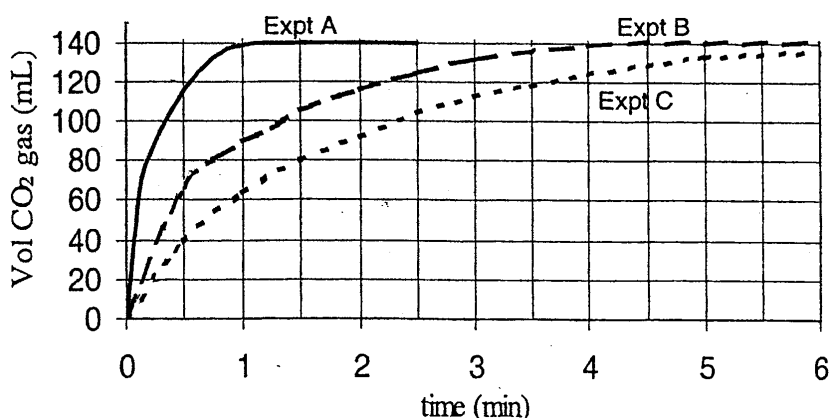


1. State and explain the effect of modifying each of the following on the rate of reaction:
 - a) concentration of reactants /2
 - b) temperature of the reaction mixture /2
 - c) pressure of the reaction mixture /2
 - d) state of subdivision of the reactants /2
 - e) presence of catalysts /2
 - f) intensity of light (for photochemical reactions) /2
2.
 - a) Draw a labelled energy profile diagram for an exothermic reaction with and without a catalyst. /3
 - b) State and explain the effect increasing the temperature would have on this diagram. /2
3. Describe the function of enzymes. /2
4. The graph below shows the results of a series of experiments at room temperature.



Experiment A: 0.5g powdered zinc carbonate, 25 mL of 0.5 mol L⁻¹ HCl, room temperature.

Experiment B: 0.5g granules zinc carbonate, 25 mL of 0.5 mol L⁻¹ HCl, room temperature.

Experiment C: 0.5g lump of zinc carbonate, 25 mL of 0.5 mol L⁻¹ HCl, room temperature.

- (a) Write the equation for the reaction /2
- (b) State an hypothesis that could be tested using the above series of experiments /2
- (c) State, for Experiment B, whether the rate of reaction is faster at 1 minute or 2 minutes, and state how the graph shows this. /2
- (d) If Experiment D were conducted as in Experiment B except with 3.0 mol L⁻¹ HCl:
 - (i) State the effect on the total CO₂ produced /1
 - (ii) State the effect on the rate at which CO₂ is produced /1