Rewarding Learning

ADVANCED
General Certificate of Education
2015

Chemistry

Assessment Unit A2 3

assessing

Module 3: Practical Examination
Practical Booklet A

[AC233]

TUESDAY 5 MAY, MORNING

MARK SCHEME

Annotation

AVAILABLE MARKS

1. Please do all marking in **red** ink.

2. All scripts should be checked for mathematical errors. Please adopt a system of one tick (✓) equals 1 mark, e.g. if you have awarded 4 marks for part of a question then 4 ticks (✓) should be on this candidate's answer.

3. The total mark for each question should be recorded in a circle placed opposite the question number in the teacher mark column.

4. As candidates have access to scripts please do not write any inappropriate comments on their scripts.

General points

- All calculations are marked according to the number of errors made.

- Errors can be carried through. If the wrong calculation is carried out then the incorrect answer can be carried through. One mistake at the start of a question does not always mean that all marks are lost.

- Any number of decimal places may be used provided the 'rounding' is correct.

- Listing is when more than one answer is given for a question that only requires one answer, e.g. the precipitate from a chloride with silver nitrate is a white solid; if the candidate states a white or a cream solid, one answer is correct and one answer is wrong. Hence they cancel out.

- Although names might be in the mark scheme it is generally accepted that formulae can replace them. Formulae and names are often interchangeable in chemistry.

- The marking of colours is defined in the 'CCEA GCE Chemistry Acceptable Colours' document.

MARKING GUIDELINES

Interpretation of the Mark Scheme

- **Carry error through**
  This is where mistakes/wrong answers are penalised when made, but if carried into further steps of the question, then no further penalty is applied. This pertains to calculations and observational/deduction exercises. Please annotate candidates' answers by writing the letters c.e.t. on the appropriate place in the candidates' answers.

- **Oblique/forward slash**
  This indicates an acceptable alternative answer(s).

- **Brackets**
  Where an answer is given in the mark scheme and is followed by a word/words in brackets, this indicates that the information within the brackets is non-essential for awarding the mark(s).

Titration Exercise

AVAILABLE MARKS

1 Table [3]

The Table should be drawn as a boxed table. It should be labelled with the following:
initial burette reading, final burette reading and the titre. It is not necessary to use exactly these words but there should be appropriate columns and rows.
The recorded readings should be checked for mathematical accuracy [1].

The rough titration value should be greater than the accurate values (no more than 2 cm^3) [1]. If rough less than accurate [–1].

Units, i.e. cm^3, should be stated in each column/row [1].

Use of decimal places [2]
All burette readings should be to at least one decimal place – each mistake is penalised by one mark.
(However initial burette readings of 0 are penalised once only.)
If used, the second decimal place position should be 0 or 5 only – other values will be penalised by 1 mark for each.

Average titre [2]
Accurate titrations only should be used. All accurate titration values should be used.
The use of a rough value is [–1].

The average value can be calculated to two decimal places or more, e.g. 25.15 and 25.20 would average to 25.175.
If three (or more) accurate titres are recorded, then the average titre must be calculated using all three (or more) accurate titres.
Any error is [–1]. This might be an incorrect calculation or the omission of units. If the average titre is included in the table then the units indicated on the table apply.

Titration consistency [1]
This is the difference within the accurate titrations. If three (or more) accurate values are given then the difference between highest and lowest is used.

Difference	**Mark**
±0.3	[1]
>0.3	[0]

This value of ±0.1 might need to be raised in the light of candidate response. [8] 8

2 **(a)**

Test	Observations
1 Describe the appearance of **X**.	*(Pale) green (crystals)* [1]
2 Add 3 spatula measures of **X** to 20 cm^3 of water and stir until there is no further change. Use this solution for tests 3, 4 and 5.	*Yellow/green solution* [1]
3 **(a)** In a fume cupboard add 5 drops of concentrated ammonia solution to 2 cm^3 of the solution of **X** in a test tube. **(b)** Add a further 5 cm^3 of concentrated ammonia solution to the test tube.	*Green precipitate* [1] *Precipitate colour darkens/ remains* [1]
4 **(a)** Add 5 drops of sodium hydroxide solution to 2 cm^3 of the solution of **X** in a test tube. **(b)** Add a further 5 cm^3 of sodium hydroxide solution to the test tube.	*Green precipitate* [1] *Precipitate remains* [1]
5 Add 2 cm^3 of barium chloride solution to a test tube containing 2 cm^3 of the solution of **X**.	*White precipitate* [1]
6 Place a half spatula measure of **X** onto a watch glass in a fume cupboard. In the fume cupboard and wearing gloves, slowly add 10 drops of concentrated sulfuric acid.	*White solid* [1] – *not crystals*
7 Place a spatula measure of **X** in a dry boiling tube. Heat the boiling tube gently.	*White solid* [1] – *not crystals* *Colourless liquid forms on walls of tube* [1]

(b) Water bath filled using hot water from a kettle.

Test	Observations
1 Add 10 drops of **Y** to 2 cm^3 of acidified potassium dichromate solution in a test tube. Place the test tube in a hot water bath for 5 minutes.	*(Orange to) green* [1]
2 Add 1 cm^3 of **Y** to 2 cm^3 of Fehling's solution in a test tube. Place the test tube in a hot water bath for 5 minutes.	*Red precipitate* [1]

Total

AVAILABLE MARKS
12
20