



Chemistry 12

Resource Exam A

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.**

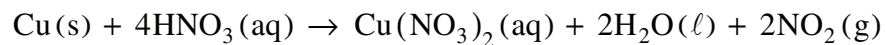
PART B: WRITTEN RESPONSE

Value: 37.5% of the examination

Suggested Time: 40 minutes

1. (4 marks)

In a fume hood, a student reacted copper and nitric acid in a flask according to the following equation:



The following data was collected:

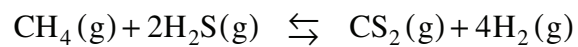
Time (min)	Mass of flask and contents (g)
0.0	250.50
2.5	249.25
5.0	248.24
7.5	247.44

Calculate the overall rate of reaction in grams NO_2 per minute.

How much time will it take to react 0.50 g of Cu at this rate?

2. (4 marks)

Consider the following equilibrium:



Initially, 0.120 mol CH_4 and 0.280 mol H_2S were placed in a 2.00 L flask. At equilibrium, $[\text{CS}_2] = 0.030 \frac{\text{mol}}{\text{L}}$. Calculate K_{eq} .

3. (4 marks)

Write the net ionic equation for the reaction that occurs when 40.0 mL of 1.50 M AgNO_3 is mixed with excess Na_2SO_4 solution, and calculate the mass of the precipitate that forms.

4. (3 marks)

Identify an amphoteric substance and write two balanced equations that demonstrate its amphoteric nature.

5. (5 marks)

A 2.00 M diprotic acid (H_2X) has a pH of 0.60. Calculate its K_a value. Start by writing a general equation for the predominant equilibrium.

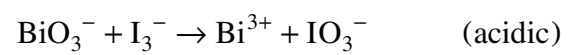
6. (3 marks)

A titration was performed by adding 0.125 M NaOH to a 25.00 mL sample of H_2SO_4 . Calculate the $[\text{H}_2\text{SO}_4]$ from the following data.

	Trial #1	Trial #2	Trial #3
Initial volume of NaOH (mL)	4.00	17.05	8.00
Final volume of NaOH (mL)	17.05	28.00	19.05

7. (4 marks)

Balance the following in acidic solution.



8. (3 marks)

Draw an operating electrolytic cell used in the electrolysis of molten sodium chloride, $\text{NaCl}(\ell)$.
Label the anode and cathode.