

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 cm³ (½ mark)

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

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

(iii) moles of the dibasic acid used;

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

= 0.0014675 moles

(1 mark)

(iv) moles of NaOH in 25.0 cm³.

= (0.0014657 x 2) = 0.002935 moles

(1 mark)

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

= $\frac{25.0 \text{ cm}^3 \text{ of NaOH}}{1000 \text{ cm}^3} = 0.002935$

= $\frac{0.002935}{1} = 0.1174 \text{ M}$

(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 cm³ (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 × 2)
 = 0.001145 moles (1 mark)

(iv) moles of NaOH that reacted with 25.0cm³ of salt **B** in solution **B**;
 = 0.0029314 - 0.001145
 = 0.0017864 moles (2 marks)

(v) I. moles of salt **B** in 25.0cm³ of solution **B**;
 $\frac{0.0017884 \times \frac{1}{2}}{6} = 0.00089$ moles (1 mark)

II. concentration in moles per litre of salt **B** in solution **B**;
 = $0.00089 \times \frac{1000}{25}$
 = 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 - Gas which turns red litmus paper blue - Brown solid formed (2 marks)	Inferences NH ₄ ⁺ present (1 mark)
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(3 marks)

(ii)	Observations - Yellow / brown solution - Brown ppt (1 mark)	Inferences Fe ³⁺ formed (1 mark)
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(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)
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)