Chemistry

Standard level

Paper 1B

Practice paper

Topic: Chemical Kinetics

Chemistry

Standard level

Paper 1B

Specimen paper

45 minutes

Instructions to candidates

- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for paper 1B is [20 marks].

Section B

1. A student investigated the rate of reaction between marble chips (calcium carbonate, $CaCO_3$) and dilute hydrochloric acid, HCl(aq). The flask was left open on a digital balance, and the total mass was recorded over time.

Time / s	0	30	60	90	120
Mass of flask + contents / g	150.00	149.70	149.52	149.40	149.40

(a) State the balanced chemical equation for the reaction, including state symbols. **[2]**

.....
.....
.....
.....

(b) Explain why the mass of the flask and its contents decreases during the reaction. **[1]**

.....
.....

(c) Calculate the average rate of mass loss between 0 and 30 seconds, including appropriate units. **[2]**

.....
.....
.....
.....

(d) Identify the time at which the reaction has definitively stopped according to the data, and state one reason why the reaction stopped. **[2]**

.....
.....

.....

.....

2. In a separate experiment, a gas syringe was used to collect hydrogen gas produced from the reaction of magnesium ribbon with sulfuric acid. The volume of gas collected was plotted against time, forming a curved graph that eventually plateaus.

(a) Describe how the graph of Volume against Time can be used to determine the instantaneous rate of reaction at t=20 seconds. **[2]**

.....
.....
.....
.....

(b) Explain, with reference to collision theory, why the curve becomes less steep (the rate decreases) as the reaction proceeds. **[2]**

.....
.....
.....
.....