

KANDARA SUB-COUNTY SECONDARY SCHOOLS FORM 3 2016

JOINT EXAMINATION

Kenya Certificate of Secondary Education (KCSE)

Chemistry (233/3)

Paper 3 (PRACTICAL)

October 2016

MARKING SCHEME

Q1. Table 1 and Table II

For each table;

a) Complete table (1 mark)

Conditions

- i) One titration (0 mk)
- ii) 2 titrations done ($\frac{1}{2}$ mk)
- iii) 3 titrations done (1mk)

Penalties (maximum $\frac{1}{2}$ mk)

- i) Wrong arithmetic
- ii) Inverted table
- iii) Burette reading below 1cm^3 and above 50cm^3 unexplained

NOTE:

Penalise $\frac{1}{2}$ mk for any or all the above mistakes maximum penalty is $\frac{1}{2}$ mk

b) Decimal place (1mk)

Note; only for row 1 and row 2

Conditions

- i) 1 d.p consistently used row 1 and 2 (1mk)
- ii) Whole numbers with no d.p used consistently (1mk)

Penalties

- Penalise fully (1mk) for any unmet condition
- If in row 2, zero is used consistently eg 0 or 0.0 or 0.00 do not penalise (*accept zeros used in row 2 in any way if at all zeros are used in all titrations*)

c) Accuracy (1mk)

Conditions

- i) If any of the 3 titres is within ± 0.1 of the school value (S.V) (1mk)
- ii) If any of the 3 titres is within ± 0.2 of the S.V ($\frac{1}{2}$ mk)
- iii) If none of the 3 titres is within ± 0.1 or ± 0.2 of S.V (0 mk)

Penalties

- i) If the candidate takes the average of titres beyond a range of ± 0.2 penalise fully (1mk)
- ii) If the candidate fails to take the average of all the titres within a range of ± 0.2 penalise fully (1mk)
- iii) If the answer got after average is not correct penalise $\frac{1}{2}$ mk (NB correct according to candidate's titre)
- iv) If the answer is approximated to less than 2d.p penalise $\frac{1}{2}$ mk

e) Final accuracy (1mk)

Conditions

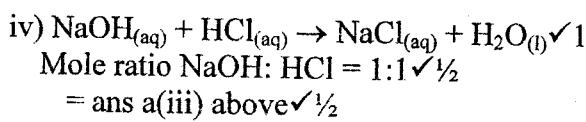
- i) If candidate's correct average titre is within ± 0.1 of the S.V award (1mk)
- ii) If candidate's correct average titre is within ± 0.2 of the S.V award ($\frac{1}{2}$ mk)
- iii) Award 0mk for a value beyond ± 0.2 of the S.V.

Procedure I

a) ii) $\frac{8.8\sqrt{1}}{40} = 0.22M\sqrt{1}$ or 0.22 moles/litre or 0.22 moles/l

*accept full mark if no units
penalise $\frac{1}{2}$ for wrong units*

iii) $\frac{\text{ac titre (table 1)} \times \text{ans a(ii)}}{1000} \sqrt{1} = \text{ans} \sqrt{1}$



b) $\frac{1000 \times \text{ans (a(iv)}}{25} = \text{ans} \sqrt{\frac{1}{2}}$

Note penalties

- i) Penalise $\frac{1}{2}$ mk for wrong units
- ii) Penalise $\frac{1}{2}$ mk for molarity approximated to less than 3d.p
- iii) Penalise $\frac{1}{2}$ mk for number of moles approximated to less than 4d.p
- iv) Penalise a $\frac{1}{2}$ mk for a value altered when used in a successive step

Procedure II

a(ii) $\frac{\text{av. titre (table 2)} \times \text{ans a(ii)(table 1)}}{100} \sqrt{\frac{1}{2}} = \text{ans} \sqrt{\frac{1}{2}}$

a(iii) Mole ratio NaOH: HCl = $1:1 \sqrt{\frac{1}{2}}$
= ans a(ii) above $\sqrt{\frac{1}{2}}$

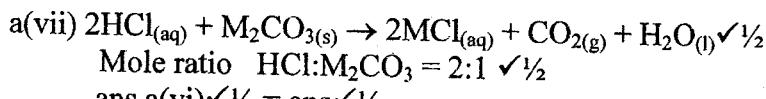
a(iv) ans a(iii) $\times 4 \sqrt{\frac{1}{2}} = \text{ans} \sqrt{\frac{1}{2}}$

a(v) $\frac{\text{ans(b) (table 1)}}{10} \sqrt{\frac{1}{2}} = \text{ans} \sqrt{\frac{1}{2}}$

OR

$\frac{\text{ans (b) (table 1)} \times 100}{1000} = \text{ans}$

a(vi) ans a(v) above - ans a(iv) above $\sqrt{\frac{1}{2}} = \text{ans} \sqrt{\frac{1}{2}}$



$\frac{\text{ans a(vi)}}{2} \sqrt{\frac{1}{2}} = \text{ans} \sqrt{\frac{1}{2}}$

b) i) ans a(vii) above $\times 106 \checkmark \frac{1}{2} = \text{ans } \checkmark \frac{1}{2}$

ii) ans b(i) above $\times 100 \checkmark \frac{1}{2} = \text{ans } \% \checkmark \frac{1}{2}$
0.6

Note/penalties

- i) Penalise $\frac{1}{2}\text{mk}$ for wrong units
- ii) Penalties $\frac{1}{2}\text{mk}$ for number of moles approximated to less than 4 d.p

2. a) i)

Observation	Inference
Solid dissolves $\checkmark \frac{1}{2}$ forming colourless solution $\checkmark \frac{1}{2}$	$\text{Cu}^{2+}, \text{Fe}^{3+}, \text{Fe}^{2+}$ absent $\checkmark 1$
<u>Note</u> -Penalise $\frac{1}{2}\text{mk}$ if colourless solution is not formed	<u>Note</u> -Penalise $\frac{1}{2}\text{mk}$ for any omission or contradictory ion

a) ii)

Observation	Inference
Burns with a yellow flame $\checkmark 1$	Na^+ present $\checkmark 1$
<u>Note</u> -Penalise fully (1mk) If smoky /sooty is used	<u>Note</u> -Penalise fully (1mk) for any contradictory ion

a) iii)

Observation	Inference
White ppt formed $\checkmark \frac{1}{2}$ with lead (II) nitrate and dissolves with nitric (v) acid $\checkmark \frac{1}{2}$	$\text{CO}_3^{2-} \checkmark \frac{1}{2}, \text{SO}_4^{2-} \checkmark \frac{1}{2}$ present
<u>Note</u> accept effervescence/bubbles for $\frac{1}{2}\text{mk}$	<u>Note</u> Penalise ($\frac{1}{2}\text{mk}$) for any contradictory ion

b) i)

Observation	Inference
White ppt formed $\checkmark \frac{1}{2}$ which dissolves in excess $\checkmark \frac{1}{2}$	Zn^{2+} present $\checkmark 1$
	<u>Note</u> Penalise fully (1mk) for any contradictory ion

(ii)

Observation	Inference
White ppt formed $\checkmark \frac{1}{2}$ with lead (II) nitrate solution white ppt does not $\checkmark \frac{1}{2}$ dissolve with nitric (V) acid	SO_4^{2-} present $\checkmark 1$
	<u>Note</u> -Penalise fully (1mk) for any contradictory ion

3. a)

Observation	Inference
Solid melts and burns with a yellow <u>sooty/smoky</u> flame ✓1	$\begin{array}{c} \\ \text{C} = \text{C} \\ \end{array}$ ✓1 or $-\text{C} \equiv \text{C}-$
<u>Note</u> -Penalise fully (1mk) if word sooty/smoky is omitted	<u>Note</u> -accept any of the two above for full (1mk) -give 0mk if one is wrong

b) i)

Observation	Inference
Purple acidified potassium Manganate (VII) turns colourless/is decolourised/discolourised✓1	$\begin{array}{c} \\ \text{C} = \text{C} \\ \end{array}$ ✓1 or $-\text{C} \equiv \text{C}-$
<u>Note</u> -Penalise ½mk if purple colour is not mentioned	<u>Note</u> -Penalise fully (1mk) if any structure is wrong -Accept for (1mk) if only double or triple bonds are drawn at form 3 even if R-OH is not shown