

CHEMISTRY PAPER 3 ANSWERS

KCSE 2012

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3029 – 00200, Nairobi

Coordinated by KENPRO, Macjo Arcade, 4th Floor, Suite 15E, Off Magadi Road, Ongata Rongai |Tel:
+254202319748 |
E-mail: infosnkenya@gmail.com | Website: www.schoolsnetkenya.com/

1. Table 1

	I	II	III
Final burette reading	17.45	32.90	36.05
Initial burette reading	2.10	17.45	20.60
Volume of solution B used (cm ³)	15.35	15.45	15.45

(4 marks)

(a) (i) Average volume

$$= \frac{15.35 + 15.45 + 15.45}{3}$$

$$= 15.42 \text{ cm}^3$$

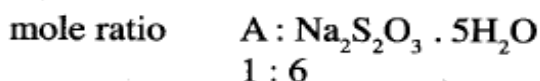
(1 mark)

(ii) Moles of sodium thiosulphate used

$$= \frac{0.05 \times 15.42}{1000} \quad \left(\frac{1}{2}\right)$$

$$7.71 \times 10^{-4} \text{ moles} \quad \left(\frac{1}{2}\right)$$

(1 mark)

(b) (i) Number of moles of A in 25.0 cm³

$$7.71 \times 10^{-4} / 6 = 1.28 \times 10^{-4} \text{ moles}$$

(1 mark)

(ii) Concentration of solution A in mol dm³

$$\begin{array}{l} 1.28 \times 10^{-4} \text{ moles in } 25 \text{ cm}^3 \\ ? \text{ moles in } 1000 \text{ cm}^3 \end{array}$$

$$1.28 \times 10^{-4} \times 1000 / 25 \quad (1)$$

$$5.12 \times 10^{-3} \text{ moles/dm}^3 \quad (1)$$

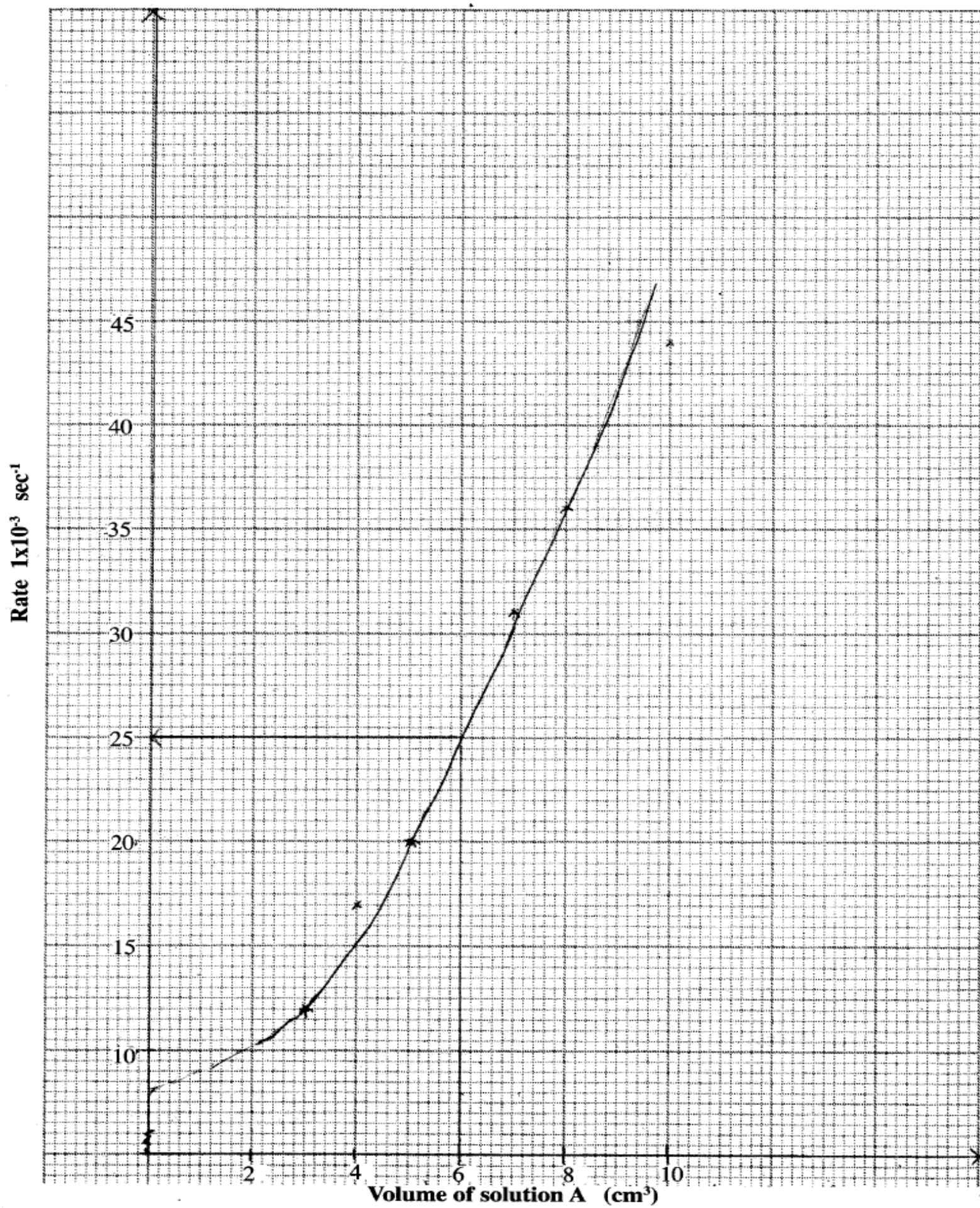
(2 marks)

Table 2

Test tube number	1	2	3	4	5	6
Volume of distilled water (cm ³)	0	2	3	5	6	7
Volume of solution A (cm ³)	10	8	7	5	4	3
Time (s)	22.5	28.0	32.0	50.0	57.5	85.0
Rate = $\frac{1}{\text{Time}}$ (s ⁻¹)	0.044	0.036	0.031	0.020	0.017	0.012

(1) (1) (1) (1) (1) (1)

(6 marks)



(b) Time taken for 4cm³ of distilled water.

∴ 6cm³ of solution A is added.
 from the graph = $25 \times 10^{-3} \text{ sec}^{-1}$
 = 40 seconds

(1)

(1)

(2 marks)

2. Observation

(a) (i)	(I)	A white precipitate (1)	Presence of Pb ²⁺ , Ba ²⁺ or Ca ²⁺ (1) <i>1 mark for all the 3 ions</i> <i>½ mark for 2 correct ions</i> <i>0 mark for one or none</i>
	(II)	No white precipitate (1)	Absence of Pb ²⁺ (1)
	(III)	No white precipitate (1)	SO ₄ ²⁻ , SO ₃ ²⁻ , CO ₃ ²⁻ ions absent (1) <i>1 mark all the 3</i> <i>½ mark for 2 ions correct</i> <i>0 mark for one or none</i>
	(IV)	No white precipitate (1)	Cl ⁻ ions absent (1)
(ii)		Effervescence ½/Bubbles/Fizzing Colourless gas produced ½ Turns red litmus blue ½ Blue litmus remained blue ½ (2 marks)	NO ₃ ⁻ present (1)
			(Total 11 marks)

	Observations	Inferences
(a)	No effervescence (1)	Compound/solution F not acidic H ⁺ or R-COOH absent. (1)
(b) (i)	Burns with a sooty/smoky $\frac{1}{2}$ luminous/yellow flame $\frac{1}{2}$	Unsaturated cpd (1) $>C=C<$ Long chain hydrocarbon or $-C\equiv C-$
(ii)	Some white suspension/solid remains undissolved $\frac{1}{2}$	Compound slightly/partially soluble in water $\frac{1}{2}$
(c) (i)	Effervescence $\frac{1}{2}$ Colourless gas produced $\frac{1}{2}$	Mixture is acidic (1) RCOOH present
(ii)	Not decolourized (1)	$\begin{array}{c} \diagdown \text{C}=\text{C} \diagup \\ \text{---C}\equiv\text{C---} \end{array}$ absent (1) absent

(Total 9 marks)