' 1 (L5)
- (ii) • iron
accept 'Fe' 1 (L5)
- (iii) • mercury
accept 'Hg' 1 (L6)
- (iv) • aluminium
accept 'Al' 1 (L6)
- (b) (i) • an arrow drawn at 0°C
accept any unambiguous indication 1 (L5)
- (ii) • gas ✓
if more than one box is ticked, award no mark 1 (L6)
- (iii) • liquid ✓
if more than one box is ticked, award no mark 1 (L6)

[7]

Q26.

- (a) (i) any **one** from
- to stop water vapour **or** steam escaping
accept 'gas or vapour or particles could escape'
'to stop water escaping or spilling out' is insufficient
 - to stop lavender oil vapour escaping
accept 'to stop oil escaping'
accept 'to make sure the oil goes down the tube'
accept 'the oil or vapours could not be collected'
'to stop the smell escaping' is insufficient

- to reduce heat loss
accept 'to stop heat loss' or 'to keep heat in'
accept 'to stop the heat escaping'
accept 'to maintain the pressure'

1 (L5)
- (ii) any **one** from
- it could explode
 - it could break
accept 'the lid might come off'
accept 'so the pressure does not break the seal'
'the pressure would be too high' is insufficient
'it would get too hot' is insufficient

1 (L5)
- (b) (i) • *from gas to liquid*
***both** answers are required for the mark*
answers must be in the correct order

1 (L5)
- (ii) any **one** from
- it sinks
accept 'lavender oil floats'
 - it is at the bottom
accept 'the oil is on the top'
'they are not mixed' is insufficient

1 (L6)
- (c) • B
if more than one letter is identified, award no mark

1 (L6)

[5]

Q27.

- (a) (i) • sodium chloride + • water
accept 'hydrogen oxide' for water
answers must be in the correct order

2 (L7)
- (ii) • H₂O

1 (L7)
- (b) any **one** from
- the same atoms are present in the reactants and the products
accept 'mass is conserved'
'the mass did not change' is insufficient
'the particles are the same' is insufficient
*do **not** accept 'the molecules are the same'*
 - no gas was given off
accept 'nothing was added or lost'

1 (L7)

- (c) (i) • sodium chloride
carbon dioxide
water
answers may be in any order
all three answers are required for the mark
- 1 (L7)

- (ii) any **one** from
- carbon dioxide **or** gas escapes
'mass is lost' is insufficient as it is given in the question
 - carbon dioxide is a gas
 - one of the products is a gas **or** escapes
- 1 (L7)

[6]

Q28.

- (a) (i) any **two** from
- smoother **or** rounder
accept 'it was more like a pebble'
 - broken **or** crumbled **or** crushed **or** it was smaller pieces
accept 'it eroded' or 'it weathered'
 - powder **or** dust formed
- 2 (L3)

- (ii) • it was harder than the chalk
accept 'it was hard or strong'
'it did not erode or weather' is insufficient
'it is solid' is insufficient
- 1 (L4)

- (b) • *chalk: B granite: A*
both answers are required for the mark
answers must be in the correct order
- 1 (L4)

- (c) (i) fossils
- 1

- (ii) starfish
accept 'it looks like a star or starfish'
accept 'it has five legs'
if more than one box is ticked, award no mark both the answer and the correct explanation are required for the mark
- 1

- (d) (i) any **one** from
- it is too hot for animals to live (in molten rock)
accept 'animals would be burnt'
accept 'it is too hot'
accept 'fossils are destroyed'

accept 'they would melt'

- there are no animals in magma **or** melted rock
'animals do not live underground' is insufficient

1 (L4)

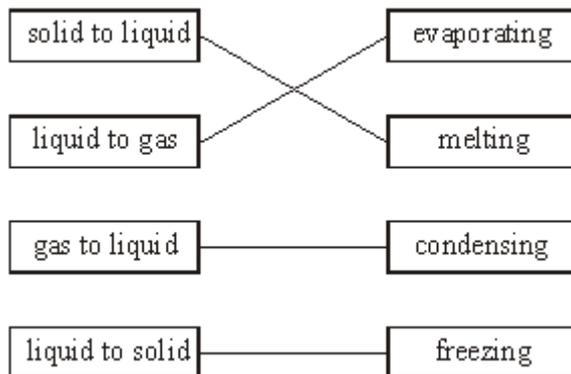
- (ii) • magma ✓
if more than one box is ticked, award no mark

1 (L4)

[8]

Q29.

- (a) •



award three marks for **all four** correct lines
award two marks for any **three** correct lines
award one mark for any **two** correct lines
*if more than one line is drawn from any change of state,
do not credit that change of state*

3 (L3)

- (b) • 0 °C

accept 'zero'
do **not** accept 'nothing'

1 (L4)

- (c) • it decreased

accept 'it got colder'
*'it dropped to below 0°C' is insufficient
any references to time are insufficient*

1 (L3)

- (d) • Sand increases friction between car tyres and the road. ✓
• Salt makes ice melt. ✓

*if more than two boxes are ticked, deduct a
mark for each incorrect box
minimum of zero*

2 (L4)

[7]

Q30.

- (a) •

2	20
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3	45 or 46
4	80

all three answers are required for the mark

1 (L5)

(b) any **one** from

- the height for 4 cm is 4 times the height for 2 cm
accept 'for 2 cm it went 20 cm but for 4 cm it went 80 cm'
a mark may be awarded for other correct figures
accept 'if I double the distance it goes four times as high'
'when she doubled the distance it did not double the height'
is insufficient
- the graph is a curve
accept 'the graph is not a straight line'
- the height for 2 cm is not twice the height for 1 cm
accept 'if it goes from 2 to 3 cm, the height more than doubles'
- the height should have been 40 cm when he pressed it down 4 cm
accept appropriate arguments for other values

1 (L6)

(c) (i) • some
some

both answers are required for the mark

1 (L6)

(ii) • most
least

both answers are required for the mark
answers must be in the correct order

1 (L6)

(iii) • least
least

both answers are required for the mark

1 (L6)

[5]

Q31.

(a) (i) • It is neutral ✓

if more than one box is ticked, award no mark

1 (L5)

(ii) • any number less than 7

1 (L6)

(iii) any **one** from

- they are alkaline **or** an alkali
accept 'a soluble base'

accept 'it has a pH above 7'
specific pH values such as 'its pH is 8.5' are insufficient

- they react with the acid

1 (L5)

(b) • copper sulphate

accept 'copper sulfate'
accept 'the sulphate' for 'copper sulphate'

• citric acid

accept 'acid' for 'citric acid'

• indigestion tablet

• sugar

accept 'tablet' for 'indigestion tablet'
if **all four** answers are correct, award three marks
if **two or three** answers are correct, award two marks
if **one** answer is correct, award one mark

3 (L5)

[6]

Q32.

(a) (i) • metamorphic

1 (L5)

(ii) • igneous

1 (L5)

(b) • when magma cools more quickly the crystals are smaller

accept the converse
accept 'in magma which cools faster the crystals are small'
answers must include a comparison
do **not** accept 'crystals are bigger when the rock cools slowly'

1 (L6)

(c) (i) • oxygen

'O₂' is insufficient

1 (L5)

(ii) • aluminium oxide

accept 'aluminium trioxide'

1 (L6)

(iii) • 5

1 (L6)

(d) (i) any **one** from

- at the bottom

- below copper
'less reactive' is insufficient 1 (L6)
- (ii) • zinc chloride
accept 'ZnCl₂'
answers can be in either order 1 (L6)
- hydrogen
accept 'H₂'
'H' is insufficient 1 (L6)