

# FOCUS A365

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Name.....

Index No...../.....

School.....

Candidates Signature.....

Date .....

*Kenya Certificate of Secondary Education (K.C.S.E)*

## CHEMISTRY

Paper 3

PRACTICAL

2 ¼

### Instructions to candidates

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided in the question paper.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

**For Examiners use only.**

Question	Maximum Score	Candidates Score
1	12	
2	12	
3	16	
<b>TOTAL SCORE</b>	40	

1. You are provided with:

- 3.0g of dibasic acid  $H_2X$ , solid **W**
- Aqueous Sodium hydroxide solution **K**
- Aqueous hydrochloric acid containing 7.3g per litre, solution **M**

You are required to:

Determine the concentration of sodium hydroxide, solution **K** in moles per litre. Work out the concentration of solution **W**

**Procedure I**

Fill the burette with solution **M**. pipette  $25\text{cm}^3$  of solution **K** and pour into a conical flask. Add 2 drops of phenolphthalein indicator and titrate against solution **M** from burette. Repeat two more times and complete table 1

Table 1

	I	II	III
Final burette reading ( $\text{cm}^3$ )			
Initial burette reading ( $\text{cm}^3$ )			
Volume of solution used ( $\text{cm}^3$ )			

(5mks)

(a)(i) Work out the average volume of solution **M**

(ii) Calculate the concentration of solution **M** in mole per litre

(2mks)

(iii) Calculate the number of moles of solution **K** present in one litre of its solution

(2mks)

**Procedure II**

Using a 100ml measuring cylinder, measure  $40\text{cm}^3$  of distilled water and add the whole of solid **W** to the water in a measuring cylinder. Shake to dissolve solid **W** and add more distilled water to make a total volume of  $50\text{cm}^3$  of the solution. Transfer the solution into an empty beaker. Measure accurately  $25.0\text{cm}^3$  of the solution using a 100ml measuring cylinder and then add distilled water to make 100ml of the solution and label it solution **W**. pipette  $25.0\text{cm}^3$  of solution **K** into a conical flask and add two drops of Methyl orange indicator. Titrate against solution **W** from burette. Repeat two more times and record your results in table II below

Table II

	I	II	III
Final burette reading ( $\text{cm}^3$ )			
Initial burette reading ( $\text{cm}^3$ )			
Volume of solution used ( $\text{cm}^3$ )			

(5mks)

(a) What is the average volume of solution **W** used?

.....

(b) Calculate the:

(i) Mole of solution **W** that reacted with solution **K** ( reaction ratio=2:1,2 mole of **K** react with 1 mole of **W**) (2mks)

(ii) Mole of solution **W** in 100cm<sup>3</sup> of solution (2mks)

(iii) Moles per litre of the original solution made when solid **W** was dissolved (2mks)

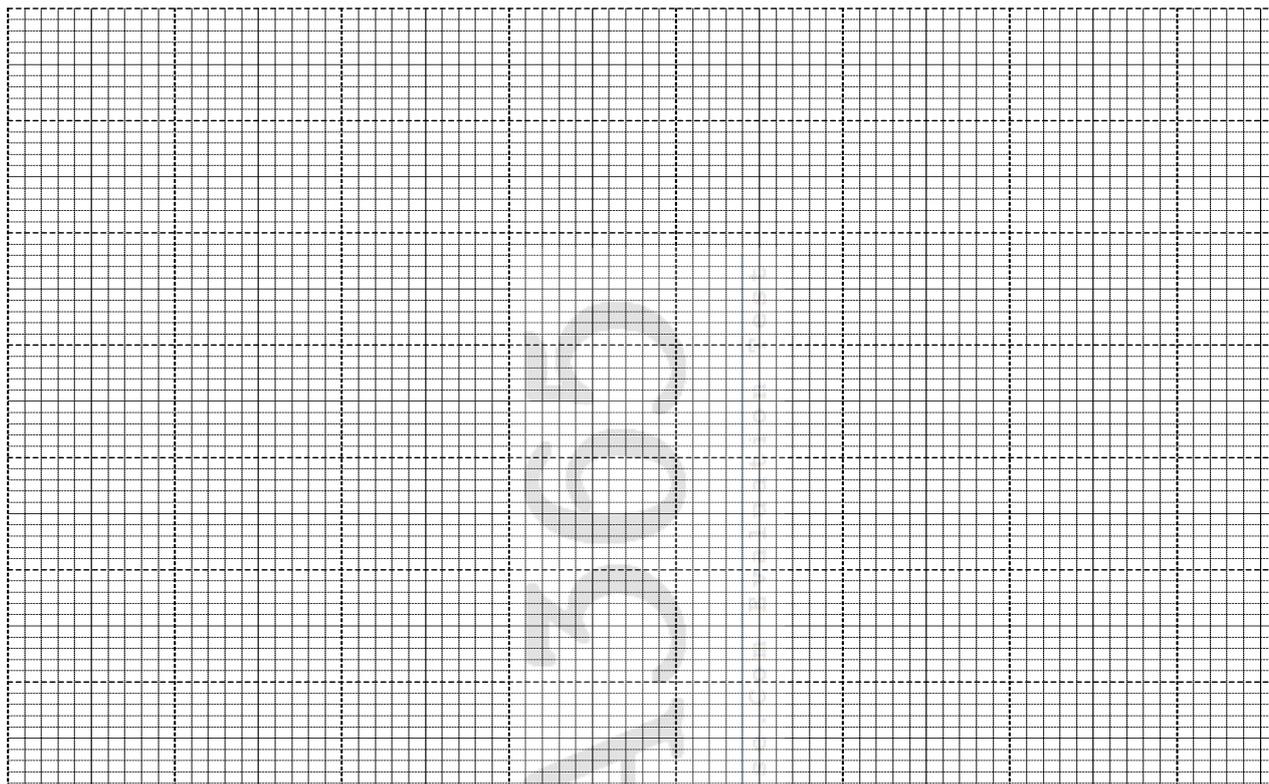
2. You are provided with solid **D** weighed exactly of 4.0g  
You are required to determine the solubility of solid **D** at difference temperatures

**Procedure**

- (i) Fill a clean burette of distilled water to a boiling tube containing all the solid provide
- (ii) Transfer 4cm<sup>3</sup> of distilled water to a boiling tube containing all the solid **D** provided
- (iii) Heat the mixture while stirring with the thermometer to a temperature of about 80°C when the entire solid will have dissolved
- (iv) Allow the solution to cool while stirring with thermometer. Note the temperature at which crystals start to appear and record the temperature in the table below.
- (v) To the same solution, add 2cm<sup>3</sup> of distilled water from the burette, heat the mixture while stirring with the thermometer to a temperature of about 80°C when the entire solid will have dissolved.
- (vi) Allow the mixture to cool and record the temperature at which crystals first appear in the table below
- (vii) Repeat procedure (v) and (vi) three more times and record the temperature in the table
- (viii) Complete the table of solubility of solid **D** at different temperatures

Volume of water in boiling tube (cm <sup>3</sup> )	Temperature at which crystals first appear (oC)	Solubility of solid <b>D</b> in g/100g of water
4		
6		
8		
10		
12		

(a) On the grid provided plot a graph of solubility of solid **D** against temperature (3mks)



(b) Hence determine the mass of solid deposited when solution is cooled from 55°C to 50°C (1mk)

(c) Use your graph to determine the temperature at which 80g of solid **D** would dissolve in 100g of water. (1mk)

3. (a) You are provided with solid **N**. Carry out the tests below. Write your observations and inferences in the spaces provided

(i) Heat about one third of solid **N** in a clean dry test-tube. Test the gases produced with both blue and red litmus papers.

Observations	Inferences
(1mk)	(1mk)

(ii) Using a boiling tube, dissolve the rest of solid N in about 10cm<sup>3</sup> of distilled water and use the solution for the tests below.

(I) To about 2cm<sup>3</sup> of the solution, add 5cm<sup>3</sup> of solution P (Aqueous sodium carbonate)

Observations	Inferences
(1mk)	(1mk)

(II) To 2cm<sup>3</sup> of the solution, add about 4cm<sup>3</sup> of aqueous ammonia drop wise until in excess

Observations	Inferences
(1mk)	(1mk)

(III) To 2cm<sup>3</sup> of the solution, add about 4cm<sup>3</sup> of aqueous barium nitrate

Observations	Inferences
(1mk)	(1mk)

(IV) To the mixture obtained in III above, add about 2cm<sup>3</sup> of dilute hydrochloric acid

Observations	Inferences
(1mk)	(1mk)