

## SAMPLE PAPER 2

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### Paper 1

1. During the extraction of copper from copper pyrite ( $\text{CuFeS}_2$ ), some of the processes include.
- Crushing the ore
  - Mixing the crushed ore with water, oil and bubbling air through it.
  - Roasting the ore
  - What name is given to process (ii) and give its use (1mk)

b) Write equation for roasting of the copper pyrite (1mk)

c) Give one use of the copper metal.

2. Sodium hydrogen carbonate reacts with nitric acid according to the equation below.



4.2 g of sodium hydrogen carbonate was reacted with  $100\text{cm}^3$  of 1M nitric acid. Molar gas volume at room temperature and pressure =  $24\text{dm}^3$ . Na = 23, O = 16, H=1, C = 12.

a) Determine the reagent that was in excess. 2mks

b) Calculate the volume of carbon (IV) oxide that was liberated at room temperature and pressure.

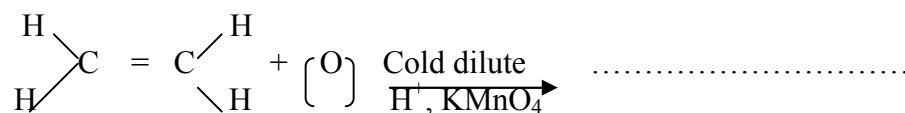
1mk

3. a) State and explain Boyle's law on the behaviour of gases. 2mks
- b) State two conditions under which real or natural gases are likely to behave like ideal or perfect gases.

4. (a) Name the following compounds.



b) Complete the following equation.



5. The table below gives some elements in the periodic table. Use it to answer the questions that follow. The letter do not represent the actual symbols.

Element	A	B	C	D	E
Atomic Number	12	13	14	15	16

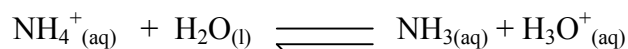
Which of the following letters represent

- a) A non metallic element with the largest atomic size? Explain
- b) A metallic element which form ions with the smallest ionic radius? Explain 1½mks
6. The table below shows the pH values of solutions J to N

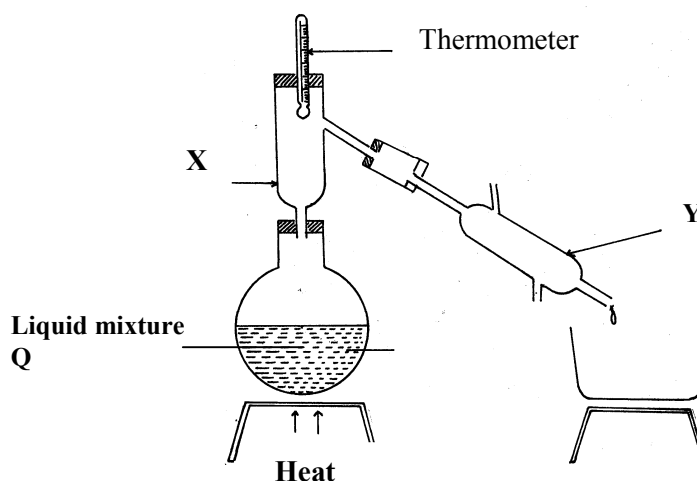
<b>Solution</b>	J	K	L	M	N
<b>pH</b>	5	13	2	10	7

- a) Which solution
- (i) Contains the largest concentration of hydroxides ions?  
1½mks
- (ii) is likely to be a solution of acetic acid? 1½mks
- b) In the equation below, identify the reagent that acts as an acid in the forward reaction.  
Give a reason.

2mks



7. Study the diagram below and answer the questions that follow. The diagram shows the method used to separate components of mixture Q



- a) Name X and Y 1mk
- b) What is the purpose of apparatus X? ½ mks
- c) Show the direction of flow of cold water used for cooling the vapour formed. ½ mk
- d) What name is given to the above method of separating mixtures? 1mk
8. Explain the following observations.
- a) Alkaline earth metals are generally less reactive than alkali metals. 1mk
- b) The order of reactivity increases down group 1 but decreases down group (vii).2mks

9. Describe briefly a simple test which would be used to distinguish between the following ions in the solution. Give the result of the test in each case.

a)  $Zn^{2+}_{(aq)}$  and  $Fe^{2+}_{(aq)}$  1 ½ mks

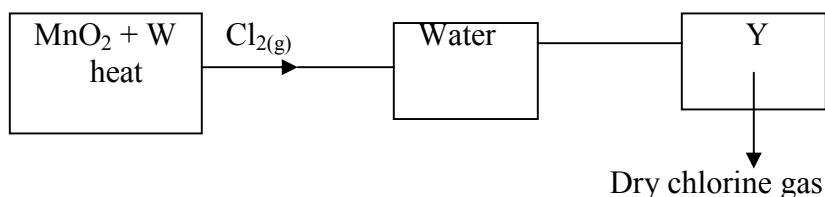
b)  $CO_3^{2-}_{(aq)}$  and  $SO_3^{2-}_{(aq)}$  1 ½ mks

10. The atomic number of element A is 11 and that of B is 8.

a) Write down the possible formulae of compound formed between A and B. 1mk

b) Draw a diagram using dots (.) and crosses (x) to show the bonding in the compound formed. 2mks

11. The flow chart below shows laboratory preparation of chlorine gas. Study it and answer the questions that follow.



a) Name substances.

1mk

W

Y

b) Explain whether heating would be necessary if potassium manganate (VII) was used instead of Manganese (IV) Oxide ( $MnO_2$ ) 1mk

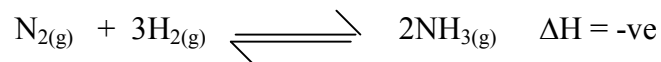
c) What is the function of water in the above set up? 1mk

12. Explain using chemical means how you will differentiate between carbon (ii) oxide and carbon (IV) oxide.

1mk

13. a) What condition is necessary for chemical equilibrium to be established? 1mk

b) The production of ammonia gas involves a reversible reaction as shown

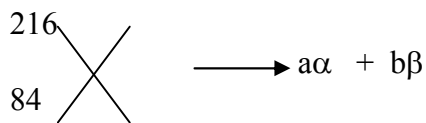


Suggest two conditions that are likely to shift the equilibrium from right to left. 2mks

14. An unknown mass of anhydrous potassium carbonate was dissolved in water and the solution made up to  $200cm^3$ .  $25cm^3$  of this solution neutralized  $18.0cm^3$  of  $0.22M$  nitric (v) acid. Calculate the unknown mass of potassium carbonate ( $K=39$ ,  $C=12$ ,  $O=16$ ) 3mks

15. a) State two factors which determine the stability of an isotope. 1mk

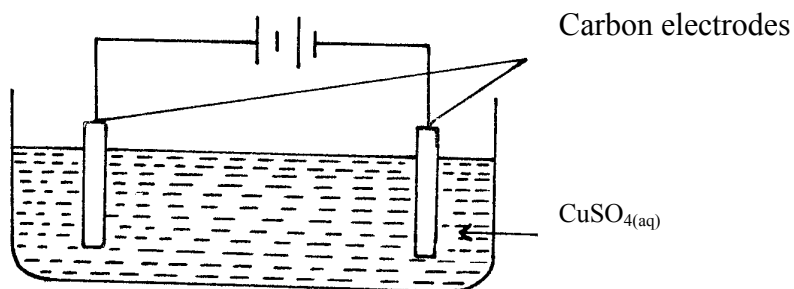
b) A radioactive element x decays as shown below.



Determine the values of a and b

2mks

16. Study the diagram below and answer the questions that follow.



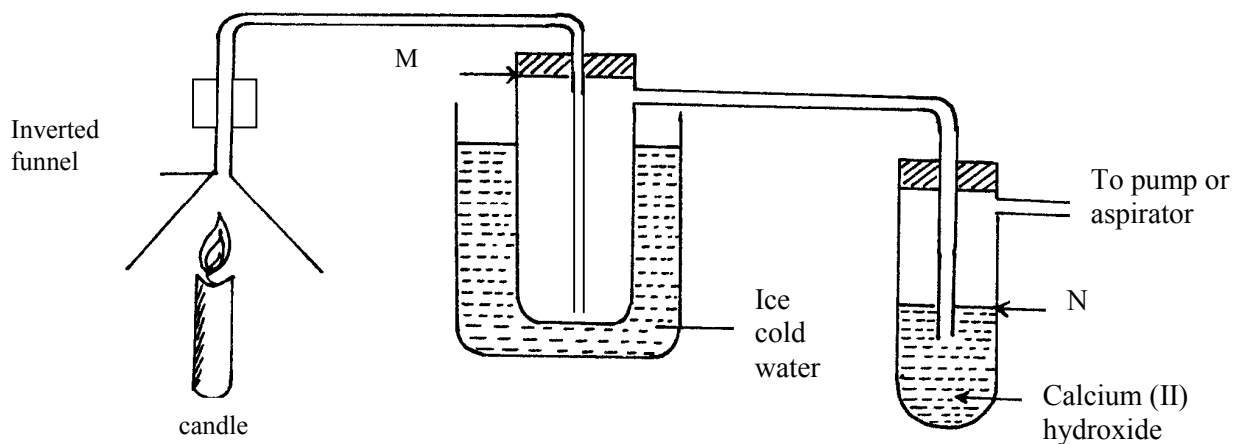
a) State any two observations made during the experiment.

2mks

b) What is the likely pH of the resultant solution at the end of experiment?

1mk

17. A candle was burnt in air as shown below by a form one student. He made some observations as the burning progresses.



a) State the observations made at.

2mks

M

N

18. During heating of a hydrated copper (II) sulphate crystals, the following readings were got.

Mass of evaporating dish = 300g

Mass of evaporating dish + hydrated salt = 305g

Mass of evaporating dish + dehydrated salt = 303.2g

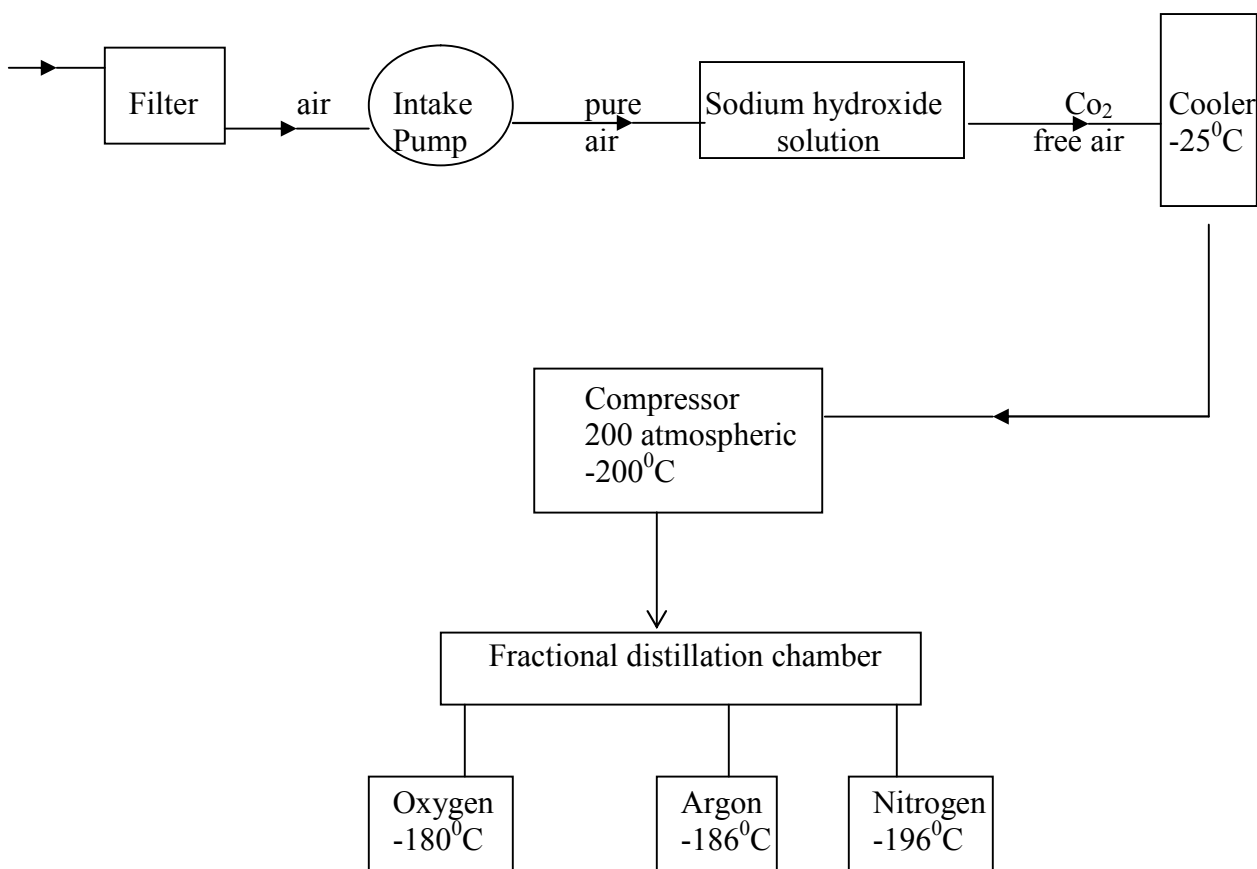
Calculate the empirical formula of hydrated copper (II) sulphate.

(Cu = 64.5, S=32, O=16, H=1)

3mks

19. Write down an ionic equation between sodium hydroxide solution and dilute hydrochloric acid. 1mk

20. Study the flow diagram below for the industrial manufacture of oxygen and nitrogen and answer the questions that follow.



a) Explain how gaseous air is turned into liquid air at the compressor. 2mks

b) Carbon (iv) oxide is first removed from the air before the air is passed into the cooler at  $-25^{\circ}\text{C}$ . Why is this done? 1mk

21. When magnesium ribbon is burnt in air and the product dissolved in water, a colourless solution is formed and a colourless gas is evolved.

(i) What effect does the solution formed have on litmus paper? 1mk

(ii) Name the compound responsible for the production of the colourless gas. 1mk

(iii) Write down a balanced chemical equation for the reaction producing the colourless gas.

22. The following are some half cell electrode potentials with respect to copper.

E/V

$K^+_{(aq)} + e^-$	$\longrightarrow$	$K_{(s)}$	-2.99
$Na^+_{(aq)} + e^-$	$\longrightarrow$	$Na_{(s)}$	-2.75
$Ca^{2+}_{(aq)} + 2e^-$	$\longrightarrow$	$Ca_{(s)}$	- 2.86
$Cu^{2+}_{(aq)} + 2e^-$	$\longrightarrow$	$Cu_{(s)}$	0.00
$Hg^{2+}_{(aq)} + 2e^-$	$\longrightarrow$	$Hg_{(l)}$	+0.87
$Ag^+_{(aq)} + e^-$	$\longrightarrow$	$Ag_{(s)}$	+ 0.79

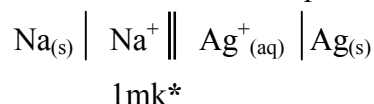
(a) Explain why electrode potential of copper is zero. 1mk

(b) Identify the weakest oxidizing agent and weakest reducing agent. 1mk

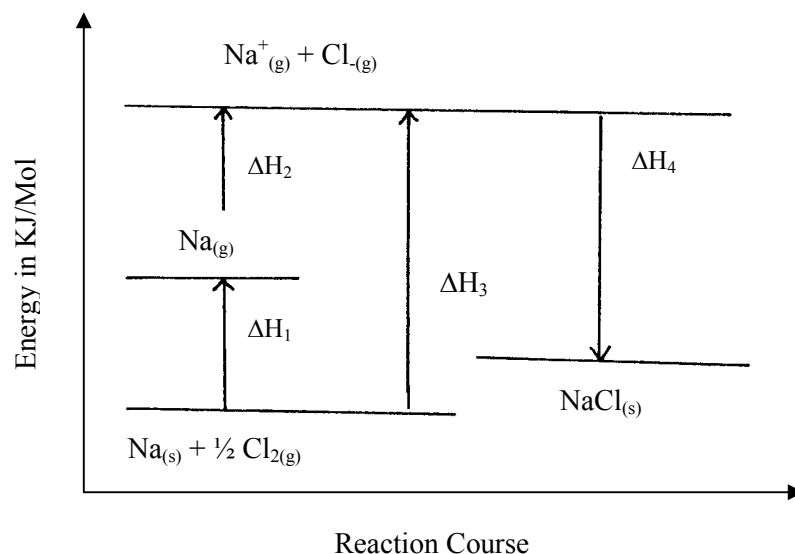
(i) Weakest oxidizing

(ii) Weakest reducing

Work out the e.m.f of a cell represented by



23. Study the energy level diagram below and answer the questions that follow.



a) Identify the enthalpy changes represented by

$\Delta H_1$  1/2 mk

$\Delta H_2$  1/2 mk

$\Delta H_4$  1/2 mk

b) Given that

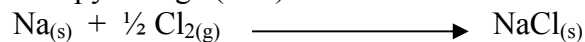
$$\Delta H_1 = + 434 \text{ KJ/Mol}$$

$$\Delta H_2 = + 371 \text{ KJ/Mol}$$

$$\Delta H_3 = + 483 \text{ KJ/Mol}$$

$$\Delta H_4 = - 781 \text{ KJ /Mol}$$

Calculate the enthalpy change ( $\Delta H$ ) for the reaction.



24. a) State and explain two factors which make nitrogen unreactive. 2mks

- b) State the property of nitrogen that makes it suitable for use as a refrigerant. 1mk
25. The table below gives some properties of substances G H I and J. Study it and answer the questions that follow.

Substance	Solubility in water	Electrical conductivity		M.Pt °C	B.Pt °C
		Solid state	Liquid state		
G	Insoluble	Doesn't conduct	Doesn't conduct	High	High
H	Slightly soluble	Doesn't conduct	Doesn't conduct	Low	Low
I	Soluble	Doesn't conduct	Conducts	High	High
J	Insoluble	Conducts	Conducts	High	high

- a) Select the substance which is likely to be copper metal. Give reason. 1 ½ mk
- b) What type of bond structure exists in substance G. Give a reason. 1 ½ mk
26. Below is a sample of the periodic table.

							M	
						Q		
	I						N	
K	L		P					

- a) Give the family name to which element M and N belong. 1mk
- b) Compare the reactivity of elements K and L. Give a reason. 1mk
- c) Write the formula of the compound formed when P reacts with Q. 1mk
27. a) Explain why sulphur melts over a range of temperature. 1mk
- c) What is the role of super heated water in this extraction of sulphur in the Frasch process?  
2mks
28. Name the cleaning agent below. 1mk

