

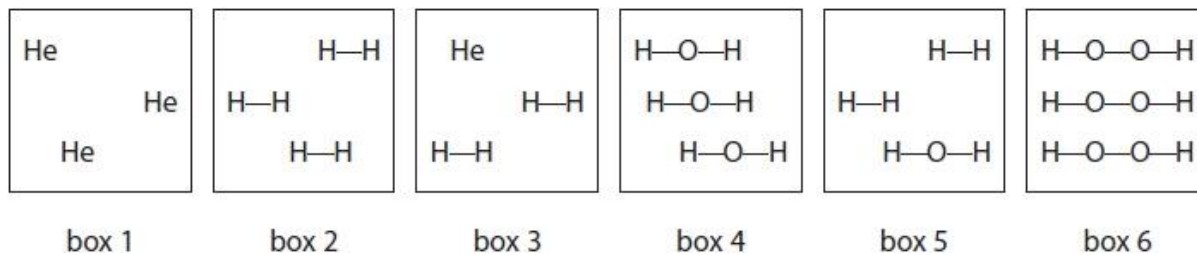


Year 10 practice questions

Chemistry

Q1. Substances can be classified as elements, compounds or mixtures.

(a) Each of the boxes in the diagram represents either an element, a compound or a mixture.



(i) Explain which **two** boxes represent an element.

(2)

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(ii) Explain which **two** boxes represent a mixture.

(2)

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(b) The list gives the names of some methods used in the separation of mixtures:

- chromatography
- crystallisation
- distillation
- filtration

Use names from the list to choose a suitable method for each separation.

Each name may be used once, more than once or not at all.

(i) Separating water from sodium chloride solution.

(1)

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(ii) Separating the blue dye from a mixture of blue and red dyes.

(1)

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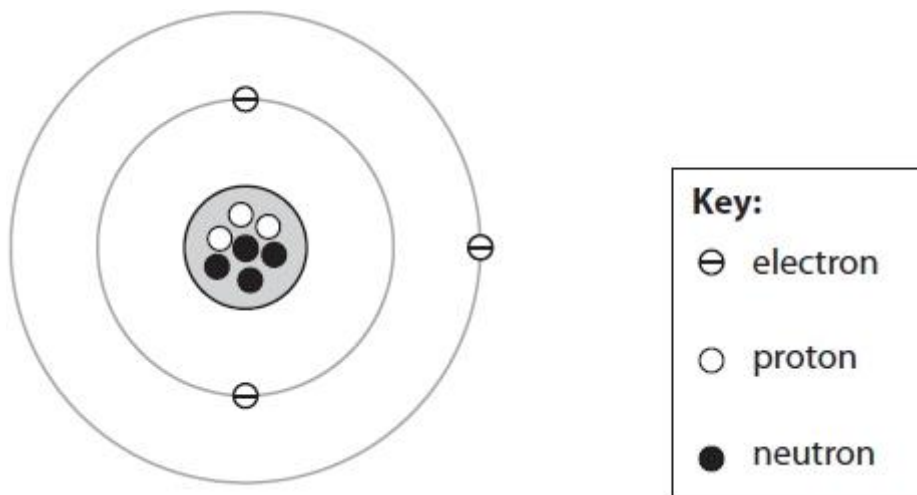
(iii) Separating potassium nitrate from potassium nitrate solution.

(1)

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(Total for question = 7 marks)

Q2. The diagram represents an atom of an element.



Use numbers from the box to complete the table.

You may use each number once, more than once or not at all.

1	2	3	4	5	6	7
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(5)

atomic number of the atom	
number of shells shown	
mass number of the atom	
number of protons in an isotope of this element	
group where the element is found in the Periodic Table	

(Total for question = 5 marks)

3. This is a method used to measure the solubility of a solid in water:

- add an excess of solid to some water in a boiling tube and stir
- measure the temperature of the saturated solution formed
- weigh an empty evaporating basin
- pour some of the saturated solution into the evaporating basin
- weigh the basin and contents
- heat the evaporating basin to remove all of the water
- weigh the evaporating basin and remaining solid.

(a) The table shows the results of an experiment using this method.

mass of evaporating basin / g	89.6
mass of evaporating basin + saturated solution / g	115.8
mass of evaporating basin + solid / g	94.9

Calculate the mass of solid obtained and the mass of water removed.

(2)

mass of solid = g

mass of water = g

(b) In another experiment, at a different temperature, the mass of solid obtained is 10.5 g and the mass of water removed is 16.8 g.

Calculate the solubility of the solid, in g per 100 g of water, at this temperature.

(2)

solubility = g per 100 g of water

(c) If the evaporating basin is heated too strongly some of the solid decomposes to form a gas.

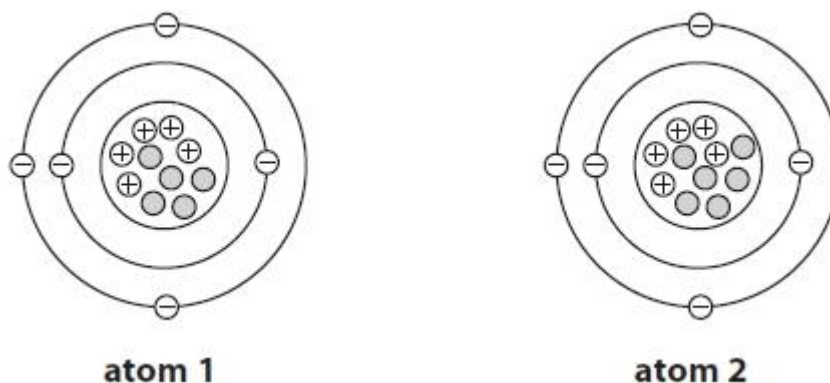
Explain how this strong heating would affect the value of the calculated solubility of the solid.

(3)

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.....(Total for question = 7 marks)

Q4. The diagram shows the structures of two different atoms.



(a) State how the diagram shows that both of these atoms are neutral. (1)

.....

(b) Explain how the diagram shows that these atoms are isotopes. (2)

.....

(c) Complete the table to show the atomic number and mass number of atoms 1 and 2. (2)

	Atomic number	Mass number
atom 1	5	
atom 2		11

(d) The table shows the mass number and percentage of two different atoms of another element.

Mass number	Percentage of atom
6	7.0%
7	93.0%

Calculate the relative atomic mass (A_r) of this element.
 Give your answer to one decimal place. (2)

relative atomic mass =
(Total for question = 7 marks)

Q5. Ammonium chloride decomposes in a reversible reaction. The equation for this reaction is



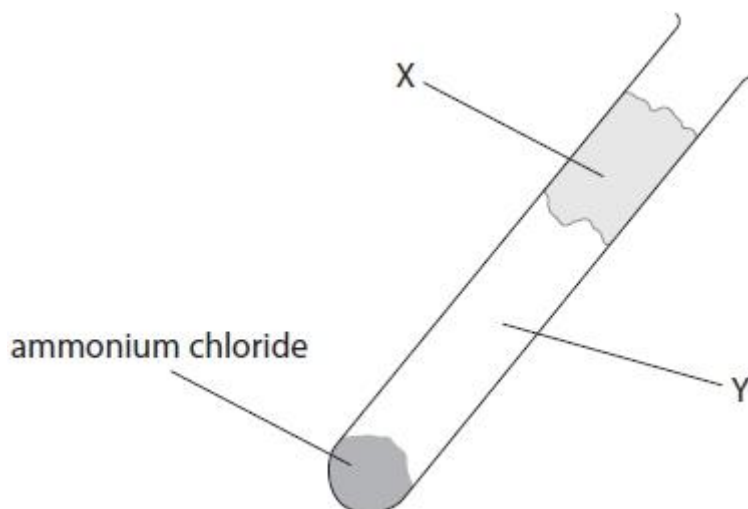
(a) State how the equation shows that the reaction is reversible.

(1)

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.....

(b) Some ammonium chloride is heated gently in a test tube.

The diagram shows the test tube after it has been heated gently for a short time.



(i) Identify solid **X** and the two gases formed in region **Y** of the test tube.

(2)

Solid **X**

Gases in region **Y**

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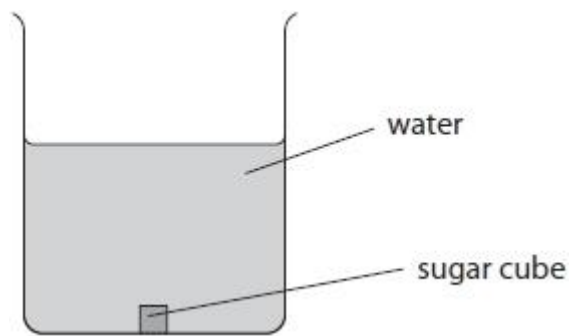
(ii) Which change of state occurs in the test tube during heating?

(1)

- A** condensing
- B** evaporating
- C** melting
- D** subliming

(Total for question = 4 marks)

Q6. A sugar cube is placed in a beaker containing water.
 The beaker is left until the sugar cube disappears and a sugar solution forms.
 The concentration of the solution is the same at the bottom and top of the beaker.



(a) Use the particle theory to explain what happens to the sugar cube to make the concentration of the solution the same at the bottom and top of the beaker.

(3)

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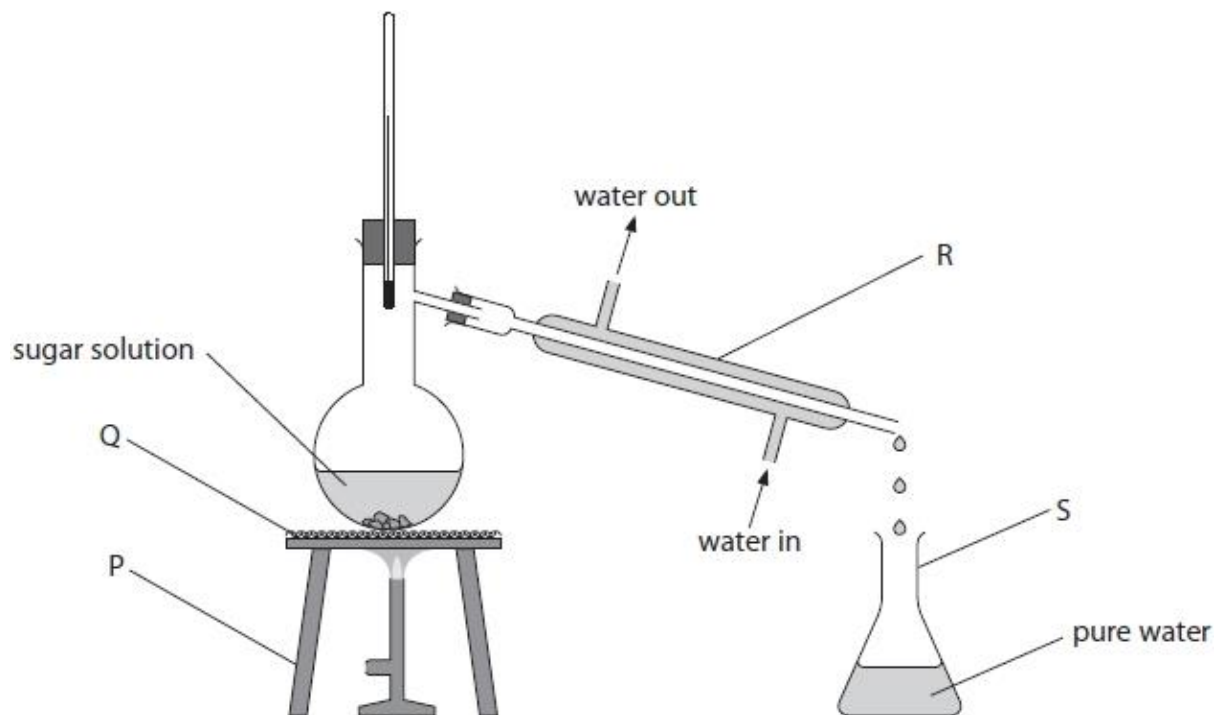
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(b) This apparatus is used to obtain pure water from the sugar solution.



(i) What is the name of the process shown in the diagram?

(1)

- A crystallisation
- B distillation
- C filtration
- D sublimation

(ii) Give the name of each piece of apparatus.

(4)

P

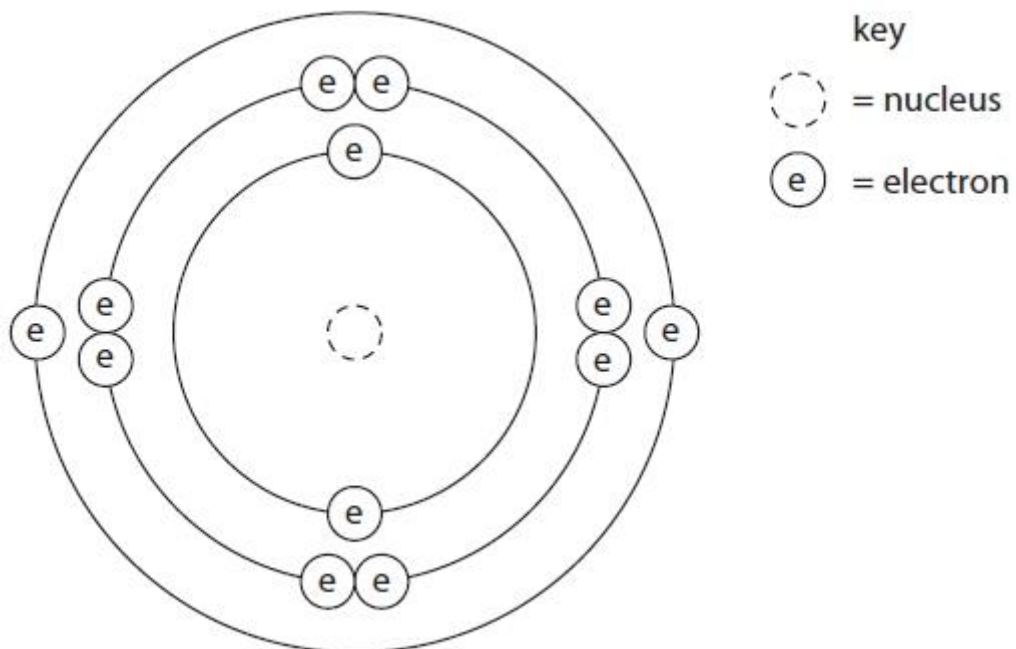
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(Total for question = 8 marks)

Q7. The diagram shows the electronic configuration of an atom of element X.



(a) Element X has three isotopes.

The table gives the mass number of each isotope and its percentage abundance in a sample of element X.

Mass number	Percentage abundance (%)
24	79.0
25	10.0
26	11.0

Calculate the relative atomic mass (A_r) of element X.
Give your answer to one decimal place.

(3)

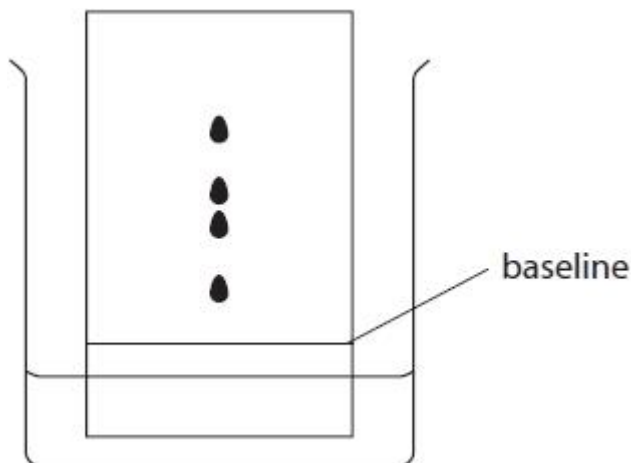
relative atomic mass of X =

(Total for question = 3 marks)

Q8. A student wants to find out if the green colouring in grass is a mixture of dyes. He uses a solvent to dissolve the green colouring from some grass. He then separates the solution of the green colouring from the remaining grass.

(a) The student uses a dropping pipette to place a drop of the green solution onto a piece of chromatography paper and produces a chromatogram.

The diagram shows his results.



(i) Add three more labels to the diagram to show

- the solvent
- the chromatography paper
- the original position of the spot of the green solution

(3)

(ii) Explain how many different dyes are present in the green colouring.

(1)

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(Total for question = 4 marks)

Mark scheme end semester 1 practice questions yr 10 chemistry.

Q1.

Question number	Answer	Additional guidance	Mark
(a)(i)	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> boxes 1 and 2 (1) because they both have only one type of atom/molecule (1) 	<p>accept other indications, e.g. only He and only H-H</p> <p>accept species in place of atom/molecule</p> <p>second mark can be awarded if only box 1 or box 2 identified</p>	2

Question number	Answer	Additional guidance	Mark
(a)(ii)	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> boxes 3 and 5 (1) box 3 contains a mixture of helium and hydrogen and box 5 contains a mixture of hydrogen and water (1) 	<p>second mark can be awarded if only box 3 or box 5 identified</p>	2

Question number	Answer	Mark
(b)(i)	Simple distillation	1

Question number	Answer	Mark
(b)(ii)	Chromatography	1

Question number	Answer	Mark
(b)(iii)	Crystallisation	1

Q2.

Question number	Answer	Notes	Marks										
	<table border="1"> <tr> <td>atomic number of the atom</td> <td>3</td> </tr> <tr> <td>number of shells shown</td> <td>2</td> </tr> <tr> <td>mass number of the atom</td> <td>7</td> </tr> <tr> <td>number of protons in an isotope of this element</td> <td>3</td> </tr> <tr> <td>group where element is found in the Periodic Table</td> <td>1</td> </tr> </table>	atomic number of the atom	3	number of shells shown	2	mass number of the atom	7	number of protons in an isotope of this element	3	group where element is found in the Periodic Table	1		5
atomic number of the atom	3												
number of shells shown	2												
mass number of the atom	7												
number of protons in an isotope of this element	3												
group where element is found in the Periodic Table	1												

Q3.

Question number	Answer	Mark
(a)	<ul style="list-style-type: none"> (mass of solid) 5.3 (g) (1) (mass of water) 20.9 (g) (1) 	2

Question number	Answer	Mark
(b)	<ul style="list-style-type: none"> $(10.5 \div 16.8) \times 100$ (1) 62.5 (grams of solid per 100 g of water) (1) 	2

Question number	Answer	Mark
(c)	<p>An explanation that links together the following three points:</p> <ul style="list-style-type: none"> the gas will escape (1) the mass of solid remaining will be less (than it should be) (1) the value of the calculated solubility will be lower (than it should be) (1) 	3

(Total for question = 7 marks)

Q4.

Question number	Answer	Additional guidance	Mark
(a)	Equal numbers of + and - charges/equal numbers of protons and electrons	accept 5 in place of equal	1
Question number	Answer		Mark
(b)	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> same number of protons (1) different numbers of neutrons (1) 		2

Question number	Answer	Mark
(c)	<ul style="list-style-type: none"> (Atom 1 mass number) 10 (1) (Atom 2 atomic number) 5 (1) 	2

Question number	Answer	Mark
(d)	<ul style="list-style-type: none"> Setting out of calculation Evaluation $((6 \times 7.0) + (7 \times 93.0) \div 100) (1)$ $= 6.9 (1)$	2

Q5.

Question number	Answer	Mark
(a)	Reversible arrow	1

Question number	Answer	Additional guidance	Mark
(b)(i)	<ul style="list-style-type: none"> (X) ammonium chloride (1) (Y) ammonia and hydrogen chloride (1) 	accept formulae	2

Question number	Answer	Mark
(b)(ii)	D (subliming)	1

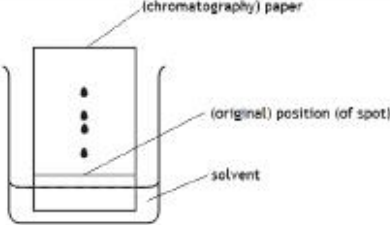
Q6.

Question number	Answer	Notes	Marks
(a)	<p>Any 3 from</p> <p>M1 (moving) water particles/molecules bombard/collide with the sugar cube</p> <p>M2 sugar particles/molecules go into solution/dissolve</p> <p>M3 sugar particles/molecules spread out/diffuse/move randomly</p> <p>M4 (until) sugar particles/molecules are distributed evenly in the water</p>	<p>ALLOW sugar particles move from area of high concentration to area of low concentration</p> <p>Max 2 if no reference to sugar particles/molecules</p>	3
(b)(i)	<p>B distillation</p> <p>A is incorrect as the diagram does not show the apparatus used for crystallisation</p> <p>C is incorrect as the diagram does not show the apparatus used for filtration</p> <p>D is incorrect as the diagram does not show the apparatus used for sublimation</p>		1
(ii)	<p>P tripod</p> <p>Q gauze</p> <p>R condenser</p> <p>S conical flask</p>	<p>ACCEPT wire gauze</p> <p>ALLOW condensing tube</p> <p>Do not allow just flask</p>	4
Total for Question = 8			

Q7

Question number	Expected Answer	Accept	Reject	Marks
(a) (i)	12			1
(ii)	M1 – 2 M2 – two electrons in <u>outer/valence shell</u> Award M2 if M1 missing but not if incorrect Ignore references to magnesium and 2.8.2	roman numeral		1 1
(iii)	X ²⁺	Mg ²⁺		1
(b)	M1 – (79 x 24) + (10 x 25) + (11 x 26) M2 – divide by <u>100</u> M3 – 24.3 Mark M2 and M3 csq on M1 if one minor slip in numbers in M1 (eg 97 instead of 79 or 25 instead of 24) M3 dep on M2 Correct answer with no working scores 3 IGNORE units	(0.79 x 24) + (0.10 x 25) + (0.11 x 26) for 2 marks 24.32 with no working scores 2		1 1 1

Q8.

Question number	Answer	Notes	Marks
(a)	D (filtration)		1
(b) (i)		<p>award one mark for each correct label</p> <p>solvent: ALLOW label line to any point under the solvent level</p> <p>paper: ALLOW label line to paper, including under solvent level</p> <p>original spot: has to be in the centre of the baseline i.e. below the visible spots</p>	3
(ii)	<u>Four</u> because there are <u>four</u> spots/dots (above the baseline in the chromatogram)	ALLOW blobs / marks / colours IGNORE refs to different heights	1

(Total for question = 5 marks)