KayScience Combined Science Tuition (9-1)

GCSE *Combined* Chemistry

Weeks 9-12

Online Tuition

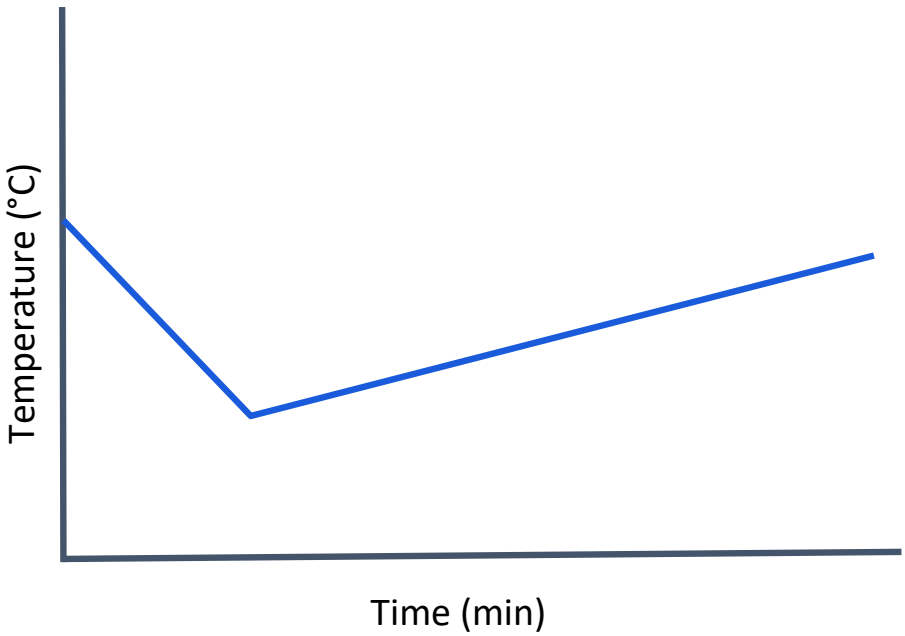
Exam Question Workbook

KayScience

1. The graph below shows the temperature change against time of substance X dissolving in water.

Explain the changes.

(4)



1. Describe how you would measure the change in temperature to see if any reaction is exothermic.

(3)

2. Describe a method to find out how the temperature changes when dissolving different amounts of **SUBSTANCE Z** in water.

(6)

1. Explain what makes a reaction exothermic in terms of bond breaking and bond forming.

(3)

2. Explain what makes a reaction exothermic in terms of bond breaking and bond forming.

(3)

1. Draw a reaction profile for an exothermic reaction.

Your reaction profile must include the labels:
- energy level of the reactants and of the products
- activation energy
- overall energy change

(4)

1. Draw a reaction profile for an endothermic reaction.

Your reaction profile must include the labels:
- energy level of the reactants and of the products
- activation energy

(3)

1. Calculate the energy change when hydrogen reacts with oxygen to form water:

$$2H_2 + O_2 \rightarrow 2H_2O$$

H-H 436kJ/mol
O=O 498kJ/mol
H-O 464 kJ/mol

(3) or (4)

Overall energy change = ... kJ/mol

2. Calculate the energy change when hydrogen reacts with nitrogen to form ammonia:

$$N_2 + 3H_2 \rightarrow 2NH_3$$

N≡N 945kJ/mol
H-H 436kJ/mol
N-H 391 kJ/mol

(3) or (4)

Overall energy change = ... kJ/mol

1. Explain how the rate of reaction increases as the concentration increases.

(3)

2. Explain, in terms of particles, why the rate of reaction decreases during any reaction.

(3)

1. Explain why increasing the temperature increases the rate of reaction

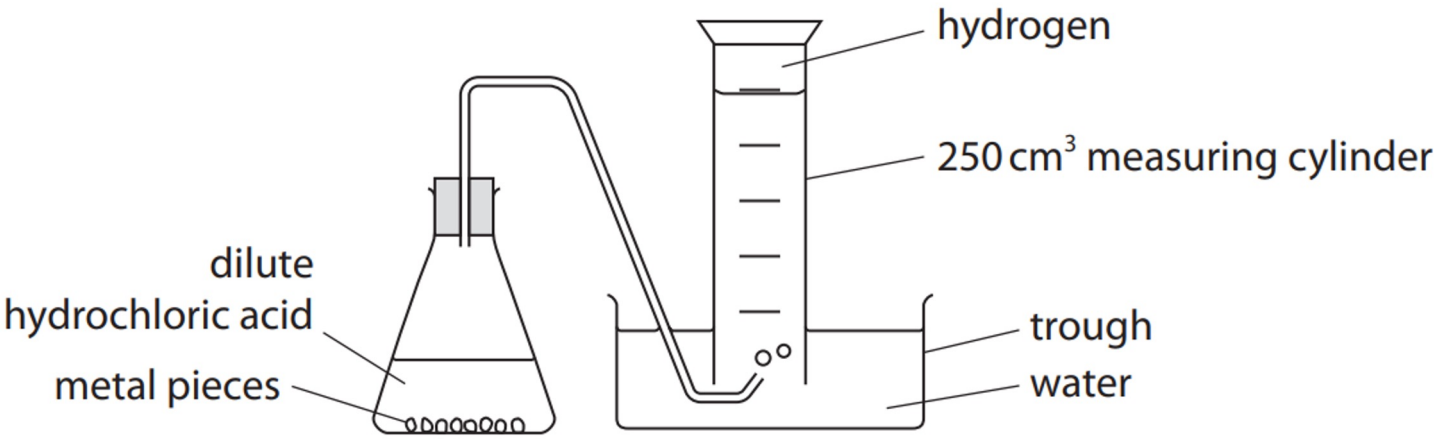
(3)

2. Explain how the size of reactants affects the rate of reaction.

(4)

3. Explain how a catalyst increases the rate of a reaction.

(2)



The effect of particle size of magnesium metal on the rate of the reaction was investigated using the method below:

a) Measure 25 cm^3 of 0.3 mol/dm^3 hydrochloric acid into a conical flask.

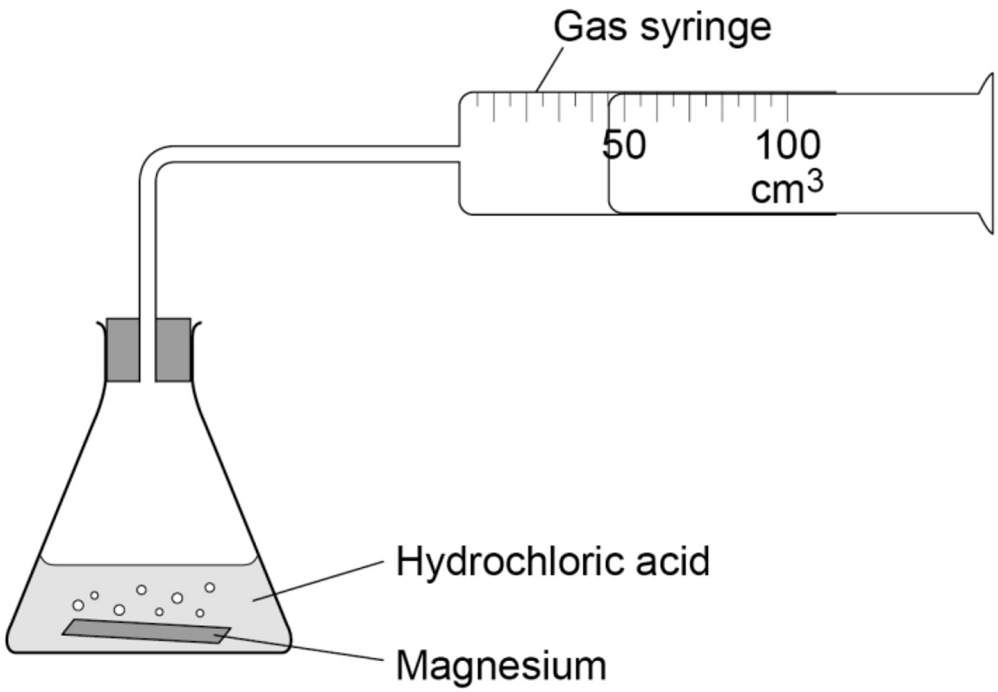
b) Add a spatula of small pieces of magnesium metal to the conical flask.

c) Measure the volume of gas produced every minute for 10 minutes.

d) Repeat steps 1 to 3 with some larger pieces of magnesium metal.

1. Select two valid improvements from the options below:

- Measure the volume of hydrogen gas produced every 3 minutes
- Use 0.06 mol/dm^3 hydrochloric acid
- Use a mass of 2 g magnesium in each experiment measured using a balance
- Measure the increase in mass of the conical flask
- Put the conical flask in a water bath at the same temperature



2. Plan an investigation using the apparatus above to investigate how the concentration of hydrochloric acid can affect the rate of reaction.

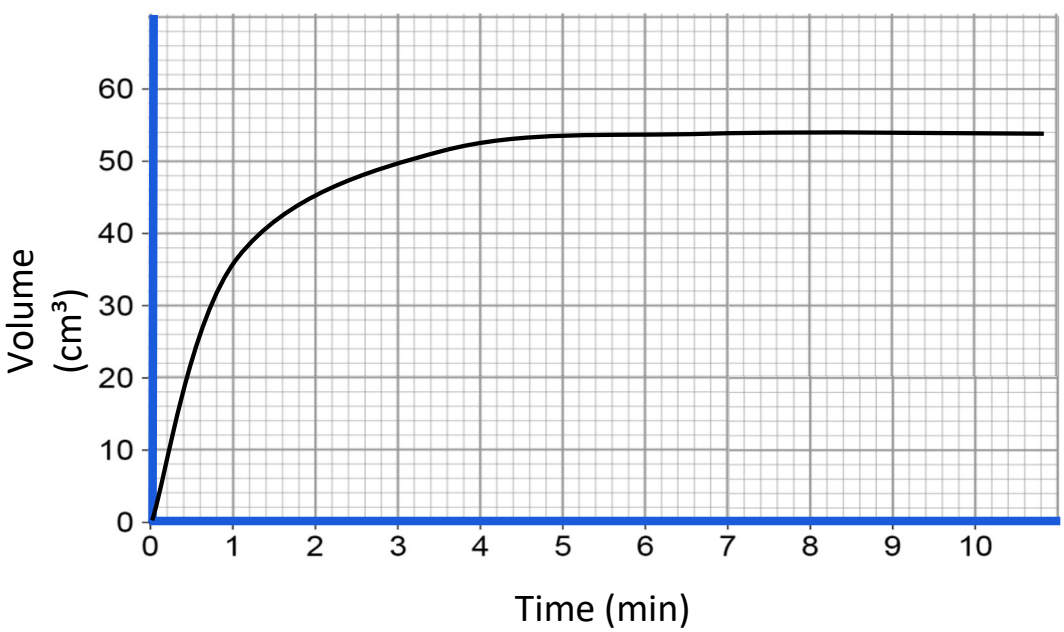
(6)

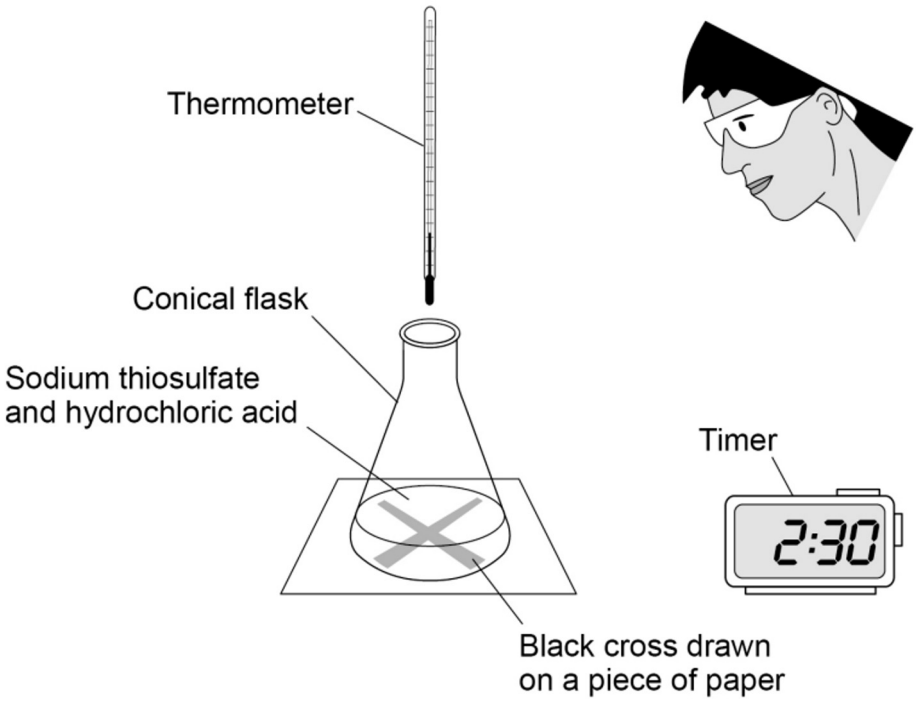
3. Explain what happens to the mass of the products as the reaction progresses between marble and hydrochloric acid in a conical flask.

(3)

4. Determine the mean rate of reaction in cm^3/s between 1 and 3 minutes. Give your answer to 2 significant figures.

(3)





5. The effect of temperature on the rate of reaction was investigated.
Sodium thiosulfate solution was reacted with hydrochloric acid.

There are errors in the method below.

Describe how this method can be improved.

(6)

1. Use a beaker to measure 100 cm^3 of heated sodium thiosulfate solution. Then pour this into a conical flask.

2. Measure the room temperature using a thermometer.

3. Place the conical flask on a black cross drawn on paper.

4. Start the timer.

5. Use the same beaker to measure 20 cm^3 of hydrochloric acid. Then pour this into the conical flask.

6. Stop the timer once the cross can no longer be seen.

7. Repeat the experiment at a different room temperature.

1. What is crude oil?

(1)

2. Describe how crude oil is formed.

(3)

3. Describe how natural gas is formed.

(3)

1. What is a hydrocarbon?

(2)

2. State the molecular formula of the following alkanes:

methane = ...

ethane = ...

propane = ...

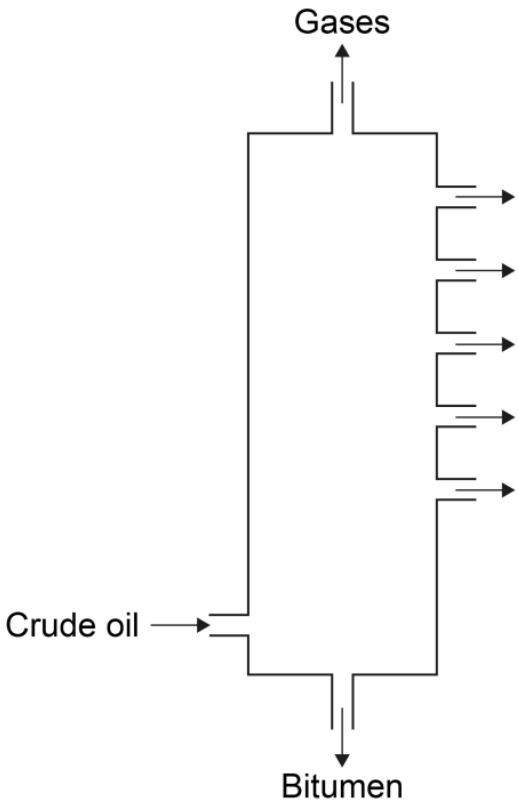
butane = ...

pentane = ...

(5)

3. State the general formula for alkanes.

(1)



1. Describe how fractional distillation is used to separate crude oil into different fractions.

(4)

1. What is cracking?

(2)

2. Write the general word equation for the cracking of an alkane.

(1)

3. Write the balanced equation for the cracking of: $C_{10}H_{22} \rightarrow C_8H_{18}$ + _____

(1)

4. Write the balanced equation for the cracking of: $C_{14}H_{30} \rightarrow$ _____ + C_2H_4

(1)

5. Write the balanced equation for the cracking of: $C_{12}H_{26} \rightarrow C_8H_{18}$ + __ C_2H_4

(1)

6. Describe the conditions required for the cracking of hydrocarbon molecules from the fuel oil fraction.

(2)

1. When investigating complete combustion, what is the job of the ice which surrounds the U-shaped tube?

(1)

2. Explain how carbon monoxide can be produced when butane is burned.

(2)

3. Write the symbol equation for the complete combustion of methane.

(2)

4. State which type of combustion releases more energy.

(1)

5. Soot damages the lungs causing breathing problems. How else can incomplete combustion be dangerous for people?

(3)

1. Describe the test for oxygen gas and give the result.

(2)

2. Describe the test for carbon dioxide gas and give the result.

(2)

3. Describe the test for chlorine gas and give the result.

(2)

4. Describe the test for hydrogen gas and give the result.

(2)

5. State the molecular formula of ammonia.

(1)

6. Describe the test for ammonia gas.

(2)

7. Give the result for the test of ammonia gas.

(2)

1. State the meaning of a pure substance.

(1)

2. Explain why sugar is a pure substance.

(2)

3. State the meaning of an impure substance.

(1)

4. Explain why the melting point is the same throughout a pure substance.

(2)

5. Describe how to test a sample of water is pure.

(2)

1. What is a formulation?

(1)

2. State the job of the pigment, binder and solvent in paint.

(3)

3. State the job of the surfactant in washing-up liquid.

(1)

4. State the job of the rinse agent in washing-up liquid.

(1)

5. Explain why medicines are formulations.

(2)

1. Explain how paper chromatography is able to separate mixtures.

(3)

2. During chromatography of paint colourings, the solvent front travelled 10.4 cm and the paint colouring Z travelled 34 mm. What is the Rf value for the paint colouring Z? (2 d.p.)

(3)

Rf value = ...

3. Explain how a chromatogram can show that a mixture of colours has more than one colouring.

(2)

4. Describe how can you use a chromatogram to figure out which sample contains the greatest number of coloured substances.

(1)

5. Describe how a chromatogram can tell you a substance is insoluble in the solvent used.

(1)

6. How does paper chromatography show the presence of a pure substance?

(1)

7. How can a chromatogram be used to identify identical substances in different samples?

(2)