AQA – Amount of substance – A2 Chemistry P3

1. June/ 2019/Paper_3/No.5

0 5 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.

0 5 . 1 Give the equation for the reaction between iron and sulfuric acid.

[1 mark]

0 5 . 2 The titration results are shown in **Table 3**.

Table 3

	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.

[1 mark]

Mean titre _____ cm^3

0 5 . 3 Give the overall ionic equation for the oxidation of Fe^{2+} by manganate(VII) ions, in acidic conditions.

[1 mark]

0 5 . 4 State the colour change seen at the end point of the titration.

[1 mark]

_____

0 5 . 5 Name the piece of apparatus used for these stages of the method.

[1 mark]

Taking the 25.0 cm^3 portions _____

Adding the
potassium manganate(VII) solution _____

0 5 . 6 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.

[1 mark]

% uncertainty _____

2. June/ 2019/Paper_3/No.14

Which atom has the greatest first ionisation energy?

[1 mark]

A H ⬭

B He ⬭

C Li ⬭

D Ne ⬭