

07

REGISTRATION CENTER NUMBER		CENTER NAME	
CANDIDATE'S FULL NAME			
CANDIDATE'S IDENTIFICATION NUMBER	SUBJECT CODE 0715	PAPER NUMBER 3	
FOR OFFICIAL USE ONLY (Candidate random Code)			
CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD ADVANCED LEVEL EXAMINATION			
SUBJECT TITLE CHEMISTRY	SUBJECT CODE 0715	PAPER NUMBER 3	
		EXAMINATION DATE: MARCH 2021	

THREE HOURS

Enter the information required in the boxes above.

Do not write in pencil except for graphs

You are reminded of the necessity for good English and orderly presentation in your answers.

Your results must be recorded in the spaces provided in this question booklet. No further descriptions of the experiments are required. Candidates must allow for themselves enough time to complete and check their calculations where these required. In calculations you are advised to show all the steps in your working.

SAFETY SPECTACLES should be worn for all practical work. Candidates are reminded that many chemicals are POISONOUS. PIPETTE FILLERS should be used when appropriate.

Answer BOTH questions. They carry equal marks

Calculators are allowed

TURN OVER

FOR EXAMINERS'S USE ONLY			
Marked by:.....	SCORE		
Signature:..... Date	1	45	
Checked by:.....	2	45	
	SBA	10	
Signature:..... Date	TOTAL	100	

1. You are provided with:
 Solution P, dilute sulphuric acid
 Solution Q, aqueous sodium carbonate
 Solid borax (disodium tetraborate)
 Methyl orange indicator
 You are required to:
 (a) Prepare a solution of the disodium tetraborate (borax) and use it to determine the concentration of sulphuric acid solution.
 (b) Use the sulphuric acid to determine the concentration of sodium carbonate solution.

Previous knowledge of this type of exercise is not required, full details of the procedure are given below.

PROCEDURE

1. Weigh accurately between 4.50g and 4.60g of borax and record the masses in table 1.
 Dissolve the borax in a little distilled water in a beaker with warm water to assist dissolution. Carefully transfer the solution into a 250cm³ volumetric flask and make with distilled water.
2. Using a clean pipette place 25cm³ of the borax solution into a 250cm³ conical flask. Add 2-3 drops of methyl orange indicator and titrate with solution P to the end-point. Record the results of two careful titrations in table 2.
3. Using a suitable rinsed pipette, place 25cm³ of solution Q in a 250cm³ conical flask. Add 2-3 drops of methyl orange indicator and titrate with solution P to the end-point. Record the results of two careful titrations in table 3.

RESULTS

Table 1

Mass of weighing beaker + borax = -----g
 Mass of weighing beaker alone = -----g
 Mass of borax weighed = -----g

Table 2

Burette readings	Approximate	Accurate	Accurate
Second burette reading			
First burette reading			
Titre/cm ³			

Mean titre, (t₁) =cm³ of dilute sulphuric acid reacts with 25cm³ of borax solution.

Table 3

Burette readings	Approximate	Accurate	Accurate
Second burette reading			
First burette reading			
Titre/cm ³			

Mean titre, (t₁) =cm³ of dilute sulphuric acid reacts with 25cm³ of borax solution.

CALCULATION

Borax has relative Molecular mass of 381 and reacts with H_2SO_4 according to the equation;



1. Calculate the concentration (mol dm^{-3}) of the borax solution?

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.....
.....

2. Calculate the concentration (mol dm^{-3}) of the sulphuric acid solution.

.....
.....
.....

3. Calculate the concentration of the Na_2CO_3 solution

(a) In mol dm^{-3}

.....
.....
.....

(b) In g dm^{-3}

.....
.....
.....

Question 2

2. You are provided with two inorganic salts R, S and an organic compound T. Carry out the following tests on R, S and T, recording your observations and inferences in the tables. Then answer the questions that follow the tables

- (a) Carry out a flame test on R

OBSERVATIONS	INFERENCES

(b) To a little of solid R in a dry pyrex test tube, add concentration sulphuric acid (CARE) and warm.

OBSERVATIONS	INFERENCES

(c) Dissolve the remainder of R in 10cm^3 of distilled water. Use portions of the solution for the following tests:

(i) To 2cm^3 of the solution of R add aqueous lead nitrate solution.

OBSERVATIONS	INFERENCES

(ii) To a 2cm^3 of the solution of R add aqueous copper(II)sulphate. Reserve the resulting mixture for test f(ii)

OBSERVATIONS	INFERENCES

(d) Carry out a flame test on a small portion of solid S

OBSERVATIONS	INFERENCES

(e) To little of solid S in a test tube, add dilute hydrochloric acid.

OBSERVATIONS	INFERENCES

(f) Dissolve the remainder of S in 10cm^3 of distilled water. Use portion of the solution for the following tests:

(i) To a 2cm^3 of the solution of S add a few drops of aqueous iron(III)chloride

OBSERVATIONS	INFERENCES

(ii) Add the solution of S to the mixture resulting from test c (ii)

OBSERVATIONS	INFERENCES

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- (g) Shake 1cm^3 of T with 2cm^3 of distilled water. Test the resulting mixture with red and blue litmus papers

OBSERVATIONS	INFERENCE

- (h) To 4cm^3 of potassium dichromate solution, add 1cm^3 of dilute sulphuric acid, then add 1cm^3 of T to the resulting mixture and warm.

OBSERVATIONS	INFERENCE

- (i) To 1cm^3 of T, add 2cm^3 of potassium iodide solution, then 4cm^3 of sodium chlorate(I) (sodium hypochlorite). Warm the mixture and allow it to cool

OBSERVATIONS	INFERENCE

- (j) To 1cm^3 of T, add 1cm^3 of acetic acid, then a few drops of concentrated sulphuric acid. Heat the mixture, then pour it into about 10cm^3 of distilled water in a small beaker.

OBSERVATIONS	INFERENCE

Now answer the following questions

1. Suggest an identity of compound R and S

2. Give the structural formula of compound T