

Name:

Edexcel Style

Combined Science GCSE

States of Matter and Mixtures Test
(Levels 4–9)

Date:

Time Allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total Marks Available
1	2.7, 2.10, 2.11		9
2	2.7, 2.8		6
3	2.7		8
4	2.7		5
5	2.4		2
6	2.1, 2.2		7
7	2.12		13
Total			50

Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. Paper chromatography is one way to separate soluble mixtures.
A student conducted an experiment to separate blue and red ink.

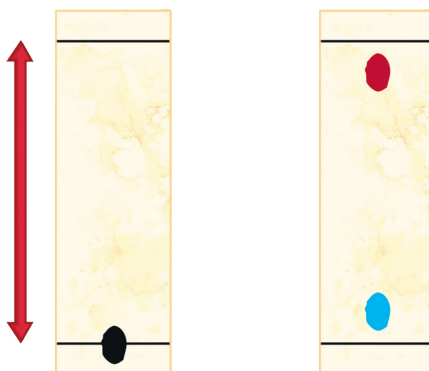
(a) Why in chromatography is the baseline drawn in pencil not ink?

(1)

(b) Explain what happens to the ink on the spot when the blotting paper is put into the beaker of water.

(2)

(c) The results of the experiment are shown below:

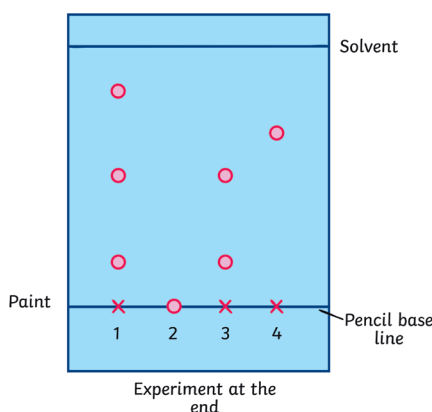


If the red spot has moved 15.3 cm and the solvent has moved 16.1 cm, calculate the R_f value of the substance to two decimal places using the following equation:

$$R_f = \frac{\text{distance travelled by a dye}}{\text{distance travelled by solvent front}}$$

(2)

- (d) The diagram below shows four samples of food colouring that have been separated using chromatography:
1,2,3 and 4



- (i) Which mixture contains the insoluble food colouring?

(1)

- ☐ Mixture 1
☐ Mixture 2
☐ Mixture 3
☐ Mixture 4

- (ii) How could the experiment be changed to allow for a result to be shown for the insoluble food colouring?

(1)

- (iii) Look at the diagram above and explain which food colouring separated into the greatest number of soluble food colours.

(2)

(Total for Question 1 = 9 marks)

2. If one of a metal's compounds is reacted with a suitable acid, a salt of that metal can be made. Plan an experiment in which you react an appropriate compound of magnesium with an appropriate acid to form pure, dry crystals of magnesium sulphate (MgSO_4). Write the relevant equation if you can.

(6)

(Total for Question 2 = 6 marks)

3. (a) Nitrogen and oxygen can be obtained from air.

(i) Why does the air need to be cooled before the start of the process?

(1)

(ii) Explain how, using fractional distillation, nitrogen and oxygen can be obtained from liquid air.

(3)

(b) Crude oil can be separated using fractional distillation. If fraction A is taken from the bottom of the column and fraction B is taken from the top, what can be said about the boiling point, viscosity and ease of ignition of fraction B? Shade the correct row.

(1)

Boiling Point	Viscosity	Ease of Ignition
Lower than A	Higher than A	More difficult than A
Lower than A	Lower than A	Easier than A
Higher than A	Lower than A	More difficult than A

(c) Some fractions from fractional distillation of crude oil are gases, petrol, kerosene, diesel oil, fuel oil and bitumen. Which fraction best suits each of the following statements?

(i) _____ is used in some cars as fuel and has a higher boiling point than kerosene.

(1)

(ii) _____ is used as fuel in large ships and is harder to ignite than most other fractions.

(1)

(iii) _____ is taken from the top of the fractionating column.

(1)

(Total for Question 3 = 8 marks)

4. (a) How can two immiscible liquids be separated? Tick the correct box.

(1)

- ☐ Fractional distillation
- ☐ Evaporation
- ☐ Filtration
- ☐ Separating funnel

(b) Which of the following is a mixture?

(1)

- ☐ Sodium chloride solution
- ☐ Sodium chloride
- ☐ Sodium
- ☐ Chlorine

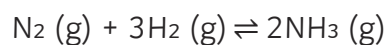
(c) Tick the correct column in the table to show which method of separation would be used for each situation.

(3)

	Separation Method			
	Fractional distillation	Simple distillation	Filtration	crystallisation
Separate ethanol from water				
Separate sand from a mixture of sodium chloride solution				
Copper sulphate crystals from copper sulphate solution				

(Total for Question 4 = 5 marks)

5. Ammonia can be formed using the Haber process by reacting nitrogen and hydrogen together. This is shown in a balanced symbol equation:



- (i) What physical state are the substances all in?

(1)

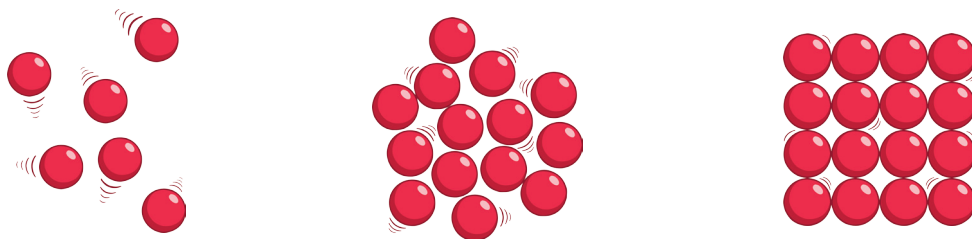
- (ii) What does the symbol $\rightleftharpoons$ mean?

(1)

(Total for Question 5 = 2 marks)

6. (a) Identify the states of matter from their diagram.

(3)



(b) What type of change is interconversions between one state and another?

(1)

(c) What are the names given to the following changes of state?

(i) Solid to liquid: _____

(1)

(ii) Liquid to gas: _____

(1)

(iii) Gas to liquid: _____

(1)

(Total for Question 6 = 7 marks)

7. Water can be collected from roofs of houses in water storage tanks. This water is not potable.

(a) Choose the correct meaning of the word potable.

(1)

- ☐ Tastes nice
- ☐ Pure
- ☐ Contains dissolved substances
- ☐ Safe to drink

(b) Why should water in a tank like this be filtered to make it potable?

(1)

- ☐ To remove undissolved solids
- ☐ To remove dissolved gases
- ☐ To remove dissolved solids
- ☐ To kill microbes

(c) (i) Which gas can be added to water to make it potable?

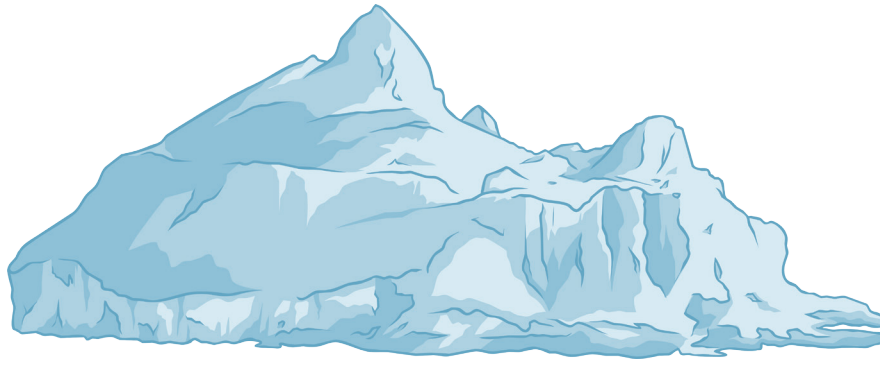
(1)

(ii) What is the test for this gas?

(1)

(iii) Why does this gas make water potable?

(1)



(d) (i) How can the water molecules from the iceberg end up as water in the lake?

(4)

(ii) Water from rivers and lakes is unsafe to drink as it has rainwater in. Explain how it is treated to make it safe.

(4)

(Total for Question 7 = 13 marks)

TOTAL FOR PAPER = 50 MARKS