



Chemistry 12

Resource Exam B

Response Booklet

Instructions

Answer the following questions in the space provided in this **Response Booklet**. You are expected to communicate your knowledge and understanding of chemical principles in a clear and logical manner. Your steps and assumptions leading to a solution must be written in this **Response Booklet**. Answers must include units where appropriate and be given to the correct number of significant figures. **For questions involving calculations, full marks will NOT be given for providing only an answer.**

PART B: WRITTEN RESPONSE

Value: 37.5% of the examination

Suggested Time: 40 min

1. (4 marks)

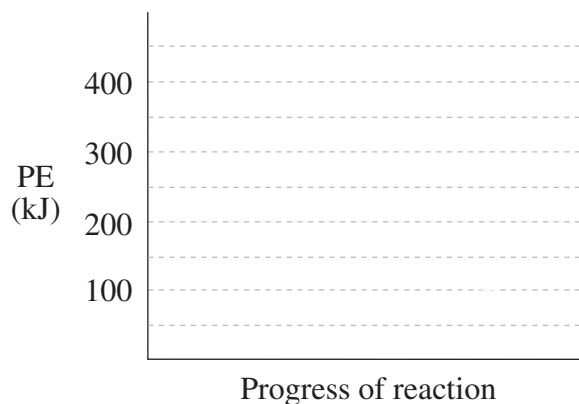
Consider the following values for a catalyzed reaction that goes to completion:

$$PE(\text{products}) = 250 \text{ kJ}$$

$$E_a = 175 \text{ kJ}$$

$$\Delta H = +50 \text{ kJ}$$

Sketch a PE diagram for this reaction on the grid provided, then use a dotted line to show how removing the catalyst would change the PE diagram.

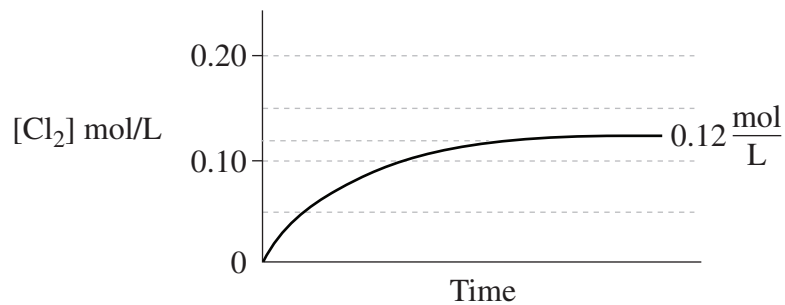


2. (4 marks)

Consider the following equilibrium:



A student added 2.40 mol CCl_4 to a 2.00 L flask and monitored the $[\text{Cl}_2]$. The following graph was produced.



Calculate the value of K_{eq} .

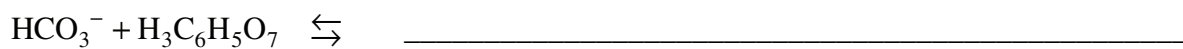
3. (4 marks)

A 0.15 g sample of solid PbF_2 is recovered from 300.0 mL of its saturated solution.

What is the K_{sp} of PbF_2 ?

4. (3 marks)

Complete the Brønsted–Lowry acid base equation below and predict whether reactants or products will be favoured at equilibrium, and justify your answer.



5. (5 marks)

Calculate the pH of 0.45 M H_2CO_3 . Start by writing the predominant equilibrium equation.

6. (3 marks)

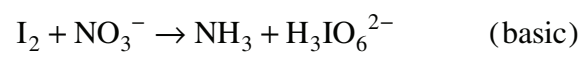
The following two experiments were conducted:

- Titration A: a strong base was titrated with a strong acid.
- Titration B: a weak base was titrated with a strong acid.

How does the pH at the equivalence point of Titration B compare with the pH at the equivalence point of Titration A? Explain.

7. (4 marks)

Balance the following in basic solution:



8. (3 marks)

Draw and label the parts of an electrolytic cell capable of copper plating an inert carbon electrode.