FORM FOUR CLUSTER KCSE MODEL 3

CHEMISTRY PAPER 3 ANSWERS

1. Question 1

(a) Table.

i) Complete table 1 mark;

Conditions:

- Complete table with 3 titration = l mark;

- Incomplete table with 2 titrations = 'A mark;

- Incomplete table with 1 titration = 0 mark;

Conditions:

- Accept only 1 to 2dp used consistently; otherwise penalize fully;

- Accept 2dp only if the second d.p is "0" or "5"; otherwise penalize FULLY;

- Accept inconsistency in us of 'zeros' as initial volume i. e 0, 0.0, 0.00.

(iii) Accuracy = l mark (only tick the correct value otherwise don't tick);

- Compare the candidates // students value with the school value (SV); and tick (√) the chosen value where it earns a mark;

Conditions:

- If any vale is within $\pm$ 0.10 cm3 of SV = l mark;

- If No value is within $\pm$ 0.10 cm3 but at least one is within 0.20 of SV = ½ mark;

- If no value is within 0.20 cm3 of SV = 0 mark

Note: - If there is wrong arithmetic // subtraction in the table compare the SV with the worked out correct value // the titre and award accordingly; (

Penalties: - Wrong arithmetic // subtraction;

- Inverted tables;
- Burette readings beyond 50.0 cm3, unless explained;

- Unrealistic titre values i.e. too low (below 1.0 cm3) or too high (100 cm3);

Note:

- Penalize ½ mark EACH to a maximum penalty of ½ mark (i. e penalize ½ mark only once);

(ii) Use of decimals (tied to rows 1 and 2 only) = l mark

(b) Principles of averaging = lmark;

- Values averaged MUST be shown and MUST be within $\pm$ 0.20 cm3 of each other;

Conditions:

- If three consistent values are averaged = l mark;

- If 3 titrations are done but only 2 are within 0.20 cm3 of each other rare averaged = l mark;

- If only 2 titrations are done, are consistent and are averaged = ½ mark;

- If 3 possible but only 2 re averaged = 0 mark;

- If 3 titrations are done, are inconsistent and yet are ALL averaged = 0 mark;

- If only 2 titrations done, are inconsistent and yet averaged = 0 mark; Penalties:

- Penalize ½ mark for wrong arithmetic error outside + 2 units in the second decimal place.

- Penalize ½ mark if no working is shown but the answer is correct;

- If now working is shown and the answer is wrong, penalize fully;

- Accept rounding off the answer to 2 decimal places;

- Otherwise penalize ½ mark for wrong rounding off to l dp or to whole numbers;

c) i) $1000cm^3 = 0.5\,moles$

$$34cm^3 = \frac{34 \times 0.5}{1000} = 0.017\,moles;$$

(ii) 250 cm3=0.017 moles

Titre volume in (b)

(iii) $\frac{titre \times 0.017}{250}$ =Final answer;

(iv) Using mole ratio, moles in 25cm3 of **FA1:**

=½ x answer in (c) (ii) above;

=Final answer (x);

25 cm3= Final answer (x);

$$1000cm^3 = \frac{1000 \times final\ answer(\times)}{25cm^3}$$

(v) Mass =Moles x RMM

of NaCO3=106

Mass per litre = answer in (iii) x 106;

Final answer (q);

(vi)

$$\%\,age = \frac{answer\ in\ (iv)}{4.5} \times 100;$$

2. Question 2

(b) Table.

(i) Complete table with 8 readings... l mark

Penalties and conditions:

- Penalize ½ mark for each space not filled;

- Reject fractions for height of precipitate and award a maximum of 2½ marks for the table (height row)

- Penalize ½ mark each for entry not in mm in the time column e.g. 2.5 cm.

(ii) ..... . Use of decimals..... ½ mark

- Accept readings in 1 to 2d.p used consistently throughout; otherwise penalize fully (time column).

(iii) **Accuracy .....** l mark

- Compare the candidates Ist time reading with the school value.

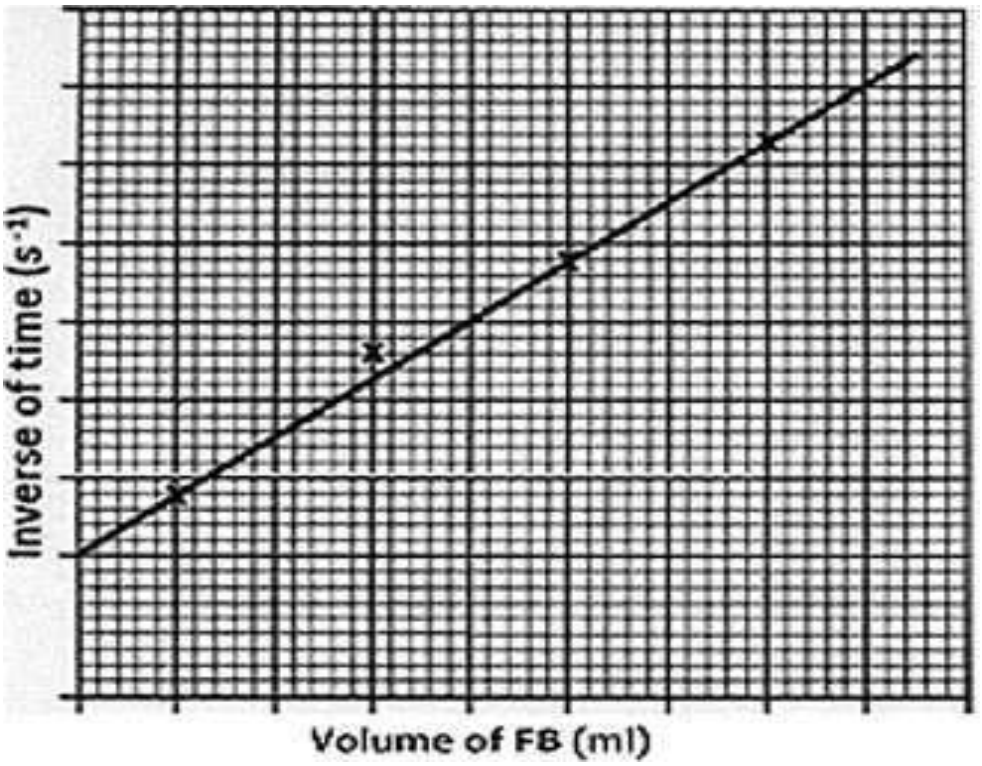
- If within ± 2 seconds award l mark; otherwise penalize fully. (iv) Trend ..... 1 mark (time row)

-Award l mark if time is decreasing to downwards;

- Where values of time are constant, mark only the first constant value and reject the rest. If two constant values are following each other mark one and reject the other.

(c) Graph;

Trend



Marking:

Final answer;

(i). Scale. ½ mark;

-Area covered by actual plots including the origin should be ¾ of the space provided for the plot.

-scale should accommodate the 4 plots; otherwise penalize fully.

-The scale must be consistent on both axes otherwise penalize fully; (ii) Labeling of the axes. ½ mark;
Conditions:

-Penalize ½ mark for wrong units used.

-Penalize ½ mark for inverted axis;

-Accept if no are shown on labelling; but both axes must be correctly labeled; (iii). Plotting 2 marks;
-Accept 3 or 4 plots correctly plotted for 2 marks;

-If 2 points are correctly plotted, award l mark;

-If only 1 point is correctly plotted award 0 mark;

-the points for the table are to 3 or more dps and rounded off to 2dp on plotting penalize ½ mark once;

otherwise accept rounding off to 3 decimal places; (iv). Line l mark;
-Accept a straight line passing through at least 2 points correctly plotted and through the origin; otherwise penalize fully;

(d). Gradient.

-lines drawn on the graph.

-The hypotenuse of the constructed "triangle" should cover at least half of the length of the line drawn by the candidate.

-Correctly reads (to nearest ½ small square) the coordinates from the graph

-Accept values from the table if the line is drawn through the point.

-Do not penalize reuse of values for an incorrectly plotted point

-Calculates gradient correctly to at least 1 decimal place using the values read from the graph by the candidate.

Maximum score: 3 marks;

(f) Has:

-Variable volume of water,½ mark;

-Water to keep total combined volume (FB 4 and water) constant at 40 cm3; ½ mark;
-Record the volume of (FB 4 + water) for each experiment to the left of the table.

-Complete table; l mark;

-Correct and consistent use of decimals; l mark;

(g). Uses experimental data to make appropriate comment, from experimental results, as to how rate varies with concentration of KI. (Do not give this mark where mixtures selected in (J) are not appropriate, i.e. the volume of (FB 4 + water) -f 40 cm3) where an acceptable qualitative statement has been given ignore any incorrect attempt at a quantitative/mathematical expression Showing on the graph = ½ mark;

Correct value read from graph =½ mark
3.
I Solution FA 7:

	Observations	Inferences
(a)	-Evolution of brownfumes;that turn moist blue paper red and moist red litmus paper remains red; -White solid that turns yellow on heating; and back to white on cooling;	NO_3^- *present* Zn^{2+} *present*
(b)(i)	-White precipitate soluble in excess;	Zn^{2+} *present*
(ii)	-White precipitate soluble in excess;	Zn^{2+} *present*
(iii)	-No white precipitate;	SO_4^{2-} *absent;*
(iv)	-No white precipitate;	Cl^- *absent;*
(v)	-Evolution of a colourless gas with a pungent smell; gas turns moist red litmus paper blue ;moist blue litmus paper remains blue;	NO_3^- *present*

3 II Solution FA 8

	Observations	Inferences
(a)	Burns with a blue non-sooty flame;	=C=C= and –C≡C; -absent; R- OH present
(b)	Yellow bromine water remains yellow;	=C =C =and –C≡C; -absent;
(c)	Purple acidified potassium manganite (VII) turns colourless	R – OH present
(d)	No effervescence// fizzing	H^+ absent;
(e)	pH 7	Neutral substance;