

Kinetics Written Response:

1.

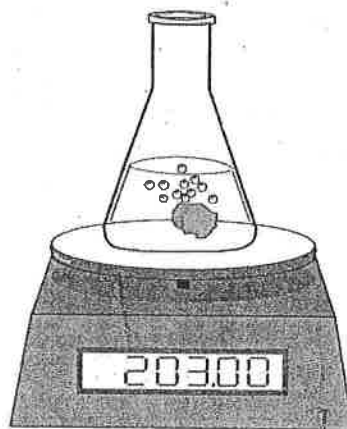
(4 marks)

Solid sodium bicarbonate and acetic acid were reacted in an open flask as follows:



The following data was recorded:

Time (s)	Mass of Flask and Contents (g)
0.00	203.00 g
30.0	202.95 g
60.0	202.93 g
90.0	202.92 g



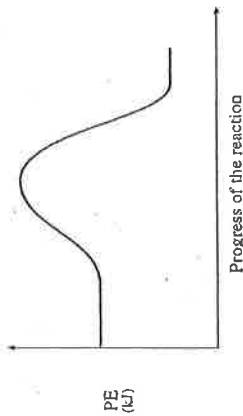
Calculate the overall rate of reaction in grams of NaHCO_3 per minute.

2. (4 marks)

A catalyzed decomposition of ozone (O_3) occurs in a series of steps as illustrated below:

Step 1	$O_3 + \text{sunlight} \rightarrow O_2 + O$
Step 2	$O_3 + NO \rightarrow NO_2 + O_2$
Step 3	$NO_2 + O \rightarrow NO + O_2$
Overall Reaction	
Catalyst	

Write the equation for the overall reaction and then identify the catalyst in the spaces above. The PE diagram below represents the uncatalyzed decomposition of ozone. On the PE diagram, sketch a curve that could represent the mechanism for the catalyzed decomposition.



3. Consider the reaction: $2Zn(s) + O_2(g) \rightarrow 2ZnO(s)$

State two different methods that would increase the rate of this reaction. Explain each in terms of collision theory. (4 marks)

Method 1: _____

Explanation: _____

Method 2: _____

Explanation: _____

4. Consider the following reaction mechanism:

Step 1	$Cl_2 \rightarrow 2Cl$	(fast)
Step 2	$Cl + CO \rightarrow COCl$	(slow)
Step 3	$COCl + Cl_2 \rightarrow COCl_2 + Cl$	(fast)

Identify a reaction intermediate in the reaction mechanism and write the equation for the overall reaction. Explain why increasing the $[CO]$ will increase the reaction rate, but increasing the $[Cl_2]$ will not. (5 marks)

Reaction Intermediate: _____

Overall Reaction Equation: _____

Explanation: _____
