**PAPER 3 – MARKING SCHEME FORM- 3 LAINAKU 2014)**

**Question 1**

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 50cm3 unless explained

 - Unrealistic titres i.e. too small (below 1.0cm3 or too high over 100cm3)

 NB: Penalise 1/2mk for each to a max. Penalty of 1/2mk (i.e. Penalise 1/2mk 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 Penalise fully.

 ii) If 2 d.p are used the 2 d.p must be a “0” or “5” otherwise penalatise fully.

 iii) Accept incosntistency 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 + 0.1cm3 of S.V ..... 1 mk

 ii) If one value is within + 0.2cm3 of the SV.....1/2mk

 iii) If no value is within + 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) Penalise 1/2mk for wrong arithmetic if the errors is outside +2 units in the 2nd d.p

 ii) Penalise 1/2mk if no working is shown but the answer is correct.

 iii) If no working is shown but answer given is wrong, penaltise fully.

 iv) Accept rounding off of answer to 2 d.p otherwise penalize 1/2mk 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.....1/2mk

 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 500cm3

1000×4) ÷500=8g✓½ **NB. Check for other correct alternative from the**

 **Candidate,s 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

Qestion 2. (a)

|  |  |
| --- | --- |
| observations | Inferences |
|  -Colourless solution✓½ -White residue✓½ | - Cu2+, Fe2+ ,Fe3+  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 | Zn2+, Pb2+, Al3+ 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 | Zn2+, Present✓ **NB: Penalise fully for any contradictory ion** |

(iii)

|  |  |
| --- | --- |
| observations | Inferences |
| - White ppt✓ | * SO42-, SO32-.CO32-, 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✓ | SO42- present✓ **NB: Penalise fully for any contradictory ion** |

(b)

|  |  |
| --- | --- |
| observations | Inferences |
| - Effevescence /bubling ✓½-gas turns blue tlitmus to red✓½ | CO32- present✓ **NB: Penalise fully for any contradictory ion** |

(i)

|  |  |
| --- | --- |
| observations | Inferences |
| - White ppt✓½- Soluble in excess✓½ | Zn2+, Pb2+, Al3+ 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 | Pb2+, Al3+ 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✓ | Pb2+, Present **NB: Penalise fully for any contradictory ion** |

Question 3.

(a)

|  |  |
| --- | --- |
| observations | Inferences |
| - Melts to colorless liquid✓½-burn with smoky flame✓½ | - ✓ for each✓½**NB: tied to smoky/sooty flame** |

(b) (i)

|  |  |
| --- | --- |
| observations | Inferences |
| - Bromine water changes from yellow/brown to colourless OR bromine water is decolourised✓ **Reject**: **It** is decolourised | -✓ for each✓½**NB: tied to correct observations otherwise zero mk** |

(ii)

|  |  |
| --- | --- |
| observations | Inferences |
| - Potassium manganate vii changes from purple to colourless OR Potassium manganate vii is decolourised✓ **Reject**: **It** is decolourised | -✓ for each✓½**NB: tied to correct observations otherwise zero mk** |