Experimental Techniques – 2019 June

1. 0620/11/M/J/19/No.2

2.00 g of powdered calcium carbonate is added to 50.0 cm^3 of hydrochloric acid.

Which apparatus is used to measure the calcium carbonate and the hydrochloric acid?

	calcium carbonate	hydrochloric acid
A	balance	burette
B	balance	thermometer
C	pipette	burette
D	pipette	thermometer

2. 0620/11/M/J/19/No.3

Rock salt is a mixture of sand and sodium chloride.

Sodium chloride is soluble in water but not in hexane.

Sand is insoluble in both water and hexane.

What is required to separate the sand from the sodium chloride?

1 filter paper

2 fractionating column

3 hexane

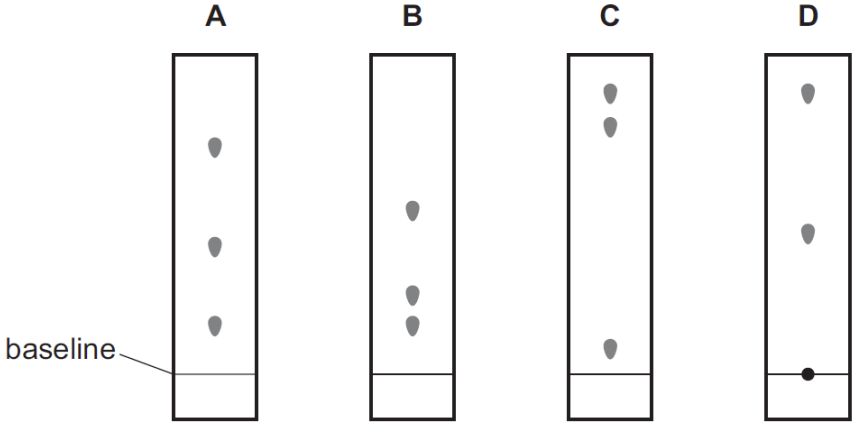
4 water

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

3. 0620/11/M/J/19/No.4

The colours in four dyes are separated using chromatography.

Which chromatogram shows an insoluble colour?



4. 0620/12,22/M/J/19/No.2

A student measures 25.00 cm^3 of dilute hydrochloric acid accurately.

Which apparatus is most suitable?

A beaker

B measuring cylinder

C burette

D dropping pipette

5. 0620/12/M/J/19/No.3

Which sequence is used to separate a soluble salt from a mixture of a soluble and an insoluble salt?

A add solvent, heat the mixture, crystallise the mixture

B add solvent, heat the mixture, filter, crystallise the filtrate

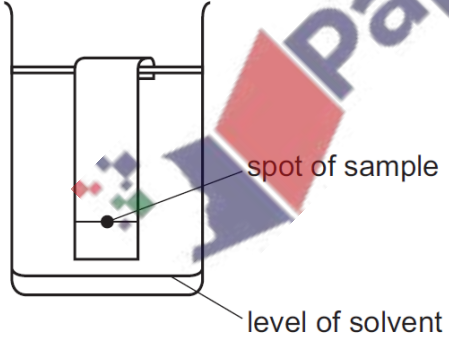
C heat the mixture, filter, crystallise the filtrate

D heat the mixture, filter, add solvent, crystallise the filtrate

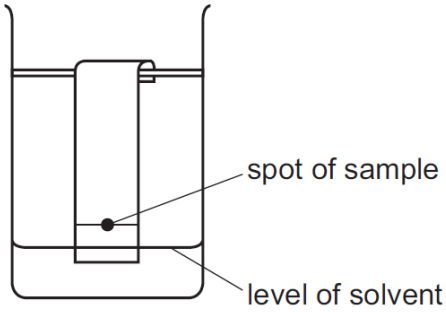
6. 0620/12/M/J/19/No.4

Which diagram shows the correct level of the solvent at the start of a chromatography experiment?

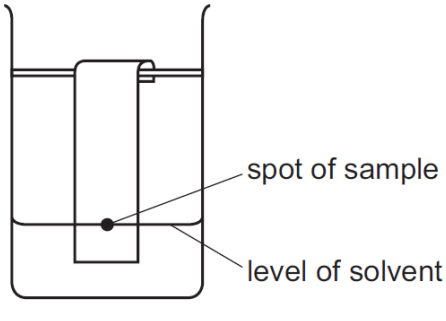
A



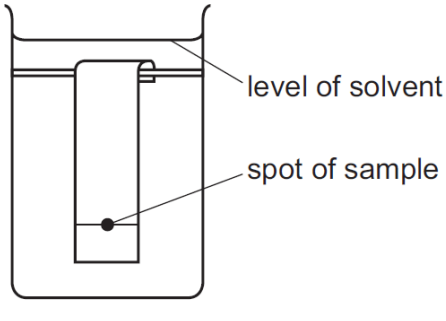
B



C



D



7. 0620/13/M/J/19/No.2

Which piece of apparatus is used to measure 24.8 cm^3 of gas produced during a reaction?

A beaker

B conical flask

C measuring cylinder

D pipette

8. 0620/13/M/J/19/No.3

Calcium carbonate is insoluble in water. Sodium chloride is soluble in water.

Which sequence of steps is used to obtain a pure, dry sample of calcium carbonate from a mixture of calcium carbonate and aqueous sodium chloride?

A filter → dry the residue with filter paper → wash the residue with water

B filter → heat the filtrate to crystallising point → leave the filtrate to cool and crystallise

C filter → wash the filtrate with water → dry the filtrate

D filter → wash the residue with water→ dry the residue

9. 0620/21/M/J/19/No.2

2.00 g of powdered calcium carbonate is added to 50.0 cm^3 of hydrochloric acid.

Which apparatus is used to measure the calcium carbonate and the hydrochloric acid?

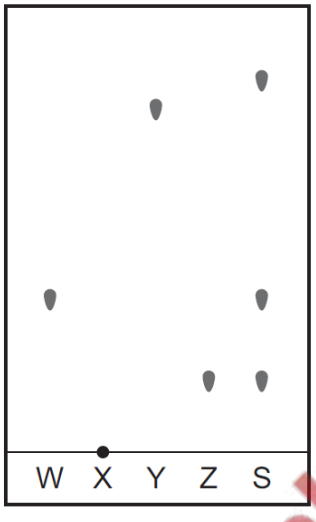
	calcium carbonate	hydrochloric acid
A	balance	burette
B	balance	thermometer
C	pipette	burette
D	pipette	thermometer

10. 0620/13/M/J/19/No.4

A student uses paper chromatography to identify the food dyes in a coloured sweet, S.

The student uses four known food dyes, W, X, Y, and Z, and ethanol as the solvent.

The chromatogram obtained is shown.



Which statements are correct?

1 S contains only two dyes.

2 X is insoluble in ethanol.

3 S contains Y and Z.

4 S contains W.

A 1, 2 and 4 only

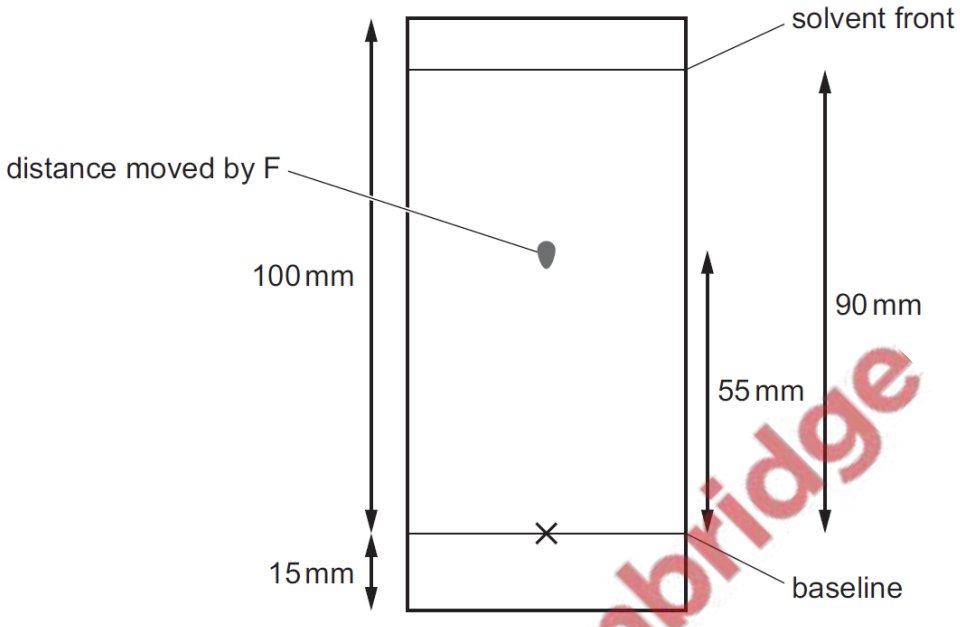
B 2 and 3 only

C 2 and 4 only

D 4 only

11. 0620/21/M/J/19/No.3

The measurements from a chromatography experiment using substance F are shown. The diagram is not drawn to scale.



What is the R_f value of F?

A 0.55 **B** 0.61 **C** 0.90 **D** 1.64

12. 0620/23/M/J/19/No.2

Which piece of apparatus is used to measure 24.8 cm^3 of gas produced during a reaction?

A beaker

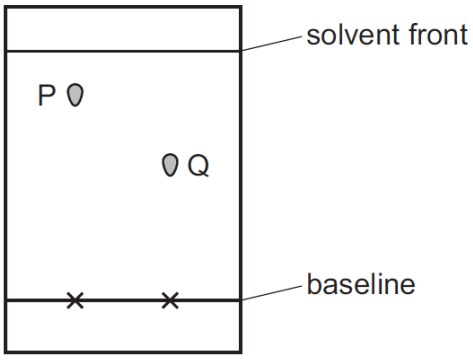
B conical flask

C measuring cylinder

D pipette

13. 0620/22/M/J/19/No.3

The chromatogram of solutions of two metal ions, P and Q, is shown.



P is coloured. A locating agent is used to find the position of Q.

The R_f value of each solution is calculated.

P is a .....1..... element and has an R_f value .....2..... than that of Q.

Which words complete gaps 1 and 2?

	1	2
A	non-transition	greater
B	non-transition	smaller
C	transition	greater
D	transition	smaller

14. 0620/23/M/J/19/No.3

R_f values are used to identify unknown substances using paper chromatography.

Which statements about R_f values are correct?

1 R_f values are always less than 1.0.

2 R_f value = distance travelled by solvent ÷ distance travelled by unknown substance.

3 The higher the R_f value, the further the unknown substance travels.

4 R_f values are not affected by the solubility of the unknown substance.

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

15. 0620/12/F/M/19/No.2

A student measures the time taken for 2.0 g of magnesium to dissolve in 50 cm^3 of dilute sulfuric acid.

Which apparatus is essential to complete the experiment?

1 stop-clock

2 measuring cylinder

3 thermometer

4 balance

A 1, 2 and 4 **B** 1 and 2 only **C** 1 and 4 only **D** 2, 3 and 4

16. 0620/12/F/M/19/No.3

Which method should be used to separate a mixture of two liquids?

A crystallisation

B electrolysis

C filtration

D fractional distillation

17. 0620/12,22/F/M/19/No.4,3

Lead(II) iodide is insoluble in water.

Lead(II) iodide is made by adding aqueous lead(II) nitrate to aqueous potassium iodide.

Which pieces of apparatus are needed to obtain solid lead(II) iodide from 20 cm^3 of aqueous lead(II) nitrate?

1 2 3 4 5

A 1, 2 and 4 **B** 1, 3 and 5 **C** 1, 4 and 5 **D** 2, 4 and 5

18. 0620/22/F/M/19/No.2

Which method should be used to separate a mixture of two liquids?

A crystallisation

B electrolysis

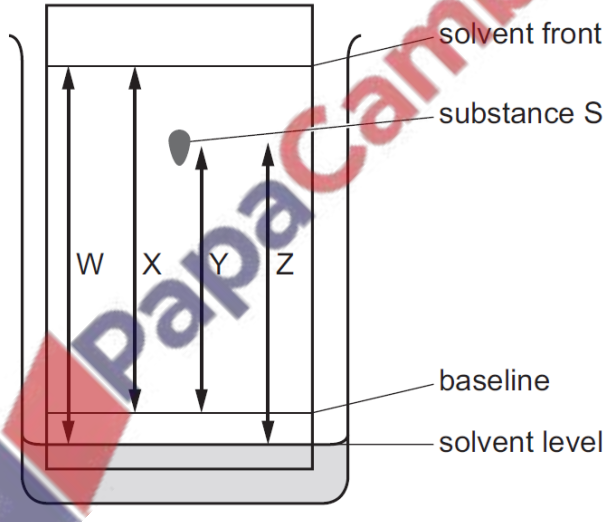
C filtration

D fractional distillation

19. 0620/22/F/M/19/No.4

The chromatogram of substance S is shown.

Some distances, W, X, Y and Z, are labelled on the diagram.



How is the R_f value of substance S calculated?

A $\frac{X}{Y}$ **B** $\frac{W}{Z}$ **C** $\frac{Y}{X}$ **D** $\frac{Y}{W}$