P525/2 CHEMISTRY Paper 2 2½ hrs

STANDARD HIGH SCHOOL ZZANA

Uganda Advanced Certificate of Education CHEMISTRY

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer **five** (5) questions in this paper including **three** (3) questions from Section **A** and any **two** (2) questions from Section **B**.

Begin each question on a **fresh** page, therefore all answers **must** be Cleary shown on the same sheet of answer sheet.

No paper should be given for rough work.

Silent non – programmable electronic scientific calculators may be used.

Mathematical tables and graph papers are to be provided.

Illustrate your answers with relevant chemical equations where applicable.

Where necessary use C = 12, O = 16, H = 1, 1 mole of a gas occupies $22400cm^3$ at stp.

Turn Over

SECTION A: (60 marks)

Answer three questions from this section.

1.	(a)	Explain how the following factors vary with the group.			
		(i)	electro positivity,	(04 marks)	
		(ii)	ionisation energy,	(03 marks)	
		(iii)	atomic radius.	(04 marks)	
	(b)	Beryllium can react with sodium hydroxide solution like aluminium unlike other group <i>II</i> members.			
		(i)	Write the equation for the reaction of beryllium and aluminissodium hydroxide solution.	um with (03 marks)	
		(ii)	Mention three properties in which beryllium shows similar aluminium.	ties with (03 marks)	
		(iii)	Explain why beryllium differs from other members of chemical behavior.	group II in (02 marks)	
		(iv)	Name two other elements which show similar relative beryllium and aluminium.	onships like (01 mark)	
2.	(a)	Write equations to show how the following compounds can be synthesized. (04 marks)			
		(i)	phenyl amine from nitro benzane,	,	
		(ii)	amino ethane from bromo ethane,		
		(iii)	propan-2-one from propan-2-ol,		
		(iv)	ethanol from chloroethane.		
	(b)	Which one of phenyl amine and ethyl amine is a stronger base? Explain your answer. (03 marks)			
	(c)	Write equations for each of the compounds phenylamine and ethylamine reacting with;			
		(i)	ethanoyl chloride,	(02 marks)	
		(ii)	acidified solution of sodium nitrite at $5^{\circ}C$,	(02 marks)	
	(d)	Phenylamine can be converted to benzene diazonium chloride. Write equations for the conversion of diazonium salt into:			
		(i)	iodobenzene,	(01 mark)	
		(ii)	benzoic acid.	(04 marks)	

Calculate the pH of a 0.4M ethanoic acid solution. State any (ii) assumptions made ($Ka = 1.8 \times 10^{-5} mol \ dm^{-3}$). (04 marks) What is meant by a buffer solution. (b) (i) (04 marks) Calculate the pH of a buffer solution made by mixing $15cm^3$ of 0.01M(ii) ethanoic acid, $Ka = 1.8 \times 10^{-5} mol \ dm^{-3}$ with $25 cm^3$ of 0.1 M(04 marks) sodium ethanoate solution. Draw a graph to show the pH changes when a strong acid is titrated with a (c) weak base and explain it's shape. (06 marks) 4. Define the term standard electrode potential. (02 marks) (a) (i) Give reasons why it is not possible to measure standard electrode (ii) potential absolutely. (02 marks) Explain the factors that affect the value of standard electrode potential. (iii) (06 marks) Describe; (b) (i) a standard hydrogen half cell, (02 marks) how you would measure standard electrode potential of a material in a (ii) solution of it's ions. (03 marks) The standard electrode potential of copper and zinc are given below. (c) $Cu^{2+}(aa) + 2e \rightarrow Cu(s)$ E = +0.34V $Zn^{2+}(aq) + 2e \rightarrow Zn(s)$ E = -0.76VWrite the cell notation for a zinc / copper cell and calculate the emf of the cell. (03 marks) State **two** ways by which an electrolytic cell differs from an emf cell. (d) (02 marks) **SECTION B: (40 marks)** Answer **two** questions from this section. 5. Briefly describe how sulphuric acid can be manufactured from iron pyrite. (a) (08 marks) Describe the process of extraction of iron from haematite. (b) (12 marks)

3.

6.

(i)

(ii)

(a)

(a)

(i)

What is meant by a weak acid?

(04 marks)

(01 mark)

(02 marks)

State any **four** properties of a primary standard.

Define a primary standard.

(iii)	Name one other substance other than oxalic acid which can	n be used as a
	primary standard for potassium manganate(VII).	(01 mark)

- (b) Explain why hydrochloric acid is not used to acidify solution of potassium manganate(*VII*). (04 marks)
- (c) Acidified potassium manganate(VII) reacts with oxalic acid.

Write the;

(i) half equations for the reaction,

(02 marks)

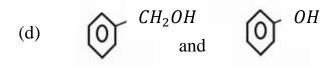
(ii) overall equation for the reaction.

(02 marks)

- (d) $10.0cm^3$ of 0.02M manganate(VII) ion solution required exactly $16.65cm^3$ of a solution containing $3.78gl^{-1}$ of $X_2C_2O_4$. $2H_2O$. Calculate the atomic mass of X. (06 marks)
- 7. For each of the following pairs of compounds, name **one** reagent that can be used to
 - (i) test for the functional group,
 - (ii) distinguish between each of the pairs.

Your answer should include the relevant observations. (05 marks each)

- (a) $CH_3CH_2CH_2OH$ and $CH_3C(CH_3)_2OH$.
- (b) $CH_3 CCH_3$ and $CH_3CH_2CH_2CHO$
- (c) CH_3CHO and $CH_3CH_2CH_2CHO$.



- 8. (a) Magnesium and barium react with steam and water respectively. State what is observed and write equations for the reactions in each case. (06 marks)
 - (b) Compare the reaction of beryllium and barium with sulphuric acid under various conditions. (08 marks)
 - (c) Describe the reactions of fluorine, chlorine and bromine with water. (06 marks)

END