

NAME \_\_\_\_\_ INDEX \_\_\_\_\_

DATE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

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CHEMISTRY  
FORM FOUR  
1<sup>ST</sup> TERM 2016  
2 HRS.

**HORIZON INSTANTS**  
Kenya Certificate of Secondary Education  
**CHEMISTRY PP1**  
FORM FOUR 1<sup>ST</sup> TERM EXAMINATION 2016

**INSTRUCTIONS**

- Write your name and your class in spaces provided
- Sign and write the date of the examination in the spaces provided.
- Answer all the questions in the spaces provided on the question paper.
- Mathematical tables and electronic calculators may be used
- All working must be clearly shown where necessary

**For Examiner's Use Only**

Questions	Maximum score	Candidates score
1 - 27	80	

*This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. Explain why hydrogen can be placed in both group I and group VII. (2 marks)

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2. Excess white phosphorous were allowed to smoulder in 100cm<sup>3</sup> of air and the volume of the remaining air was measured every hour.

Hours	0	1	2	3	4	5	6	7	8
Volume of air cm <sup>3</sup>	100	95	90	86	84	82	80	80	80

- a) Why did the volume of air remain constant from sixth hour? (1 mark)

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- b) Determine the percentage of oxygen in air using the data given in the table. (1 mark)

- c) Give two reasons why air is a mixture but not a compound. (1 mark)

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3. When a green solid was heated, a black residue and a colourless gas that forms a white precipitate in lime water were formed.

- a) Identify; (2 marks)

- i) The colourless gas.

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- ii) The green solid.

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- b) Name the type of a reaction that takes place. (1 mark)

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4. a) In terms of kinetic theory of matter, Explain what happens when a pure substance in solid state is heated until it melts. (2 marks)

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b) How does an impurity affect the melting point of a substance? (1 mark)

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c) Give one applications of the effect stated above. (1 mark)

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5. Aluminium metal is preferred for overhead electric cables. State any two properties that make aluminium suitable for this purpose. (2 marks)

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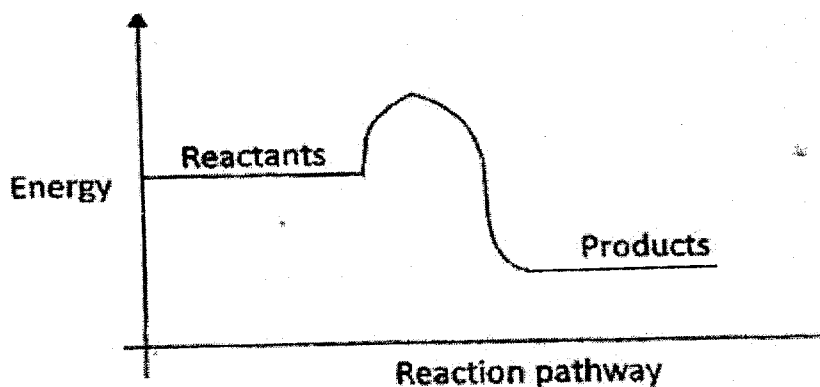
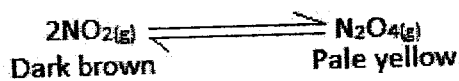
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6.a) State the Le Chatelier's principle. (1mark)

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b) Nitrogen (IV) oxide can be converted to dinitrogen tetra oxide as shown in the equation below.

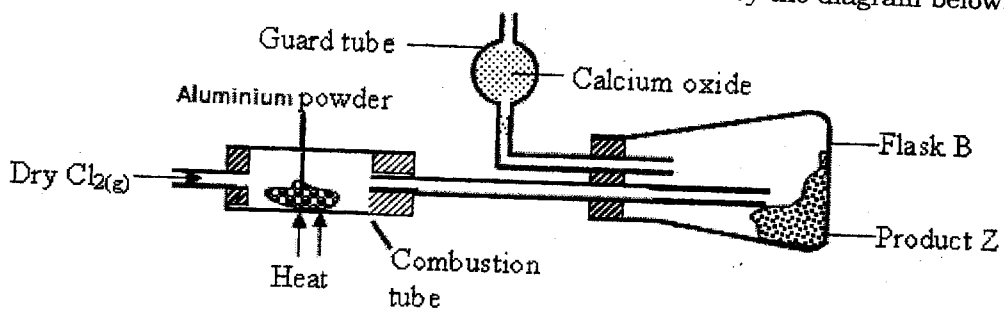


State and explain the observation made when temperature of the reaction mixture is increased. (2 marks)

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7. Heated aluminium reacts with chlorine gas as illustrated by the diagram below.



- a) Name solid Z. (1mark)
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- b) State and explain the observation made when methyl orange indicator is added to a solution of solid Z in water. (2 marks)
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- 8.a) State the observation made when a drop of water is added to a sample of anhydrous copper (II) sulphate. (1 mark)
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- b) Write an equation for the reaction that takes place. (1mark)
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- c) Give a chemical significance of the reaction that takes place. (1mark)
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9. a) Differentiate between temporary hard water and permanent hard water. (1 mark)
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- b) Write ionic equations to show how sodium carbonate softens hard water. (1 mark)
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- c) State one advantage of hard water. (1mark)
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10. In an experiment, ammonia gas was bubbled into copper (II) sulphate solution until in excess. With the aid of equations, explain the observations made. (3 marks)

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11. a) State Charles' law.

(1 mark)

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b) A sealed balloon containing  $80\text{cm}^3$  of a gas at room temperature and pressure (r.t.p) was placed in an oven at  $100^\circ\text{C}$ . Assuming there was no change in pressure, calculate the new volume of the gas in the balloon.  
(Standard pressure =  $760\text{mmHg}$ , standard temperature  $273\text{K}$ ) (2 marks)

12. a) Define the term isotopes.

(1 mark)

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b) An element X has an atomic number of 3, RAM 6.94 and consists of two isotopes of mass numbers 6 and 7.

(i) What is the mass number of the most abundant isotope of X? Give a reason. (1 mark)

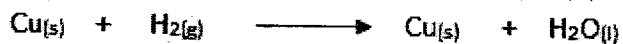
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(ii) Determine its percentage.

(2 marks)

13. Dry hydrogen gas reacts with heated copper (II) oxide as shown in the equation below.



a) Name the process undergone by the copper (II) oxide. (1 mark)

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b) Give a reason for your answer in (a) above. (1 mark)

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c) Name another gas that can be used to perform the same function as hydrogen gas in the above reaction. (1 mark)

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14. Both chlorine and sulphur (IV) oxide can be used as bleaching agents.

a) Give the condition required for them to bleach. (1 mark)

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b) Which of the two is a better bleaching agent? Explain. (2 marks)

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15. A mixture contains iodine, aluminium oxide and sodium chloride. Describe how each solid substance can be obtained from the mixture. (3marks)

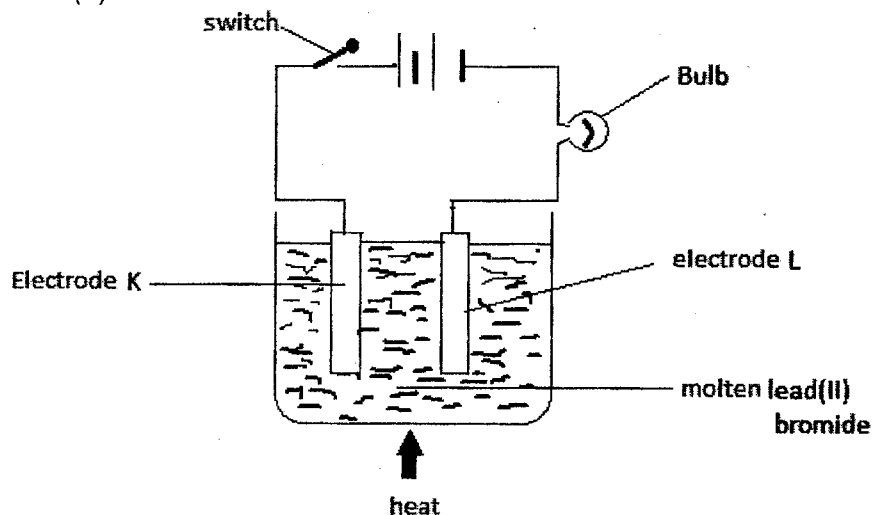
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16. Below is a set-up of apparatus used to investigate the effect of electric current on molten lead (II) bromide.



- a) Name electrode. (2marks)  
**K :**

\_\_\_\_\_

**L :**

\_\_\_\_\_

- b) State and explain observation made when the switch is closed. (1mark)
- \_\_\_\_\_
- \_\_\_\_\_

17. Study the information given in the table below and answer the questions that follows.

Bond	Bond energy KJ/mol
C - H	414
Cl - Cl	244
C - Cl	325
H - Cl	431

- (a) Calculate the enthalpy change for the reaction. (2marks)  
 $\text{CH}_4(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow \text{CH}_3\text{Cl}(\text{g}) + \text{HCl}(\text{g})$

(b) Sketch the energy level diagram.

(1mark)

18. When  $20\text{cm}^3$  of a gaseous hydrocarbon was burnt in  $125\text{cm}^3$  of oxygen, the resulting gaseous mixture occupied  $85\text{cm}^3$  at room temperature and pressure. When the gaseous mixture passed through sodium hydroxide solution, its volume decreased to  $25\text{cm}^3$ .

(a) What volume of oxygen was used during the reaction? (1mark)

(b) Determine the molecular formula of the hydrocarbon. (2marks)

c) To which homologous series does the hydrocarbon belong? (1 mark)

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19. Draw and name all possible isomers of a hydrocarbon with the molecular formula  $\text{C}_4\text{H}_6$ . (2marks)



20. Below are pH values of some solutions.

Solution	Z	Y	X	W
PH	6.5	13.0	2.0	7.0

a) Identify a solution that will not have an effect on litmus paper. (1 mark)

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b) A basic substance **V** reacted with both solutions **Y** and **X**. What is the nature of **V**. (1mark)

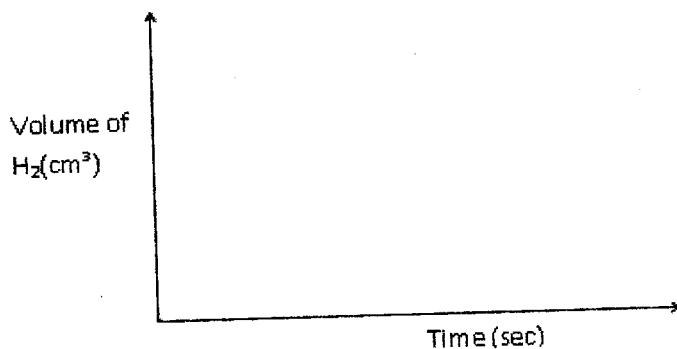
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c) State and explain the observation made when some magnesium carbonate is added to solution **X**. (1mark)

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21. A student reacted 0.5g zinc granules with 20.0 cm<sup>3</sup> of 2M sulphuric (VI) acid and volume of hydrogen gas produced was measured at various time intervals. (1mark)

a)



b) State **four** factors which would affect the rate of the above reaction. (2marks)

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22. a) State **two** physical properties of sulphur that makes it possible for it to be extracted by Frasch process. (2marks)

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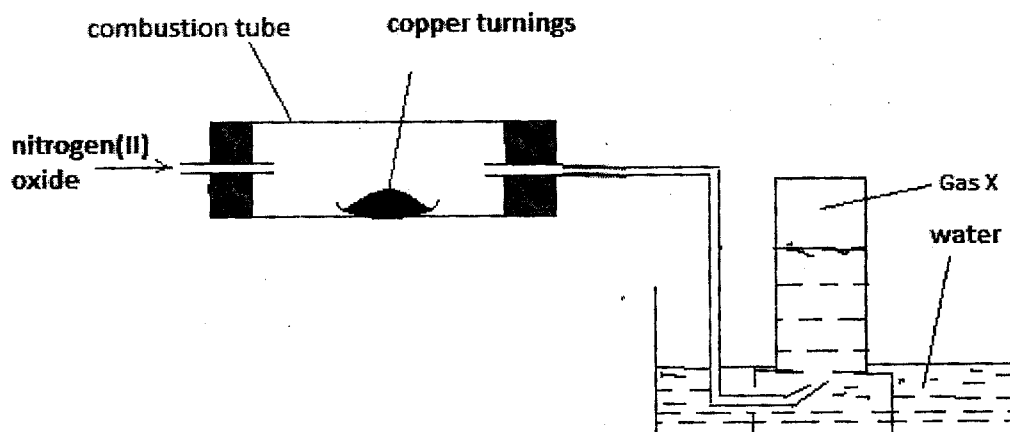
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- b) Name the allotropes of sulphur. (1 mark)

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23. Study the set up below was used to investigate properties of nitrogen (II) oxide. Study it and answer the questions that follow.



- a) Identify one omission made in the diagram. (1 mark)

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Identify gas X. (1mark)

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- b) State and explain the observation made in the combustion tube. (2marks)

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24. When water was added to sodium peroxide in an experiment, a colourless gas was formed.

- a) Identify the colourless gas and give its chemical test. (2 mark)

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- b) Write an equation for the reaction. (1 mark)

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25. a) Define solubility. (1 mark)

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- b) When 15.0g of a saturated solution of salt F at 30°C was evaporated to dryness 2.5g of salt F remained. Calculate the solubility of salt F at 30°C (2marks)
26. 25 cm<sup>3</sup> of a solution containing 80g of sodium hydroxide in a litre of solution was diluted to 200cm<sup>3</sup> with distilled water. Calculate the molarity of the solution formed. (Na=23.0, H=1.0, O = 16.0.) (2 marks)
27. State and explain the observation you would make when concentrated sulphuric (VI) acid is added to hydrated copper (II) sulphate. (2marks)
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