

**CHEMISTRY 233/3**  
**TERM 3 2017**  
**MARKING SCHEME**  
**FORM THREE**

Titration	1	2	3
Final burette reading (cm <sup>3</sup> )	21.0	21.0	21.0
Initial burette reading (cm <sup>3</sup> )	0.0	0.0	0.0
Volume of solutions used cm <sup>3</sup>	21.0	21.0	21.0

(b) Average volume of solutions S used

$$\frac{\text{Titre 1} + \text{titre 2} + \text{titre 3}}{3} = \text{ans}$$

(c) No of moles of NaOH =  $\frac{\text{titre} \times 0.5}{1000 \times 1}$

(d) Ratio HCl: NaOH  
1:1

∴ No. of moles of HCl = ans in c above

(e) No of moles of HCl in 100cm<sup>3</sup>

$$\frac{\text{Ans in d} \times 1000 \text{cm}^3}{25} = \text{ans}$$

(f) Number of moles of HCl in original 60cm<sup>3</sup> of solution

$$\frac{60 \times 1 \text{ mole}}{1000 \text{cm}^3} = \text{ans}$$

(g) Number of moles of HCl that reacted

Ans in (f) – Ans in (e) = ans

(h) Mass of sodium sodium carbonate

$$\frac{\text{Ans in g}}{2} = \text{ans}$$

2. Complete table .....2mks (tied to column 1 )

Conditions

Complete table with 4 readings .....2mks

Complete table with 3 readings .....1 1/2 mks

Complete table with 2 readings .....1mks

Complete table with 1 readings .....0mks

N/B Penalize 1/2 mk for each temperature reading above 69.5°C or below 10°C to maximum of 1mk on complete table

Where temperature readings are not continuously dropping

Mark out of 1mk and then subject to the set

Conditions

Reject temperature above 110°C

(b) Use of decimals

Accept only if ALL readings are recorded consistently either as whole numbers of 1dp which must be .0 or .5, otherwise penalize fully. This only applies to column 1

(c) Accuracy .....1/2 mk

Compare the candidates first temperature ending at 4cm<sup>3</sup> with the school value

If within +2°C of the school value..... 1/2 mk

If otherwise.....0mk

(d) Trend.....(2mks)

Award 1mk for continuous drop in temperature readings in column 1; otherwise penalize fully

(e) Column II.....(2mks)

Award 1/2 mk for each value of solubility correctly. Calculated otherwise penalize fully

Accept (a) given as units otherwise fully for any units given

Graph.....(3mks)

(a) Labelling of axes .....( 1/2 mk)

Penalize fully for inversion of axes

Penalize fully for wrong units given, otherwise ignore if units are omitted

Penalize fully if only one axis has been correctly labelled

(b) Scale

Area covered by plots should be at least 3/4 of the plotting space provided

Scale intervals should be consistent

Scale chosen be able to accommodate all the points (plots)

Note: penalize fully if any of the conditions are not met.

(c)Plotting .....1mk

Award 1mk if 3 or 4 points plotted correctly

Award 1/2 mk if only 2 points are correctly plotted

Award 0 mark if only 1 point is correctly plotted

(d) Curve.....(1mk)

Award 1mk for smooth rising curve joining atleast 3 correctly plotted points, one of which must be at 11.2g i.e value at 4cm<sup>3</sup>

Reject curve obtained by plotting 2 or more wrongly calculated values in column 11 of the table

(d) Accept the correct reading with or without showing or graph .....(1mk)

If shown on graph correctly but reading is absent or wrong, award .....( 1/2mk)

Penalize 1/2 mk for wrong units used, otherwise ignore units.

Reject readings and showing from a wrong graph

3.

(i) Black solid

Cu<sup>2+</sup>

Green or blue/blue-green flame

(ii) White ppt

Soluble in excess

Zn<sup>2+</sup>, Al<sup>3+</sup> or Pb<sup>2+</sup>

(iii) White ppt soluble

Zn<sup>2+</sup> confirmed

(iv) White ppt persists on warming

SO<sub>3</sub><sup>2-</sup>, SO<sub>4</sub><sup>2-</sup>

(v) White ppt persists in HCl

SO<sub>4</sub><sup>2-</sup> confirmed

(v) Effervescence Blue solution

CO<sub>3</sub><sup>2-</sup> tied to effervescence

Cu<sup>2+</sup> tied to blue solution

Observations	Inference
(i) solid melts lame Burns with yellow sooty flame/luminous	$\begin{matrix}   \\ \text{C} \\   \end{matrix} = \begin{matrix}   \\ \text{C} \\   \end{matrix}$ or $\begin{matrix}   \\ \text{C} \\    \end{matrix}$ Or R-COOH present

(ii) Dissolves to form a colourless solution	R-COOH present
(iii) P <sup>H</sup> 4-6	Weak acid
(iv) Decolourizes acidified KMnO <sub>4</sub>	R-COOH present
(v) Effervescence	R-COOH Confirmed