CHEMISTRY PAPER 3

ANSWERS

KCSE 2011

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11.3 Chemistry Paper 3 (233/3)

1. Table 1

	I	II	III
Final burette reading	29.70	33.40	44.60
Initial burette reading	0.00	4.00	15.30
Volume of solution **A** used (cm^3)	29.70	29.40	29.30

(4 marks)

(i) average volume $= \frac{29.4 + 29.3}{2}$

$= 29.35 cm^3$ (½ mark)

(ii) concentration of the dibasic acid **A**; (2 marks)

$conc = \frac{1.6}{126} = 0.01269$; $0.01269 \times 4 = 0.05M$

(iii) moles of the dibasic acid used;

$= \frac{29.35}{1000} \times 0.05$

$= 0.0014675$ moles

(1 mark)

(iv) moles of NaOH in $25.0cm^3$.

$= (0.0014657 \times 2) = 0.002935$ moles

(1 mark)

(v) The concentration of NaOH in moles per litre.

$= 25.0\ cm^3$ of NaOH 0.002935

$1000cm^3 = 0.1174$ M

(2 marks)

2. Table II

	1st conical flask	2nd conical flask
Final burette (cm^3)	21.20	33.60
Initial burette (cm^3)	9.70	22.20
Volume of solution **A** used (cm^3)	11.50	11.40

(3 marks)

(i) average volume; $= \frac{11.4 + 11.5}{2}$

$= 11.45\ cm^3$ (½ mark)

(ii) moles of the dibasic acid $= \frac{0.05 \times 11.45}{1000}$

$= 0.0005725$ moles (1 mark

(iii) moles of NaOH that reacted with the dibasic acid.

$= (0.0005725 \times 2)$

$= 0.001145$ moles

(1 mark

(iv) moles of NaOH that reacted with 25.0cm^3 of salt **B** in solution **B**;

$= 0.0029314 - 0.001145$

$= 0.0017864$ moles

(2 marks

(v)

I. moles of salt **B** in 25.0cm^3 of solution **B**;

$0.0017884 \times \frac{1}{2}$

$6 = 0.00089$ moles

(1 mark

II. concentration in moles per litre of salt **B** in solution **B**; (1 mark

$= 0.00089 \times \frac{1000}{25}$

$= 0.0357$ M (1 mark

III. relative molecular mass of salt **B**;

$= \frac{4.73}{0.0357}$

$= 133.0$ (1 mark)

2 (a)

(i)

Observations	**Inferences**
- Gas which turns red litmus paper blue - Brown solid formed	NH_4^+ present
(2 marks)	(1 mark)

(3 marks

(ii)

Observations	**Inferences**
- Yellow / brown solution - Brown ppt	Fe^{3+} formed
(1 mark)	(1 mark)

(2 marks)

(b) (i)

Observations	Inferences
- White ppt formed (1 mark)	CO_3^{2-}, SO_3^{2-}, SO_4^{2-} (2 marks)

(3 marks)

(ii)

Observations	Inferences
I White ppt dissolved/disappears Effervescence occurs (1 mark)	SO_3^{2-}, CO_3^{2-} (1 mark) (2 marks)
II Changes from orange to green (1 mark)	SO_3^{2-} present (1 mark) (2 marks)

3 (a)

Observations	Inferences
- Burns with a blue flame (1 mark)	Saturated compound or Short-chain hydrocarbon (1 mark)

(2 marks)

(b)

Observations	Inferences
- No effervescence (1 mark)	Not acidic (1 mark)

(2 marks)

(c)

Observations	Inferences
- colour changes from orange to green (1 mark)	R - OH present (1 mark)

(2 marks)