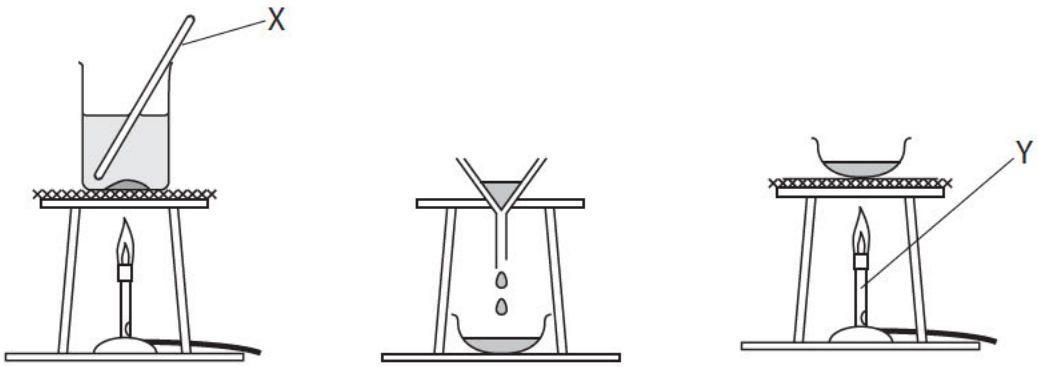
1 The diagram shows the apparatus a student uses to separate a mixture of salt and sand.

She adds the mixture to water in a beaker and then carries out the three stages shown.



stage 1 stage 2 stage 3

(a) Give the names of the pieces of apparatus labelled X and Y.

(2)

X .....

Y .....

(b) (i) A liquid that dissolves substances is a

(1)

- ☒ **A** solute
- ☒ **B** solution
- ☒ **C** solvent
- ☒ **D** suspension

(ii) The clear liquid that forms in stage 1 is a

(1)

- ☒ **A** solute
- ☒ **B** solution
- ☒ **C** solvent
- ☒ **D** suspension

(c) (i) At which stage, 1, 2 or 3, is the sand collected?

(1)

.....

(ii) At which stage, 1, 2 or 3, is the salt collected?

(1)

.....

(d) What happens to the water in stage 3?

(1)

.....

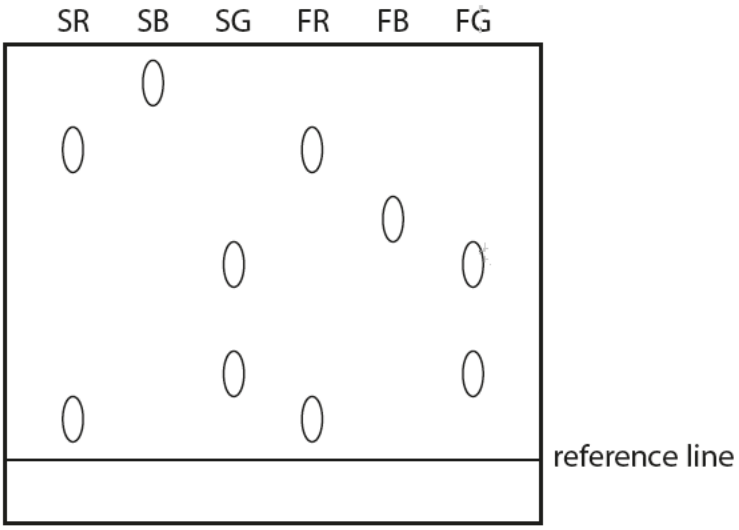
.....

(Total for Question 1 = 7 marks)

2 A student investigates some food colourings, each of which is made up of one or more dyes.

She produces a chromatogram using the safe colourings red (SR), blue (SB) and green (SG) and food colourings red (FR), blue (FB) and green (FG).

The diagram shows her chromatogram.



(a) How many dyes are there in SR?

(1)

☒ **A** 1 ☒ **B** 2 ☒ **C** 3 ☒ **D** 4

(b) Complete the table by placing ticks (✓) next to the two food colourings that are definitely safe to use.

Explain your answer.

(2)

Food colouring	Safe to use?
FR	
FB	
FG	

explanation .....

.....

.....

(Total for Question 2 = 3 marks)

3 The box shows some methods that can be used in separating mixtures.

crystallisation	dissolving	evaporation
paper chromatography	simple distillation	fractional distillation

From the box, select the best method for each of the separations.

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

(a) Removing sand from a mixture of sand and water.

(1)

.....

(b) Obtaining pure water from a salt solution.

(1)

.....

(c) Extracting the red dye from a sample of rose petals.

(1)

.....

(d) Separating the coloured dyes in a sample of green ink.

(1)

.....

(e) Obtaining ethanol (alcohol) from a mixture of ethanol and water.

(1)

.....

(Total for Question 3 = 5 marks)

4 (a) The list shows some techniques used to separate mixtures.

A crystallisation

B filtration

C fractional distillation

D paper chromatography

E simple distillation

Complete the table to show the best method of obtaining each substance from the mixture.

In each case, choose one of the letters A, B, C, D or E. Each letter may be used once, more than once or not at all.

(4)

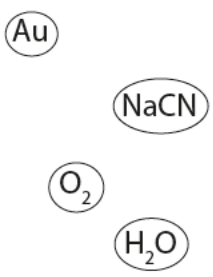
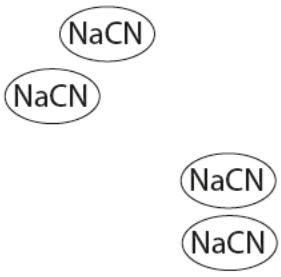
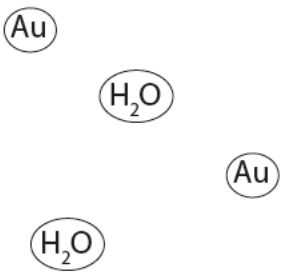
Substance	Mixture	Letter
sand	sand and water	
solid copper(II) sulfate	aqueous copper(II) sulfate	
red food dye	mixture of food dyes	
kerosene	crude oil	

(b) Gold occurs in ores, which are mixtures of gold and other substances. Several elements and compounds are used in the extraction of gold from its ores.

Each box below represents the substances present in one part of the extraction process.

Classify the contents of each box as a compound, an element or a mixture by writing your choice below each box.

(3)

			
Compound, element or mixture			

(Total for Question 4 = 7 marks)

5 The table shows the names of some common pieces of laboratory apparatus used to make measurements.

(a) Complete the table to show the name of the quantity that can be measured by each piece of apparatus, and a common unit used for that quantity. One example of each has been done for you.

(6)

Apparatus	Quantity	Unit
balance	mass	
stop clock		s
gas syringe		
ruler		

(b) Which piece of apparatus is needed to make measurements in a paper chromatography experiment?

(1)

☒ **A** balance

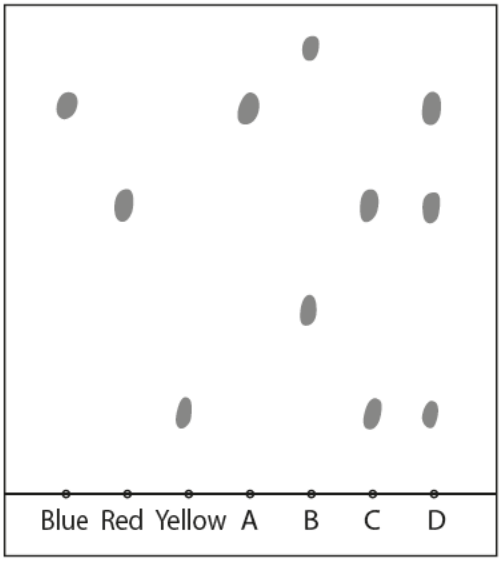
☒ **B** gas syringe

☒ **C** ruler

☒ **D** stop clock

(Total for Question 5 = 7 marks)

6 A student produces this chromatogram for four dyes, **A**, **B**, **C** and **D**.



(a) Put a cross (☒) in a box to indicate your answer.

(i) Which one of the dyes contains three colours?

(1)

☐ **A**

☐ **B**

☐ **C**

☐ **D**

(ii) Which one of the dyes contains one colour only?

(1)

☐ **A**

☐ **B**

☐ **C**

☐ **D**

(b) Each dye is made from one or more of the colours blue, red and yellow.

The student thinks that the result for one dye is incorrect.

Suggest which result is incorrect. Explain your answer.

(2)

The incorrect result is .....

because .....

.....

(Total for Question 6 = 4 marks)