Candidate's Name:	•••••	•••••	•••••	•••••	•••••	•••••	•••••	•••••
Signature:								
		Rando	m No).		Pers	onal	No.

(Do not write your School/ Centre Name or Number anywhere on this booklet) 545/3

CHEMISTRY (PRACTICAL) April./May. 2012 2 hours.

THE CHEMISTRY DEPARTMENT

SENIOR THREE TEST ONE-2012

CHEMISTRY PRACTICAL

Paper 3

2 hours

INSTRUCTIONS:

Answer both questions. Answers are to be written in the spaces provided in this booklet. All your working must be in blue or black ink. Any work done in pencil will not be marked except drawings.

You are not allowed to use reference books (i.e textbooks, booklets on qualitative analysis, etc.).

All working must be clearly shown.

Mathematical tables and silent non-programmable scientific calculators may be used.

For Examiners' Use Only					
Q.1					
Q.2					
Total					

1.	You as	re provided	d with the	following:
	1000	ie pro iraci	<i>x</i> ************************************	10110 111115

BA1 which is a solution containing 5.44g of acid, **J** per dm^3 of solution.

BA2 which is a solution made by dissolving 2.0g of sodium hydroxide to make 250cm³ of solution.

You are required to determine the;

- (i) mole ratio for the reaction between the acid, J and sodium hydroxide.
- (ii) hence the basicity of acid J.

Procedure:

Pipette 25.0 (or 20.0cm³) of **BA2** into a clean conical flask, add 2-3 drops of methyl orange indicator.

Titrate with **BA1** from the burette up to end point. Record your results in table 1.

Repeat the procedure until you obtain consistent results.

Table	1
Result	S

Titration number	1	2	3
Final burette reading(cm ³)			
Initial burette reading(cm ³)			
Volume of BA1 used (cm ³)			

(a) (i)	State	the	volumes	of	BA1	used	to	calculate	,	/2 marks) volume
										cm ³
`	ii) sed		culate			C		volume		½ mark) BA1
									(2)	1 1

 $(2\frac{1}{2} marks)$

(b) Calculate t	ne;	
(i)	number of moles of sodium hydroxide that reacted. (05 marks) $(H = 1; O = 16; Na = 23)$)
• • • • • • • • • • • • • • • • • • • •		
		•
		•
		•
		•
		•
		•
(ii)	number of moles of the acid that reacted. (04 marks) (Formula mass of the acid = 36.5)	
(ii)	,	
(ii)	,	
(ii)	(Formula mass of the acid = 36.5)	
	(Formula mass of the acid = 36.5)	•
	(Formula mass of the acid = 36.5)	•
	(Formula mass of the acid = 36.5)	•
	(Formula mass of the acid = 36.5)	•
	(Formula mass of the acid = 36.5)	•

(c) De	termine the	
(i)	reaction mole ratio for the reaction between the acid and R .	(03 marks)
•••••		
•••••		
(ii)	hence basicity of acid, J .	(02 marks)
2. Yo	ou are provided with the following:	
	BA1 which is a solution containing 0.15 moles per dm^3 of a m	
an im	BA2 which is a solution made by dissolving $6.0gl^{-1}$ of substoure anhydrous sodium carbonate.	ance Y , which is
_	re required to determine the percentage impurity of Y.	
Proce		
Pipett	e 25.0 (or 20.0cm ³) of BA2 into a clean conical flask. A	dd 2-3 drops of
pheno	lphthalein indicator.	

Titrate with BA1 from the burette up to end point. Record your results in table 1.

Repeat the procedure until you obtain consistent results.

Table 1

ette reading(cn rette reading(cn of BA1 used (c	m ³)				
of BA1 used (c					
<u> </u>	m^3)	+			
		A1 used to		average	
Calculate	the	average	volume	of (½ mark BA
				(21/2	/2 mark
•	les of Y t	hat reacted.		(4 1/2	marks
	Calculate	Calculate the	Calculate the average	Calculate the average volume	Calculate the average volume of (24)

.....

(ii) concentration of Y in BA2 in moles per litre. (03 marks))
(iii) mass of Y in one litre of BA2 . (04 marks) $ (C = 12; O = 16; Na = 23) $	
(c) Determine the percentage impurity of Y . (02 marks))
3. You are provided with the following: BA1 which is a 0.15M hydrochloric acid.	
BA2 which is a solution made by dissolving 2.65g of compound $YHCO_3$ to make 500cm^3 of solution.)
You are required to determine formula mass of <i>Y</i> . Procedure:	
Pipette 25.0 (or 20.0cm ³) of BA2 into a clean conical flask, add 2-3 drops of methy.	l
orange indicator.	
Titrate with BA1 from the burette up to end point. Record your results in table 1 .	
Repeat the procedure until you obtain consistent results.	
Table 1	

Results:

7	Titration number	er	1	2	3
Final bu	rette reading(cm	³)			
Initial bu	rette reading(cn	n ³)			
Volume	of BA1 used (cn	n ³)			
) State					· ·
(ii)	Calculate	the	average	volume	(½ mark) of BA1
(i)	number of mol				
(ii)	number of mol	es of YH	CO ₃ that react	ed.	(02 marks)
	Final but Initial but Volume State (ii) used alculate the (i)	Final burette reading(cm Initial burette reading(cm Volume of BA1 used (cm) State the volumes (ii) Calculate used	Final burette reading(cm³) Initial burette reading(cm³) Volume of BA1 used (cm³) State the volumes of BA (ii) Calculate the used	Final burette reading(cm³) Initial burette reading(cm³) Volume of BA1 used (cm³) State the volumes of BA1 used to (ii) Calculate the average used	Final burette reading(cm³) Initial burette reading(cm³) Volume of BA1 used (cm³) State the volumes of BA1 used to calculate a (ii) Calculate the average volume used

(iii) nu	number of moles of $YHCO_3$ in 500cm^3 of BA2 .	(03 marks)
(c) Determine the v	value of Y in YHCO ₃ . $(H = 1; C = 12; O = 16)$	(5 ½ marks)
•	ed with the following: is a 0.15M hydrochloric acid.	
	is a solution containing 13.10g of a hydrated sa	alt, $\boldsymbol{Y}.\boldsymbol{nH_20}$ per litre
of solution.	to determine percentage of water of water	of crystallization in
the hydrated salt. Procedure:	_	of Crystamzation in
	0.0cm ³) of BA2 into a clean conical flask, add	2-3 drops of methyl
orange indicator.		
Titrate with BA1 fr	from the burette up to end point. Record your re	esults in table 1.
Repeat the procedu	are until you obtain consistent results.	
Table 1		

Results:

Γ	7	Titration numb	er	1	2	3
}	Final bu	rette reading(cn	n ³)			
F	Initial bu	rette reading(c	m ³)			
ŀ	Volume	of BA1 used (c	m ³)			
(i)		the volumes				(7 ½ marks) average volumecm ³
	(ii)		the		volume	(½ mark) of BA1
	alculate tl	he; number of mo	les of hyd	lrochloric acid	that reacted.	cm ³ (2½ marks) (1½ marks)
••••	(ii)	number of mo				(02 marks)
				_		ydrochloric ac
••••	• • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • • •	•••••

(iii) concentr	ration of BA2 in mol	es per litre	(03 marks)
(c) Dete	ermine the value of n in 1			(3 ½ marks)
(1)	variae of it in 'i	-	= 16; Y = 100)	(3 /2 mans)
•••••				
(ii)	the percentage	of water of crystalliz	ation in the hydrated	salt, $\boldsymbol{Y}.\boldsymbol{nH_2O}$
				(02 marks)