

GCSE Chemistry

Worksheet: Mixtures

TIME 30 min	TOTAL 27 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Mixtures

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Apparatus used to separate mixtures includes filter paper, evaporating basins, condensers and fractionating columns.

0 1 . 1

Which piece of apparatus cools a vapour so that it condenses back into a liquid?

Tick (✓) **one** box.

Condenser

☐

Evaporating basin

☐

Filter funnel

☐

Fractionating column

☐

[1 mark]

0 1 . 2

Which piece of apparatus holds the residue during filtration?

Tick (✓) **one** box.

Condenser

☐

Filter paper in a funnel

☐

Measuring cylinder

☐

Test tube

☐

[1 mark]

0 1 . 3

Suggest a mixture from which a solid could be obtained by heating the mixture in an evaporating basin.

.....

.....

[1 mark]

0 1 . 4

Name the separation method that uses a condenser but not a fractionating column.

.....

.....

.....

[1 mark]

0 2

This question is about mixtures and how they are separated.

0 2 . 1

Which method would separate sand from a mixture of sand and water?

Tick (✓) **one** box.

Chromatography

☐

Crystallisation

☐

Filtration

☐

Fractional distillation

☐

[1 mark]

0 2 . 2

Which method would separate the different coloured dyes in a sample of ink?

Tick (✓) **one** box.

Chromatography

☐

Crystallisation

☐

Filtration

☐

Fractional distillation

☐

[1 mark]

0 2 . 3

What is a mixture?

.....

.....

.....

.....

[2 marks]

0 2 . 4

Separating a mixture does not make any new substances.
What type of process is used to separate a mixture?

.....

.....

.....

.....
[1 mark]

0 3

A student wants to make large crystals of copper(II) sulfate from 50 cm³ of copper(II) sulfate solution.

0 3 . 1

Describe how the student could make crystals of copper(II) sulfate from the solution.

.....

.....

.....

.....

.....

.....

[3 marks]

0 3 . 2

Explain why the student should not heat the solution until all the water has evaporated.

[1 mark]

0 3 . 3

Suggest how the student could tell when enough water has been evaporated.

[1 mark]

0 4

A student used paper chromatography to find out whether an orange food colouring contains more than one dye. The student put a spot of the colouring on a line near the bottom of a piece of chromatography paper, then stood the paper in a beaker containing a small amount of water.

0 4 . 1

The student drew the line in pencil, not in ink.
Explain why.

[1 mark]

0 4 . 2

The water level must start below the spot.
Explain why.

[1 mark]

0 4 . 3

The colouring separated into three spots: yellow, orange and red.
What does this show about the food colouring?

[1 mark]

0 4 . 4

Explain why the dyes separate as the water moves up the paper.

.....

.....

.....

.....

[2 marks]

0 4 . 5

Suggest how the student could obtain a small sample of the red dye on its own from the chromatogram.

.....

.....

.....

.....

[2 marks]

0 5

A student has two mixtures.
Mixture 1: ethanol and water, which mix completely. Ethanol boils at 78 °C and water boils at 100 °C.
Mixture 2: sand (insoluble in water) and salt (soluble in water).

0 5 . 1

Name the method that should be used to separate ethanol from mixture 1.

.....

.....

.....

.....

[1 mark]

0 5 . 2

Explain why simple distillation would **not** give pure ethanol from mixture 1.

[2 marks]

0 5 . 3

Describe how mixture 2 could be separated to obtain **three** separate products: dry sand, dry salt and water.

[3 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Chemistry · Worksheet: Mixtures · 27 marks

Question 1 (4 marks)

01.1 [1 mark]

Correct: Condenser

01.2 [1 mark]

Correct: Filter paper in a funnel

01.3 [1 mark]

Answer: e.g. salt solution (salt dissolved in water)

- a solution of a soluble solid, e.g. salt / sodium chloride solution, copper sulfate solution (1)
-

01.4 [1 mark]

Answer: simple distillation

- (simple) distillation (1)
-
-

Question 2 (5 marks)

02.1 [1 mark]

Correct: Filtration

02.2 [1 mark]

Correct: Chromatography

02.3 [2 marks]

Answer: Two or more elements or compounds that are not chemically combined.

- two or more elements or compounds / substances (1)
- not chemically combined (together) (1)

Notes: Allow 'not chemically bonded'.

02.4 [1 mark]

Answer: a physical process

- physical (process) (1)
-

Question 3 (5 marks)

03.1 [3 marks]

Answer: Heat the solution in an evaporating basin to evaporate some of the water until it is saturated; leave it to cool so crystals form; filter off the crystals and dry them.

- heat the solution (in an evaporating basin) to evaporate some of the water (1)
- leave the concentrated solution to cool (so that crystals form) (1)
- filter off the crystals and dry them (on filter paper / in a warm place) (1)

03.2 [1 mark]

Answer: Only small crystals or a powder would form, and heating too strongly could decompose the copper(II) sulfate crystals.

- only a powder / small crystals would form (large crystals form when a saturated solution cools slowly) (1)

Notes: Allow: the hydrated crystals would lose water / change colour / decompose.

03.3 [1 mark]

Answer: Dip a glass rod in the solution and take it out: if crystals form on the rod as it cools, the solution is ready.

- dip a (cold) glass rod into the solution: crystals form on the rod when the solution is ready to crystallise (1)

Notes: Allow: crystals start to appear at the edge of the solution.

Question 4 (7 marks)

04.1 [1 mark]

Answer: Ink would dissolve in the water and separate, spoiling the results; pencil does not dissolve.

- ink would dissolve / separate in the water (and interfere with the results) but pencil does not (1)

04.2 [1 mark]

Answer: Otherwise the colouring would dissolve into the water in the beaker instead of moving up the paper.

- otherwise the colouring / dyes would dissolve into the water in the beaker (1)

04.3 [1 mark]

Answer: It is a mixture of (at least) three dyes.

- it is a mixture (of at least three dyes) (1)

04.4 [2 marks]

Answer: The dyes have different solubilities in the water and different attractions to the paper, so they move up the paper at different rates.

- the dyes have different solubilities in the water / different attractions to the paper (1)
- so they move up the paper at different rates / travel different distances (1)

04.5 [2 marks]

Answer: Cut out the red spot from the dry paper, then dissolve the dye out in a little water and remove the paper (then evaporate the water).

- cut out the red spot (from the dried chromatogram) (1)
 - dissolve the dye out of the paper in water / solvent, then remove the paper (and evaporate the solvent) (1)
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Question 5 (6 marks)

05.1 [1 mark]

Answer: fractional distillation

- fractional distillation (1)

05.2 [2 marks]

Answer: The boiling points are close together, so a lot of water evaporates with the ethanol and condenses with it.

- the boiling points of ethanol and water are close together, so water also evaporates when the mixture boils (1)
- so the liquid collected (distillate) contains water as well as ethanol (1)

05.3 [3 marks]

Answer: Add water, stir and filter; dry the sand left in the filter paper; distil the filtrate to collect the water, then crystallise or evaporate the remaining solution to obtain the salt.

- add water to the mixture and stir (to dissolve the salt), then filter (1)
- the sand is left as the residue in the filter paper; dry it (e.g. in a warm oven) (1)
- heat the filtrate (salt solution) in a flask with a condenser (simple distillation) to collect the water (1)
- leave the remaining concentrated solution to crystallise / evaporate it to dryness to obtain the salt (1)

Any 3 of the points above.
