

233/1  
CHEMISTRY  
PAPER 1

TIME: 2 HOURS

2021 TRIAL 3 OCT/NOVEMBER INTERNAL EXAMINATION

*Kenya Certificate of Secondary Education (K.C.S.E.)*

Name.....

Adm No.....

Stream.....

Date .....

Sign .....

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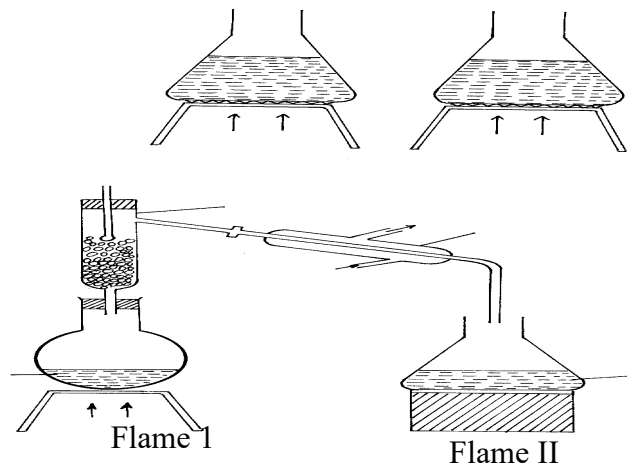
**INSTRUCTIONS TO CANDIDATES:**

- (i) Write your **name** and **index number** in the spaces provided **above**.
- (ii) **Sign** and write the **date** of examination in the spaces provided **above**.
- (iii) Answer **ALL** the questions in the spaces provided.
- (iv) Mathematical tables and silent electronic calculators **may be** used.
- (v) All working **must be** clearly shown where necessary.
- (vi) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

**For Examiner's Use Only**

Questions	Maximum Score	Candidate's Score
1 –30	80	

1. The samples of equal volumes of water were put in 100cm<sup>3</sup> conical flasks and heated for 5 minutes on a Bunsen flame. It was observed that sample 1 registered a low temperature than sample II

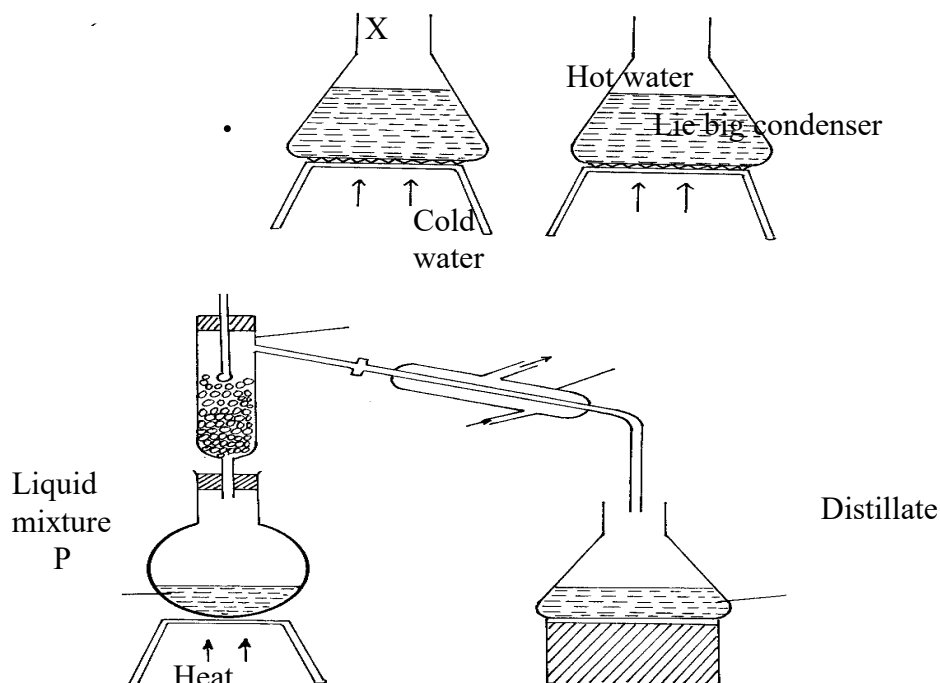


- (a) Name flame I  
(1mk)

- .....  
(b) State one disadvantage of using flame I for heating  
(1mk)

- .....  
2. Study the diagram below and answer the questions that follow.

The diagram shows the method used to separate component of mixture P



(a) Name X  
(1mk)

(b) What is the name given to the method used in separation of mixture P (1/2mk)

(c) What would happen if the inlet and outlet of water were interchanged (1/2mk)

(d) Which physical property is used to separate mixture P (1mk)

3. The table below shows the solubility of three solids P, Q, and R.

Solid	Cold Water	Hot Water
P	soluble	soluble

Q insoluble insoluble  
 R Insoluble soluble  
 How would you obtain pure samples of R,P and Q  
 (2mks)

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4. State why a water molecule  $H_2O$  can combine with  $H^+$  ion to form  $H_3O^+$  ion  
 (1mk)

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5. The  $P^H$  values of some solutions are given below

<b><math>P^H</math></b>	14.0	1.0	8.0	6.5	7.0
<b>Solution</b>	M	L	N	P	Z

(a) Identify the solution with the lowest concentration of hydrogen ion. Give reason for your answer  
 (1mk)

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 .....

(b) Which solution would be used as an anti-acid for treating stomach upset. Give for your answer  
 (1mk)

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6. The data below gives the electronic configuration of some selected atoms and ions

<b>Atom/ion</b>	$A^{2+}$	B	$C^{2-}$	$D^{2+}$	E	$F^-$	$G^+$	H
<b>Electronic configuration</b>	2	2.4	2.8	2.8.8	2.8	2.8.8	0	2.8.2

(a) Select an atom that is a noble gas  
(1mk)

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(b) What is the atomic number of C and A  
(1mk)

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.....

(c) Select an element that belong to group 2 and period four (1mk)

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(d) Write the formula of the compound formed when D and F react  
(1mk)

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7. Helium is used instead of hydrogen in balloons for metrological research. Explain  
(1mk)

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8. Zinc metal and hydrochloric acid reacts according to the following equation



1.96g of Zinc metal were reacted with 100cm<sup>3</sup> of 0.2M hydrochloric acid

a) Determine the reagent that was in excess

(2mks)

Zn=65.2; Molar gas volume at s.t.p 22.4 liters

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(b) Calculate the total volume of hydrogen gas that was liberated at s.t.p  
(1mk)

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9. Give the IUPAC names of the following compounds

(1mk)

(i) .CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH CH<sub>3</sub>

CH<sub>3</sub> .....

(ii)  $\text{CH}_3\text{CH}=\text{CHCl}$  .....  
(1mk)

10. 0.9g of potassium chloride and potassium carbonate mixture completely reacted with  $25\text{cm}^3$  of 0.2M hydrochloric acid

(i) Write an equation of the reaction which takes place  
(1mk)

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(ii) Determine the number of moles of the acid used

(1mk)

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(iii) Calculate the mass of potassium chloride in the mixture (K=39.0; C=12.0; O=16.0)  
(2mks)

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11. Study the flow chart below and answer the questions that follow

(i) Identify metal M: ..... (1mk)

(ii) Colourless gas: .....  
(1mk)

(iii) Write an equation that leads to the formation of white precipitate in process



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15. Study the information in the table below and answer the questions that follow.

Salt	Solubility g/100g of water	
	At 40°C	At 60°C
CuSO <sub>4</sub>	28	38
Pb(NO <sub>3</sub> ) <sub>2</sub>	79	98

A mixture containing 35g of CuSO<sub>4</sub> and 78g of Pb(NO<sub>3</sub>)<sub>2</sub> in 100g of water at 60°C was cooled to 40°C.

i) Which salt crystallized out? Give a reason. (2 marks)

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 .....

ii) Calculate the mass of the salt that crystallized out. (1 mark)

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16. a) Distinguish between strong and concentrated acid (1mk)

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b). A solution of ammonia in methylbenzene has no effects on red litmus paper while a solution of ammonia in water turns red litmus paper blue. Explain  
(2mks)

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17. Name the process which takes place when

i. Iodine changes directly from solid to gas  
(1mk)

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ii.  $\text{Fe}^{2+}(\text{aq})$  changes to  $\text{Fe}^{3+}(\text{aq})$   
(1mk)

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iii. White sugar changes to black when mixed with concentrated sulphuric (VI) acid  
(1mk)

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18. In the last stage of the solvay process, a mixture of sodium hydrogen carbonate and ammonium chloride is formed

a) State the method of separation used  
(1mk)

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b) Write an equation showing how lime is slaked  
(1mk)

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..  
c) Name the by-product recycled in the above process (1mk)

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19. The diagram below is a section of a model of the structure of element K

a) State the type of bonding that exist in K (1mk)

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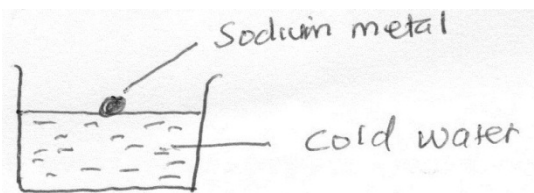
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b) In which group of the periodic table does element K belong. Give a reason (2mks)

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



a) State two observations made in the above experiment when sodium react with water (2 mks)

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b) Write a chemical equation for the reaction that takes place (1mk)

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21. (a) Explain why permanent hardness in water cannot be removed by boiling (2mks)

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(b) Name two methods that can be used to remove permanent hardness from water  
(1mk)

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22. Write an equation to show the effect of heat on the nitrate of: -

(2mks)

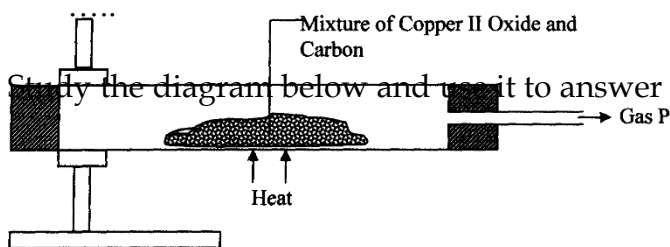
i) Potassium

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(ii) Silver

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23. Study the diagram below and use it to answer the questions that follow.



(a) State the observation made in the combustion tube. (1mk)

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(b) Write an equation for the reaction that took place in the combustion tube. (1mk)

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(c) Name gas **P** (1mk)

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24. Sulphur exists in two crystalline forms.

a) Name **one** crystalline form of Sulphur. (1mk)

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b) State **two** uses of Sulphur. (2mks)

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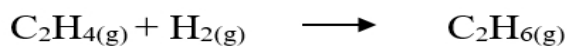
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25. Bond energies for some bonds are tabulated below: -

BOND	BOND ENERGY KJ/mol
H - H	436
C = C	610
C - H	410
C - C	345

Use the bond energies to estimate the enthalpy for the reaction.

(3mks)



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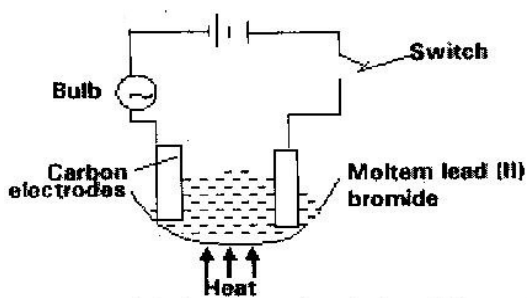
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26. Study the set up below and answer the questions that flows



State all the observations that would be made when the circuit is completed

(3mks)

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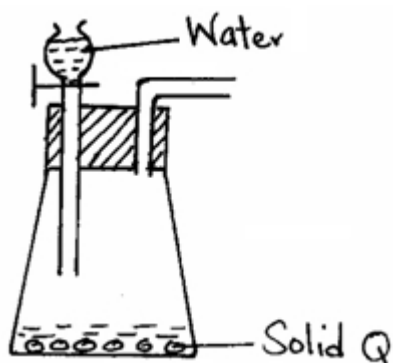
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27. Describe how solid samples of salts can be obtained from a mixture of lead (II) chloride, sodium chloride and ammonium chloride.  
(3mks)

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28. The diagram below represents a set-up used to prepare oxygen gas.



(a) Name substance Q.  
(1mk)

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(b) Complete the set-up to show how oxygen gas is collected.  
(1mk)

(c) Write the equation for the reaction that occur.  
(1mk)

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29. Two reagents that can be used to prepare chlorine gas are potassium manganate (VII) and hydrochloric acid.

(a) Write an equation for the reaction.

(1mk)

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b) Give the formula of another reagent that can be used instead of potassium manganate (VII).

(1mk)

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(c) Using an equation illustrate how chlorine bleach coloured substances.

(2mks)

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