Name.......Center/Index number....../.....

P525/3
CHEMISTRY
Paper 3
August, 2023
31/4 hours



JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS –AUGUST, 2023

CHEMISTRY

ACTICAL e it in a beaker containing about 20cm3 of

** 250cm³ The contents of the beaker into a 250cm³

3 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

- Answer all questions.
- Answers are to be written in the spaces provided.
- You are not allowed to use any reference books.
- Mathematical tables, slide rulers and non-programmable silent electronic calculators may be used.
- Candidates are not allowed to start working with the apparatus for the first 15 minutes. This time is to ensure that they have all the chemicals and apparatus they may need.
- Atomic masses: C=12, O=16, H=1, N=14, Cl=35.5

For Examiner's Use Only

Q1	Q2 (Sino)	burett EQ ading	TOTAL
	(cm ³)	burette reading	Initia
	THE SEC SHAPE SHAP	ne of FA2	Volue

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	2		
1.	You are provided with the following;		
	FA1; which is a solution containing 45gl ⁻¹ of impu	re potassium dichrom	ate (VI), $K_2Cr_2O_7$
	FA2; Which is sodium thiosulphate solution of unl	cnown concentration.	
	FA3; which is 10% Potassium iodide solution.	diown come	
	IM hydrochloric acid solution		
	Solid W which is Potassium iodate, KIO ₃		
	You are required to		
	(a) Standardise solution FA2 using solid W		
	(b) Determine the percentage purity of potassi	um dichromate in FA	1
The	eory:		
	Iodide ions in solution are oxidized to Iodine by a dichromate(VI) according to the following equation	cidified solutions of I	odate(V) and
	$IO_{3(aq)}^{-} + 6H_{(aq)}^{+} + 5I_{(aq)}^{-} \longrightarrow 3H_2O_{(I)} + 3I_{2(aq)}$	SOOL ALVIII	
	(4) F3112O(1) + 312(ac) 1 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	
	$Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6I^-(aq) \longrightarrow 2Cr^{3+}(aq)$	$+7H_2O_{(1)}+3I_{2(20)}$	
	The iodine liberated quantitatively reacts with soc	lium thiosulnhate solu	ition
	Procedure	num unosuipilate sole	
	CREWISTRY		
	Part A:		
	(a) Weigh accurately about 2.7g of W and place in	t in a heaker containin	g about 20cm ³ of
	distilled water. Stir to dissolve and transfer the	and a bound of the beels	minto a 250cm ³
	Volumetric flask Add many distillad and the	contents of the beak	i into a 250cm
	volumetric flask. Add more distilled water to a solution FA4.		
	(b) Pipette 10cm ³ of FA4 into a clean conical flash	k then add an equal vo	olume of 1M
	hydrochloric acid followed by 10cm3 of soluti	on FA3 to liberate ind	ina
	(c) Titrate the liberated iodine using solution FA2	from the bounds of	inie.
	pole vellow. Add 5 draws of start 1 11 11	from the burette until	the solution turns
	pale yellow. Add 5 drops of starch indicator ar	id continue the titration	on until the blue
	black complex is discharged.		
	(d) Repeat the procedure 2-3 times to obtain consi	stent readings and ent	er your results in
	table I below.	and an annual contraction of the	
	RESULTS:	as indy be ison.	
	그 보는 이 아이를 하는 생물을 보면 아이들을 보면 하셨다. 이번을 하는 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들이 되었다.	res are no allowed.	Condidia
	Mass of Container + W=	This time is 18	(1 ½ marks)
	Mass of Container alone=	g	
	Mass of W used =	g	(½ mark)
	volume of pipette used =	cm ³	
	Table I Stanfinger's Use Output		(4 ½ marks)
	Final burette reading (cm ³)		7 (4 /2 marks)
	Initial burette reading (cm ³)		
	Volume of FA2		
	the state of the s		

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Values of FA2 used to calculate average volume=	(½ mark
BERT 2	
∴ Calculate average volume of FA2= Questions:	
(a) Calculate the number of moles of	
(i) Indate(V) ions in 10cm ³ of EAA	(2 marks)
(O=16, K=39, I=127)	Volume of FA2 use
(ii) Thiosulphate ions, $s_2O_3^{2-}$ in $1 dm^3$ of FA2	(3½ marks)
phate ions, $S_2O_3^2$ in FA2 that reacted. (2 mag	
	-
the company despression and the second second	
<u>r B</u>	· · · · · · · · · · · · · · · · · · ·
Pipette 10cm ³ of FA1 into a clean conical flask, then add an	equal volume of 1M
hydrochloric acid followed by 10cm ³ of solution FA3 to libe	erate iodine.
Titrate the liberated iodine using solution FA2 from the bure	ette until the solution turns p
yellow. Add 5 drops of starch indicator and continue the titr	ation until you obtain a gree
solution.	and antan your regults in to
Repeat the procedure 2-3 times to obtain consistent readings	s and enter your results in ta
II below.	
RESULTS:	(1/ mork)
Volume of pipette used =	(72 IIIai K)
mass and hence the percentage purity of K-Cr-O- in FA4.	

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ic average vo			(½ mark)
		a conserver	(4½ marks)
	o ontak	7 0861776	Questions:
	3	Leave adt 9	
oles of	or or m	d (V) otabe	I (i)
127)	39, I =)=16, K=)
verage volum	e		
			(½ mark)
2 -			
2=			(3 marks)
•••••			
			T (ii)
onbl ni 720		mosuipnats	1 (11)
oles of			
	that rea	cted	(2 marks)
THE PARTY OF THE PARTY.			
daeth leatmoo	mela c	f FAllinto	ARTE (a) Pinette 10 cm ³ o
noo bna rois:	rch indi	rops of sta	vellow. Add 5 d
			solution
obtam consis	imes to	edure 2-3 t	(e) Repeat the proc
			II below.
			RESULTS:
			Volume of pipe
			T <u>.</u>
ence the perc	entage p	purity of K	2Cr ₂ O ₇ in FA1.
ence the perc	entage I	ourity of K	2Cr ₂ O ₇ in FA1.
ence the perc	entage j	ourity of K	2Cr ₂ O ₇ in FA1.
ence the perc	entage p	ourity of K	2Cr2O7 in FA1.
ence the perc	entage p	ourity of K	2Cr ₂ O ₇ in FA1.
	verage volume $2 = \dots$ coles of $3_2O_3^{2-}$ in FA2 as, $Cr_2O_7^{2-}$ in the part of $3_2O_3^{2-}$ in the part of $3_2O_7^{2-}$	verage volume	cerage volume

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You are provided with substance Y which contains two cations and two anions.
 You are required to identify the cations and anions in Y. Carry out the following tests on Y and record your observations and deductions in the table below. Where a gas (es) is (are)evolved, it must be identified.

TESTS	OBSERVATIONS DEDUCTIONS
(a) Heat two spatula endfuls of Y in a dry test tube	suppare solution
first gently and then strongly until there is no further change.	(iv) Use the fourth part of the acidified filtrate to
(b) To two spatula endfuls of Y in a boiling tube, add dilute nitric acid	earry out a test of your own choice to confirm one of the cutons in Y.
dropwise until there is no further change. Decant off the solution	Record test and observations 1 est:
(c)To the decanted solution	
in (b), add dilute sodium hydroxide dropwise until in excess. Shake and filter, keep both the filtrate and residue.	(e) Dissolve the esidue from (c) in diute nitric social. Then divide the acidic solution into four parts.
(d) To the filtrate from (c), add dilute nitric acid	(i) To the first part of the acidic solution add dilute
dropwise until the solution is just acidic. Divide the acidified filtrate into four parts	sodium hydroxide solution drops ise until in excess.
	(ii) To the second part of
(i) To the first part of the acidified filtrate, add dilute sodium hydroxide dropwise until in excess.	the acidic solution, add dilute anmon arsolution di opwise until in excess and leave to stand for 1 monue.

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the acidified filtrate, add dilute ammonia solution	You are provided with substance Y which You are required to identify the cations and record your observations and deduct
dropwise until in excess	(are)evolved, it must be identified.
(iii) To the third part of the	TESTS
acidified filtrate, add 4-	(a)Heat two spatu a endfuls
5 drops of sodium	of Y in a dry test tube
sulphate solution	first gently and then
man or the rank of the man are self-	strongly until there is no
(iv) Use the fourth part of	further change
the acidified filtrate to	4
carry out a test of your	(b) To two spatula endfuls
own choice to confirm	of Y in a boil ag tube.
one of the cations in Y.	add dilute mit ic soid
Record test and	dropwise until there is
observations	no further change.
Test:	Decapt off the solution
This list to less than SeOf in	n FALC because
	(c)To the decanted solution
(e) Dissolve the residue	in (b), add dilute sodium
from (c) in dilute nitric	hydroxide dropwise until
acid. Then divide the	in excess. Shale and
acidic solution into four	filter, keep both the
parts.	filtrate and residue
(ii) Dichromate(VI) ons, Gr ₂ 0	H with the second
(i) To the first part of the	(d) To the filtrate from (c),
acidic solution add dilute	add dilute nitric soid
sodium hydroxide	dropwise until the
solution dropwise until in	solution is just acidic.
excess.	Divide the aridified
3.333.	filtrate into four parts
(ii) To the second part of	The state of the s
the acidic solution, add	(i) To the first part of the
dilute ammonia solution	acientied filtrate, add
dropwise until in excess	dilute sodius
and leave to stand for 1	hydroxide dropwise
minute.	until in excess.
("") The standard of the	
(iii) To the third part of the	
acidic solution, add 3-4	AND THE REAL PROPERTY OF THE PARTY OF THE PA

drops of dilute sodium sulphate solution	mixture in ((ii), add
(iv) Use the fourth part of the acidic solution to carry out a test of your own choice to confirm one of the cations in Y. Record test and observations Test:	(id)To the third portion of the filtrate, add 3-4 drops of acidified potassium manganite(vii) solution and heat gently
bng.	(g) Identify the
(f) To two spatula endfuls of Y in a boiling tube, add about 4 cm³ of water, shake vigorously and filter. Keep both the filtrate and residue. Divide the filtrate into three portions	The shorts (1)
(i) To the first portion of the filtrate, add 3-4 drops of Barium nitrate solution	
(ii) To the second portion of the filtrate, add an equal volume of silver nitrate solution. Divide the resultant mixture into two parts.	
To the first part of the mixture in f(ii), add dilute ammonia solution dropwise until in excess.	

To the second part of the mixture in f(ii), add dilute nitric acid dropwise until in excess.	drops of dilute codium
	(iv) Use the fourth part of
(iii)To the third portion of	
the filtrate, add 3-4 drops of	earry out a less of your
acidified potassium	Y-m anomo od lo ago
manganite(vii) solution and	Record test and
neat gently	obsc. nions
	Tanua Tanua
entify the	
cations in Y:	4
i) anions in Y:	and
i) anions in Y:	and
· total college	Y in a boiling tube, add
	about 4 cm2 of water,
	filter. Keep both the
of Charles by Jestine	filtrate and residue.
	Divide the filtrate into
	three portions
	(i) To the first portion of the
	filtrate, add 3-4 drops of
	(ii) To the second portion of the filtrate,
	(ii) To the second portion of the filtrate, and an equal volume of
	(ii) To the second portion of the filtrate, and an equal volume of silver nitrate solution.
	(ii) To the second portion of the filtrate, a Ld an equal volume of silver nitrate solution. Divide the resultant
	(ii) To the second portion of the filtrate, a 4d an equal volume of silver nitrate solution. Divide the resultant mixture electric two parts
	(ii) To the second portion of the filtrate, a ld an equal volume of silver nitrate solution. Divide the resultant relation of the first part of the
	(ii) To the second portion of the filtrate, a 4 an equal volume of silver nitrate solution. Divide the resultant mixture efect two parts

3. You are provided with substance H which is an organic compound. You are required to determine the nature of H. Carryout the following tests on H and record four observations and deductions in the table below. (16 marks)

TESTS	OBSERVATIONS DEDUCTIONS
(a) Burn a small amount of	sorgion and near the
H on spatula end or in a	
porcelain dish.	
	(f) To 3 cm ³ of silver nitrate
(1) (1) 1 1 2 077	solution, add 2 drops of
(b) Shake 1 cm ³ of H with	dilute sodium hydroxide.
about 4cm³ of water.	Then add ammonia
Test the solution with	solution dropwise until
litmus paper and divide	the precipitate just
into three parts.	dissolves. Add 1cm³ of
(i) To the first part of the	mrsw bas H
solution, add 2-3 drops	
of iron(iii) chloride	Comment on the nature of H.
solution.	
(ii) To the second part of	
the solution, add 5 drops	
of acidified potassium	
dichromate (VI) solution	
and heat gently	
(c) To the third part of the	
solution, add 2,4	
dinitrophenyl hydrazine	
solution dropwise until	
in excess.	
(d) Dissolve 0.5cm ³ of H in	
about 1cm ³ of	
methanol. To the	
solution and 4cm ³ of	
iodine solution	
followed by sodium	
hydroxide dropwise	
until the solution	
becomes pale yellow.	

Heat the mixture and allow it to stand.	3. You are pre-aded with substance H which is as on determine the nature of H. Carryout the following
(e)To 1 cm ³ of H, add an equal volume of Fehlings solution and heat the	and deductions in the table below. IFSTS OBSERVAT
mixture.	(a) Burn a small amount of H on spanula rad or in a
(f) To 3 cm ³ of silver nitrate solution, add 2 drops of	tain minlasson
dilute sodium hydroxide. Then add ammonia solution dropwise until	(b) Shake I cm ² of H with about 4cm ² of water. Test the solution with
the precipitate just dissolves. Add 1cm ³ of	lismus paper and divide into three pars.
H and warm	(i) I withe first part of the

Comment on the nature of H.	solution, add 2-3 drops of iron(iii) chloride solution.
	(ii) To the second part of the solution, add 5 drops of acidified potassium dichromate (VI) solution and heat gently
	(c) To the third part of the solution, add 2.4 dinitrophenyl hydrazine solution dropwise until in excess.
	(d) Dissolve 0.5cm, of H in about 1cm, of methanol. To the solution and 4cm, of ioduse solution followed by sodium hydroxide dropwise amit the solution becames pale yellow.