CHEMISTRY FORM 3 PAPER 3 - MARKING SCHEME

Question 1

Table

1

a) Complete table..... 1mk

Conditions

i) Complete table with 3 titration done..... 1mk

ii) incomplete table with 2 titrations done..... $^1/_2$ mk

iii) Incomplete table with only 1 titration done.... 0 mk

Penalties

- Wrong arithmetic/subtraction
- Inverted table
- Burette reading beyond 50cm^3 unless explained
- Unrealistic titres i.e. too small (below 1.0cm^3 or too high over 100cm^3)

NB: Penalise $^1/_2$mk for each to a max. Penalty of $^1/_2$mk (i.e. Penalise $^1/_2$mk ONCE)

b) Use of decimals.....1 mk

(Tied to 1st and 2nd rows only)

Conditions

i) Accept either 1 or 2 d.p used otherwise Penalize fully.

ii) If 2 d.p are used the 2 d.p must be a "0" or "5" otherwise penalize fully. iii) Accept inconsistency of zero as initial burette reading i.e 00.0

c) Accuracy..... 1mk

Compare the candidate titre values with the S.V tick the chosen value where it earns a mark.

NB: The S.V is the teacher „Average Titre".

i) If at least One value is within $\pm$ 0.1cm3 of S.V..... 1 mk

ii) If one value is within $\pm$ 0.2cm3 of the SV.....$^1/_2$mk

iii) If no value is within $\pm$ 0.2cm3 of the SV.... O mk

Compare the SV with the worked out "CORRECT TITRE" and award accordingly.

d) Principle of Averaging..... 1 mk

Conditions

i) If 3 consistent values are averaged..... 1mk

ii) If 3 titrations are done but only 2 are consistent and averaged ..... 1 mk iii) If only 2 titrations are done and are consistent and are averaged.... 1mk iv) If 3 are possible but only 2 are averaged ....0 mk

v) If 3 titrations are done and are inconsistent and averaged..... 0 mk

Penalties

i) Penalize $^1/_2$mk for wrong arithmetic if the errors is outside +2 units in the 2nd d.p ii) Penalize $^1/_2$mk if no working is shown but the answer is correct. iii) If no working is shown but answer given is wrong, penalize fully.

iv) Accept rounding off of answer to 2 d.p otherwise penalize $^1/_2$mk for rounding off to 1 d.p or whole number.

NOTE: i) Accept "Answer if it works out exactly to 1 d.p or to a whole number.

ii) Section (i) Must be marked for the „mark" for averaging to be awarded in table 1.

e) Final answer..... 1mk compare the candidates' CORRECT average titre with the SV. i) If within ± 0.1cm3 of the SV..... 1mk ii) If within ± 0.2cm3 of the SV..... $^1/_2$mk

iii) If beyond ± 0.2cm3 of the SV....0 mk

NOTE: i) In case there was wrong arithmetic/subtraction in the table, use the correct values in averaging for the final answer.

ii) Where there are two possible average titres use the value which gives the candidate max. credit

iii) If wrong values are averaged, pick the correct values (if any) following the principles of averaging, and average and award accordingly.

CT - 1
DP - 1
AC - 1
PA - 1
FA - 1
5

CALCULATIONS

(b) RFM of NaOH = 23+1+16=40 ✓½

4g ⟶ 500cm^3

$^{1000}\times^{4)}$ ÷500=8g✓½

NB. Check for other correct alternative from the Candidates work

Penalise ½mk for wrong units if given

Molarity is 8/40✓½

=0.2M✓½

(c) Moles in 25ml.is (0.2×25) ÷ 1000✓½
= 0.005mole✓½

(d) (i) Moles of acid =Ans. In (a) ÷ 2✓ = correct Ans✓.

(ii) Molarity of the acid (Ans. (b) above×1000) ÷titreValue✓½ = Correct Ans✓½.

(iii) Molarity = g/L ÷RFM

RFM = g/L ÷ molarity = 2.95×4/Molarity in (d) (ii) above✓ = Correct Ans. ✓

(iv) HX= Ans. (d) (iii) above✓

X= Ans. (d) iii -2✓½ = Correct Ans. ✓½

question

2. (a)

observations	Inferences
-Colourless solution✓½ -White residue✓½	- Cu^{2+}, Fe^{2+} ,Fe^{3+} absent in filtrate✓½ and residue✓½ **NB: Award mks if ions given in words** **e.g copper(ii) ions but not copper**

(i)

observations	Inferences
- White ppt✓½ - Soluble in excess✓½	Zn^{2+}, Pb^{2+}, Al^{3+} Present✓ **NB: all 3 give 1mk** **If 2 half mk,one zero, Penalise ½mk for each contradictory ion to a max of 1mk**

(ii)

observations	Inferences
- White ppt✓½ - Soluble in excess✓½	Zn^{2+}, Present✓ **NB: Penalise fully for any contradictory ion**

(iii)

observations	Inferences
- White ppt✓	- SO_4^{2-}, SO_3^{2-}.CO_3^{2-}, Cl^- present✓ - **NB: Accept if ions written in words. All 3 ions 3mks, if 2 ½mk, if one zero mk**

(iv)

observations	Inferences
- White ppt✓	SO_4^{2-} present✓ **NB: Penalise fully for any contradictory ion** -

(b)

observations	Inferences
- Effevescence /bubling ✓½ -gas turns blue tlitmus to red✓½	CO_3^{2-} present✓ **NB: Penalise fully for any contradictory ion** -

(i)

observations	Inferences
- White ppt✓½ - Soluble in excess✓½	Zn^{2+}, Pb^{2+}, Al^{3+} Present✓ **NB: all 3 give 1mk If 2 half mk,one zero, Penalise ½mk for each contradictory ion to a max of 1mk**

(ii)

observations	Inferences
- White ppt✓½ - inSoluble in excess✓½	Pb^{2+}, Al^{3+} Present✓**NB: all 2 1mk, one 1/2mk , Penalise ½mk for each contradictory ion to a max of 1mk**

(iii)

observations	Inferences
- White ppt formed✓	Pb^{2+}, Present **NB: Penalise fully for any contradictory ion**