Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Physical

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Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

Sodium thiosulfate reacts with dilute hydrochloric acid as shown.

$$Na_2S_2O_3(aq) + 2\ HCl(aq) \rightarrow 2\ NaCl(aq) + SO_2\ (g) + S(s) + H_2O(l)$$

(a) Give the simplest ionic equation for this reaction.

_____

(1)

(b) The gas SO_2 is a pollutant.

State the property of SO_2 that causes pollution when it enters rivers.

Give an equation to show the reaction of SO_2 with water.

Property _____

Equation _____

(2)

(c) Draw a diagram to show the shape of a molecule of H_2O
Include any lone pairs of electrons.

State the H-O-H bond angle.

Explain this shape and bond angle.

Diagram

Bond angle _____

Explanation _____

_____

_____

_____

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(4)

(d) The initial rate of the reaction between sodium thiosulfate and hydrochloric acid can be monitored by measuring the time taken for a fixed amount of sulfur to be produced.

Describe an experiment to investigate the effect of temperature on the initial rate of this reaction.

Include

- a brief outline of your method
- how you will measure the time taken for a fixed amount of sulfur to be formed
- how you will present your results in graphical form
- a sketch of the graph that you would expect.

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(6)

(Total 13 marks)

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Q2.

The percentage by mass of iron in a steel wire is determined by a student.

The student

- reacts 680 mg of the wire with an excess of sulfuric acid, so that all of the iron in the wire forms $Fe^{2+}(aq)$
- makes up the volume of the $Fe^{2+}(aq)$ solution to exactly 100 cm^3
- takes 25.0 cm^3 portions of the $Fe^{2+}(aq)$ solution
- titrates each portion with 0.0200 mol dm^{-3} potassium manganate(VII) solution.

(a) Give the equation for the reaction between iron and sulfuric acid.

_____

(1)

(b) The titration results are shown in the table.

	1	**2**	**3**
Final volume / cm^3	22.90	45.60	22.60
Initial volume / cm^3	0.00	22.90	0.00
Titre / cm^3	22.90	22.70	22.60

Calculate the mean titre.

Mean titre _____ cm^3

(1)

(c) Give the overall ionic equation for the oxidation of Fe^{2+} by manganate(VII) ions, in acidic conditions.

_____

(1)

(d) State the colour change seen at the end point of the titration.

_____

(1)

(e) Name the piece of apparatus used for these stages of the method.

Taking the 25.0 cm^3 portions _____

Adding the

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potassium manganate(VII) solution _____

(1)

(f) The balance used to weigh the 680 mg of iron wire has an uncertainty of ±0.005 g

A container was weighed and its mass was subtracted from the total mass of the container and wire.

Calculate the percentage uncertainty in using the balance.

% uncertainty _____

(1)

(Total 6 marks)

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