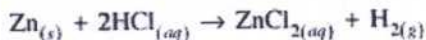


11. Consider the following reaction:



Outline 3 procedures you could use to **monitor** the rate of this reaction. Include the instruments you would use with your procedures. (3 marks)

3 Periodically take the Zn out, dry it & weigh it (balance)  
 Measure the total pressure in a closed system (pressure gauge)  
 Measure the pH periodically (pH meter)  
 Measure  $[\text{H}^+]$  periodically using titration (burette & flask etc)  
 or  $[\text{Zn}^{2+}]$

12. Explain how an **inhibitor** works to decrease the rate of a chemical reaction. (1 mark)

1 It combines with a reactant or catalyst (binds with it) to make it less effective.

13. Given the reaction:  $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$  taking place in a closed container,

1 a) What would happen to the rate of the forward reaction if the volume of the container is increased? (1 mark) decrease

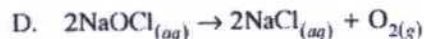
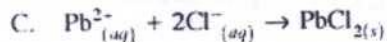
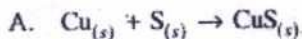
1 b) Explain your answer to (a). (1 mark) increased volume decreases both the  $[\text{H}_2]$  and  $[\text{I}_2]$ , so less chance of collisions.

1 c) What would happen to the rate of the reverse reaction if the volume of the container is increased? (1 mark) decrease

1 d) Explain your answer to (c). (1 mark)

increased volume decreases  $[\text{HI}]$  (less chance of collisions between HI molecules)

14. a) Which of the following reactions will be slowest at 25°C? (1 mark)



Answer A

- b) Give two procedures which could be used to speed up the reaction you identified in (a). (2 marks)

11/11 2 Grind Cu & or S to increase surface area  
 Increase temperature  
 Catalyst