6	7	1	16
C	N	H	S
Carbon	Nitrogen	Hydrogen	Sulfur

Chemistry Department

S3 Chemistry

Chemical Changes and Structure

(c) Rates of Reaction

HOMEWORK

Homework 11 — Chemical reactions — /10

1. What is formed in every chemical reaction? (1)

2. Give three examples of everyday chemical reactions. (3)

3. Name the signs of a chemical reaction. (2)

4. Name the type of reaction that gives out heat. (1)

5. A pupil wanted to record data that would allow her to follow the reaction between zinc and hydrochloric acid. List three ways in which she could do this. (3)

Homework 12 — Rate of Reaction 1 — /10

1. Plot a line graph of the data below on graph paper

Volume of H_2 (cm^3)	0	12.5	20	24	26.5	27.5	27.5
Time (min)	0	2	4	6	8	10	12

(3)

2. Draw an 'X' on your line to show the end-point of the reaction. (1)

3. Calculate the average rate during the first four minutes. (Show working) (2)

4. Calculate the average rate between 4 and 8 minutes. (Show working) (2)

5. What happens to the rate as the reaction proceeds? (1)

6. On your graph sketch another line, in a different colour, to show the results if the reaction had been carried out at a higher temperature. (1)

Homework 13 **Rate of Reaction 2** **/9**

1. Ryan carried out an investigation into the rate of reaction of marble chips with dilute hydrochloric acid. He noted the loss in mass as carbon dioxide was given off, taking readings every minute. His table of results is given below:

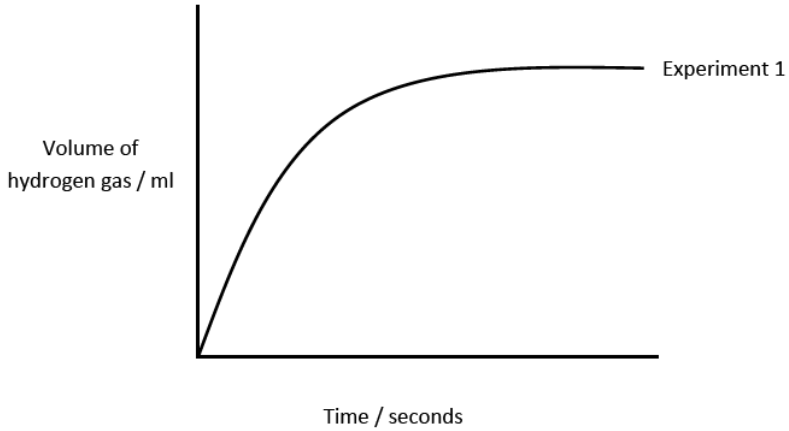
Mass of CO_2 (g)	0	1.5	2.7	3.5	4.1	4.6	4.8	5.0	5.0
Time (min)	0	2	4	6	8	10	12	14	16

a) Draw a graph of the results. (3)
b) What are the units for rate in this experiment? (1)
c) Calculate the average rate between 2 and 6 minutes? (Show working) (2)
d) From your graph state the mass of CO_2 produced at 3 minutes? (1)

2. A student carried out three experiments involving the reaction of Magnesium with dilute acid. They measured the volume of hydrogen given off. The same mass of magnesium and volume of acid were used each time.

Experiment	Temperature (°C)	Size of particles
1	40	Lumps
2	40	Powder
3	20	Lumps

A curve obtained for experiment one drawn on the graph.



Copy the above graph and draw 2 curves on the same axes to show the curves that would be obtained for experiments 2 and 3. Label each curve clearly.

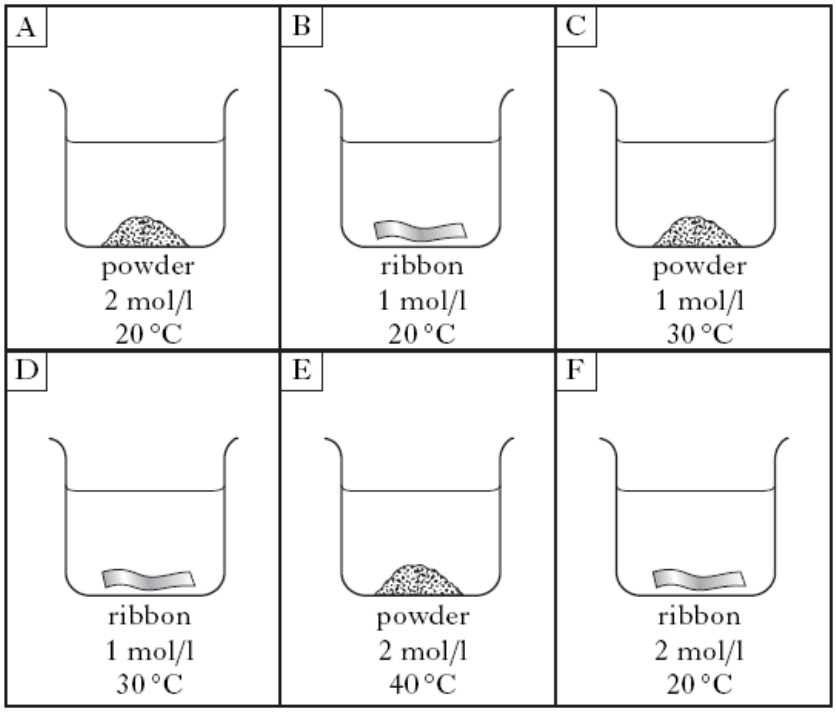
(2)

Homework 14 **Factors affecting the rate of a reaction** **/10**

1. For the following statements say whether they are true or false.

   a) A concentrated acid reacts faster than a dilute acid. (1)
   b) Whole carrots cook faster than carrot slices. (1)

2. The reaction between magnesium and hydrochloric acid was investigated.



   a) Identify which experiment would finish fastest. (1)
   b) Identify which experiment would be the slowest. (1)
   c) Which 2 experiments could be used to compare the effect of concentration? (1)

3. What is a catalyst? (1)

4. Rhodium is a metal used as the catalyst in the catalytic convertor of cars. Waste exhaust gases pass through the convertor and change to less harmful gases. What type of catalyst is rhodium?

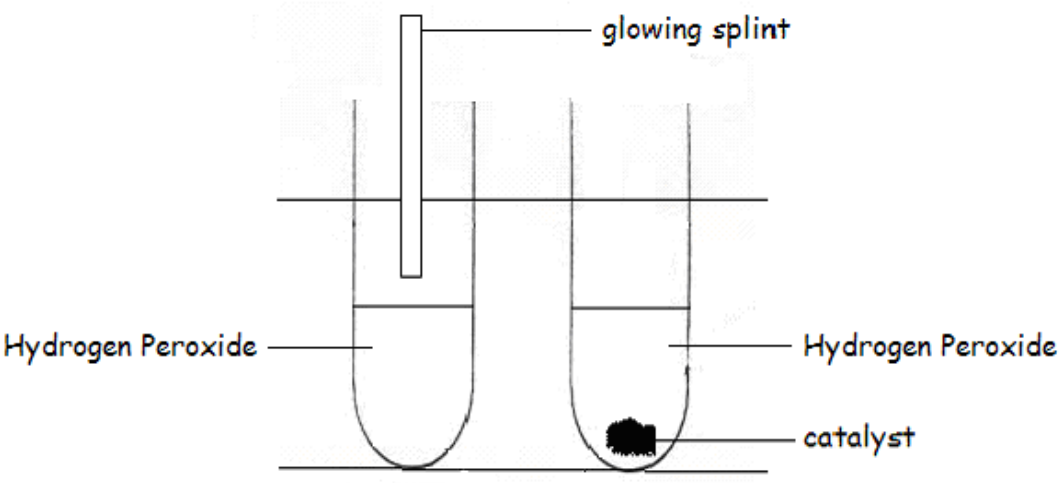
   (1)

Homework 14 continues on the next page.

5. Four different shapes of pellets are being considered for use as a catalyst. Choose which one you think would be best and explain your choice.

A B C D (2)

6. The following experiment was set up to investigate the effect of a catalyst on the decomposition of hydrogen peroxide.



What variables should be constant to make this a fair experiment? (1)