

Chemistry Revision work sheet 2018-19
Year 9

1. The diagram shows a kettle of boiling water.



As the water vapour cools it turns into droplets of liquid water.

a) The change of state when water vapour changes into liquid water is described as

1

- A boiling
- B condensation
- C evaporation
- D sublimation

b) Describe what happens when water vapour cools to form liquid water. Your answer should include the change in the energy, arrangement and movement of the particles.

3

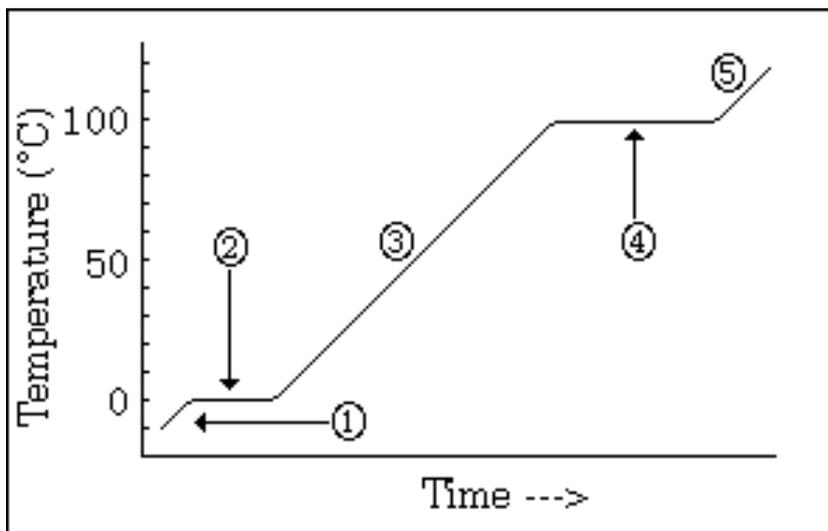
change in energy

change in arrangement

Change in movement

(Total marks for question 1 = 4)

2. The diagram below is a plot of temperature vs. time. It represents the heating of what is initially ice at -10°C at a near constant rate of heat transfer.



- a) What state or states are present during segment (1)? 1

- b) What state change, if any, is taking place at (1)? 1

- c) In which part of the heating curve is boiling taking place?(write the number) 1

- d) At what temperature would this sample finish boiling? 1

- e) What is similar in terms of temperature at stage 2 and 4 in the graph? 1

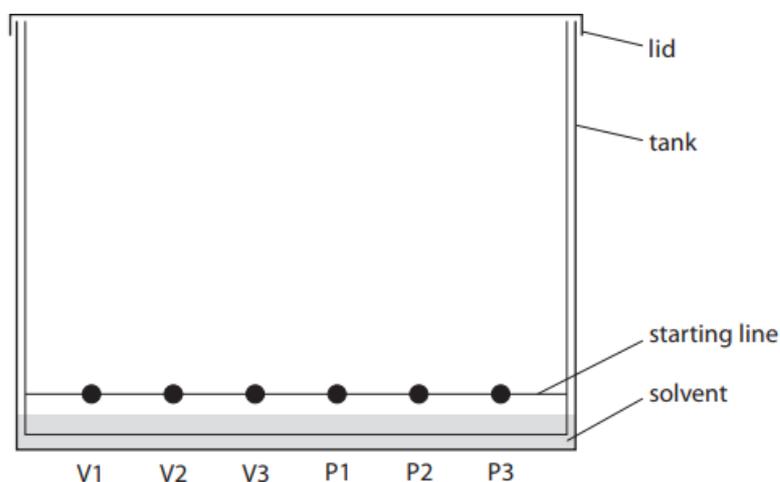
(Total marks for question 2 = 5)

3. Complete these sentences 5

- A pure substance has a _____ composition in all of a sample.
- A mixture contains elements and/or _____ that are not chemically joined together.
- A pure substance cannot be separated into other substances by _____ means.
- Elements and _____ can both be pure. Gold and sucrose are examples of pure substances.
- Pure substances have _____ melting points.

(Total marks for question 3 = 5)

5. A student investigates the pigments found in some vegetables and fruit. She obtains some coloured vegetable and fruit extracts from carrots, tomatoes and sweet potatoes. She places a spot of each extract on chromatography paper, along with spots of the three pigments beta-carotene, chlorophyll and lycopene. Her teacher provides a solvent containing volatile (vapourises easily), flammable organic compounds for the experiment. The diagram shows the apparatus at the start of the experiment.



Key to vegetable and fruit extracts and pigments

V1 = carrots

V2 = tomatoes

V3 = sweet potatoes

P1 = beta-carotene

P2 = chlorophyll

P3 = lycopene (a)

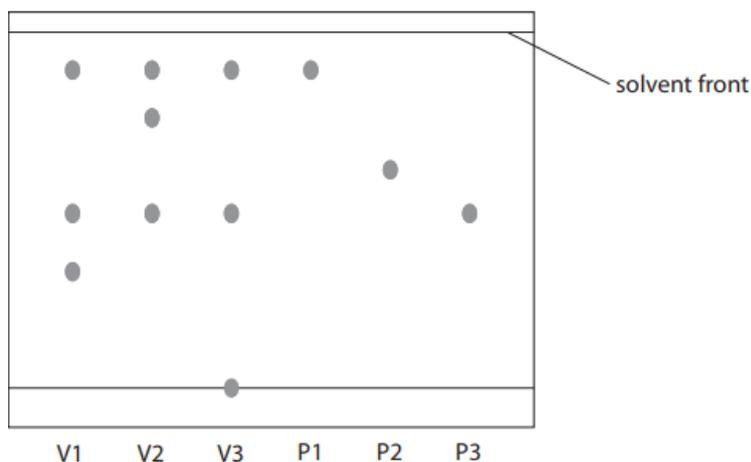
- a) Explain why it is important for the solvent level to be below the spots.

1

- b) State two potential problems that are prevented by fitting the tank with a lid.

2

The diagram shows the chromatogram at the end of the experiment.



Key to vegetable and fruit extracts and pigments

V1 = carrots

V2 = tomatoes

V3 = sweet potatoes

P1 = beta-carotene

P2 = chlorophyll

P3 = lycopene

c) Which three of the statements A, B, C, D and E are supported by the chromatogram? Place a cross in three boxes to indicate your choice. 3

A Chlorophyll is **not** present in carrots, sweet potatoes or tomatoes.

B Beta-carotene is present in carrots but **not** present in tomatoes.

C Both beta-carotene and lycopene are present in sweet potatoes.

D Lycopene is present in tomatoes but **not** present in carrots.

E Both carrots and tomatoes contain a pigment **other than** beta-carotene, chlorophyll and lycopene.

d) One of the pigments present in the vegetable extracts is not shown in the chromatogram. It appears as a very faint spot 1.3 cm above the starting line. Calculate its R_f value using the expression 2

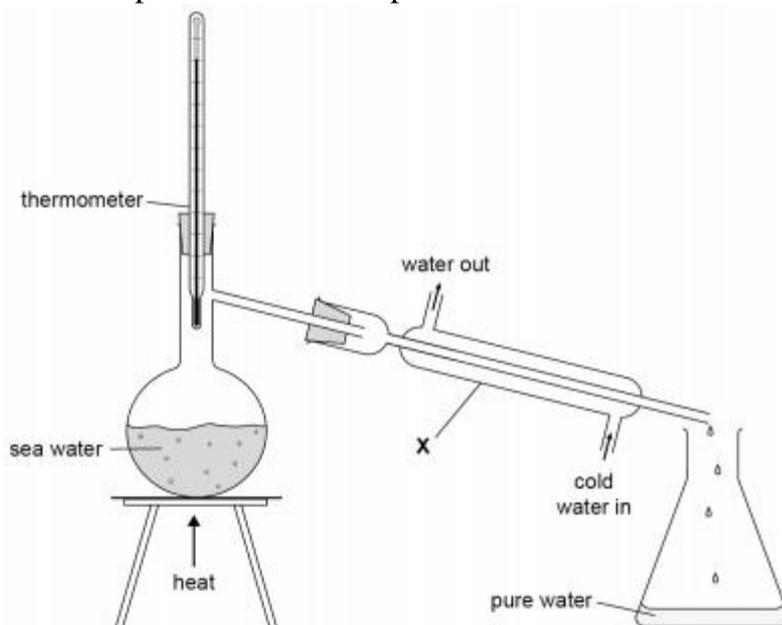
$$R_f = \frac{\text{distance travelled by pigment}}{\text{distance travelled by solvent}}$$

$$R_f = \text{-----}$$

- e) Suggest a reason why there is a spot on the starting line in the chromatogram for sweet potatoes. 1

(Total marks for question 5 = 9)

6. The diagram shows how pure water can be produced from sea water using distillation.



- a) Describe what happens in the apparatus labelled X in the diagram. 1

- b) Give one disadvantage of producing drinking water using distillation. 1

- c) The table shows the boiling points of ethanol and water. Ethanol can be separated from a mixture of ethanol and water using fractional distillation. Describe how fractional distillation separates out ethanol and water. Include risk and safety precautions in your answer.

Substance	Boiling point (°C)
ethanol	78.5
water	100

6

(Total marks for question 7 = 4)

8. The element carbon has three common isotopes. These are **carbon-12**, **carbon-13** and **carbon-14**.

a) Complete the table to show the number of protons and neutrons in each isotope of carbon. 2

Isotope	Mass number	Number of protons	Number of neutrons
carbon-12	12	6	6
carbon-13	13		
carbon-14	14		

b) Explain, in terms of electrons, why the three isotopes have the same chemical properties. 1

c) State what is meant by the term isotopes. 2

- d) A sample of carbon contained 98.90% carbon-12 and 1.10% carbon-13. 3
Use this information to calculate the relative atomic mass of carbon in the sample.
Give your answer to two decimal places.

Relative atomic mass

(Total marks for question 8 = 7)