

Name:..... Index No.:

Adm No:.....

Candidate's Signature:

Date:

233/1

CHEMISTRY

Paper 1

THEORY

JUNE 2016

Time: 2 hours

KASSU JOINT EVALUATION EXAMINATION
Kenya Certificate of Secondary Education
CHEMISTRY
Paper 1

Instructions to Candidates

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

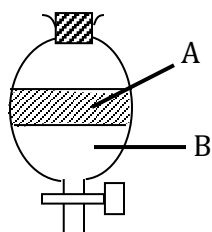
1. (a) Give **two** differences between luminous and non-luminous flames. (2 marks)

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- (b) How is the non-luminous flame produced? (1 mark)

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2. (a) The apparatus below were used to separate a mixture of liquid A and B.



- State **two** properties of liquids that make it possible to separate using such apparatus. (2 marks)

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- (b) Give the name of the above apparatus. (1 mark)

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3. (a) Explain why solid Carbon (IV) oxide is preferred over ordinary ice for use by ice cream venders. (1 mark)

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- (b) Name one piece apparatus used to measure volume of gases. (1 mark)

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- (c) Draw a diagram of a deflagrating spoon. (1 mark)

4. The table below shows the pH values of solutions P, R, Q and S.

Solution	P	R	Q	S
pH	2	7	6.5	13.5

(a) Which solution represent:

(i) Strong base - (1 mark)

(ii) Weak acid - (1 mark)

(b) Give an example of solution S. (1 mark)

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5. 6.95g of hydrated iron (II) sulphate $\text{FeSO}_4 \cdot n\text{H}_2\text{O}$ was dissolved in 250 cm^3 solution resulting into a 0.1M solution. Determine the value of n. (3 marks)
(Fe = 56, O = 16, S = 32, H = 1).

6. Rusting leads to fast wearing out of farm tools and equipment as well as buildings.

(a) Give the chemical name of rust. (1 mark)

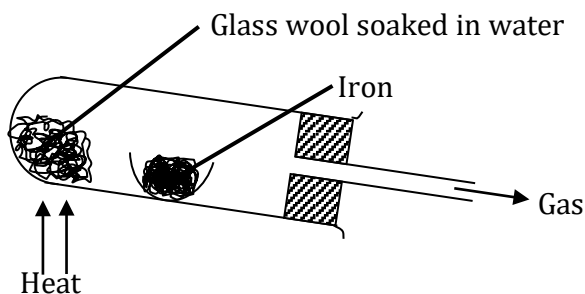
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(b) What **two** conditions accelerate rusting process? (2 marks)

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



(a) Write an equation for the reaction that take place in the combustion tube. (1 mark)

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(b) Why would it not be advisable to use potassium in place of iron in the set-up? (1 mark)

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(c) Glass wool should be heated before heating iron. Explain. (1 mark)

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8. I. Name the following organic compounds.

(a)
$$\begin{array}{ccccccc} \text{CH}_3 & \text{CH} & \text{CH}_2 & \text{CH} & \text{CH}_3 & & \\ & | & & | & & & \\ & \text{CH}_3 & & \text{Br} & & & \end{array}$$
 (1 mark)

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(b) $\text{HOCH}_2 - \text{CHOH} - \text{CH}_2\text{OH}$ (1 mark)

.....

II. Given

A $\text{CH}_3(\text{CH}_2)_{16} \text{COO}^- \text{Na}^+$

B $\text{CH}_3(\text{CH}_2)_6 \text{CH}(\text{CH}_3)\text{CH}_2 \text{SO}_3^- \text{Na}^+$

Identify detergent

A - (1 mark)

B - (1 mark)

9. In terms of structure and bonding, explain the following.

(a) Graphite is used as a lubricant. (1 mark)

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(b) Aluminium is better conductor of electricity than magnesium. (1 mark)

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(c) Water is a liquid at room temperature while hydrogen sulphide is a gas. (1 mark)

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10. (a) Define the term molar latent heat of fusion. (1 mark)

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(b) The molar heat of fusion of ice at 0°C is 6kJ mol^{-1} . Calculate the heat change when 36g of ice is converted to 36g of water at 10°C . (3 marks)
(SHC = $4.2^{\circ}\text{g K}^{-1}$, density = 1.0g/cm^3 , H = 1.0, O = 16.0)

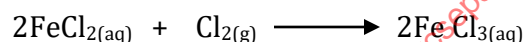
11. Draw a well labeled diagram showing how blister copper is purified. (3 marks)

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12. Gas Q with a relative molecular mass of 48 took 50 seconds to diffuse through a porous diaphragm. How long will it take for the same amount of hydrogen Chloride (HCl) to diffuse through the same diaphragm under similar conditions? (H = 1.0, Cl = 35.5).
(3 marks)

13. (a) Calculate the oxidation state of chromium in the ion $\text{Cr}_2\text{O}_7^{2-}$. (1 mark)

- (b) Using oxidation numbers, determine from the equation below the species which undergoes oxidation and reduction.



Oxidation - (1 mark)

Reduction - (1 mark)

14. Given elements A, B and C with atomic numbers 11, 19 and 13 respectively.

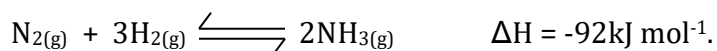
- (a) Compare the atomic radius of A and C. Explain. (2 marks)

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- (b) Compare reactivity of A and B. (1 mark)

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15. Haber process (the manufacture of ammonia gas) is given by the following equation.



State and explain the effect of:

(a) Introducing some drops of water to the equilibrium. (1 mark)

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(b) Pumping nitrogen gas to the equilibrium mixture. (1 mark)

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(c) Lowering the temperature of the reaction. (1 mark)

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16. Elements P and Q have the following atomic numbers 19 and 8 respectively.

(i) Using dot (•) and cross draw a diagram to show how the elements form bonds. (1 mark)

17. Describe how sodium sulphate crystals can be prepared starting with 50cm³ of 2M sodium hydroxide and 1M sulphuric (VI) acid. (3 marks)

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18. Write ionic equations to show how;

(a) (i) Excess ammonia solution reacts with a solution containing Copper II ions. (1 mark)

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(ii) Excess sodium hydroxide added to a solution containing Al^{3+} ions. (1 mark)

(b) Give the name of the following ion $[\text{Zn}(\text{NH}_3)_4]^{2+}$ (1 mark)

19. (a) Define electrolysis. (1 mark)

(b) During the electrolysis of molten aluminium oxide, write the equations at the;

Anode - (1 mark)

Cathode - (1 mark)

20. (a) Give any **two** differences between alpha and beta particles. (2 marks)

(b) A radioactive isotope T decays by emitting three alpha particles to form ${}_{83}^{214}\text{Bi}$ what is the atomic number and mass number T?

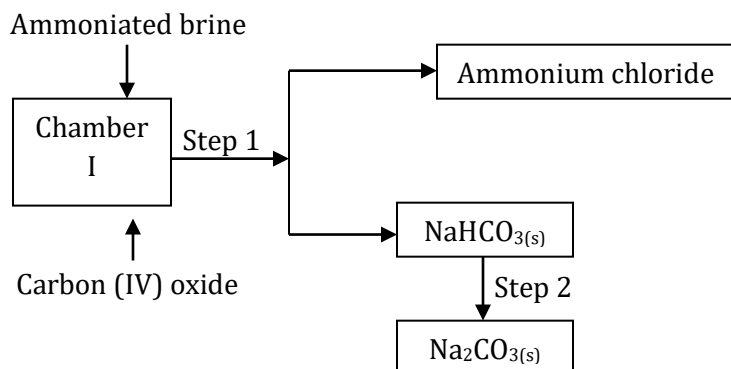
Atomic number - (1 mark)

Mass number - (1 mark)

21. (a) Using acidified potassium dichromate (VI) solution, describe how you would differentiate between sulphur (IV) oxide and hydrogen sulphide. (2 marks)

(b) Identify the catalyst preferred in contact process. Explain. (2 mark)

22. Study the following part of the solvay process for the manufacture of sodium carbonate and answer the questions that follows:



- (i) State the main source of Carbon (IV) oxide in the process. (1 mark)
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- (ii) Write down the overall equation for the reaction in chamber I. (1 mark)
-
- (iii) Name process in step 1. (1 mark)
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23. (a) The following equation involve hydrochloric acid.



State the type of reaction taking place in the reaction. (1 mark)

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- (b) State **two** contrasting chemical properties of hydrogen and chlorine. (2 marks)
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24. (a) An element O has two isotopes $^{16}_8\text{O}$ containing 90% and Isotope $^{18}_8\text{O}$.

(i) What are isotopes? (1 mark)

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(ii) Find the R.A.M of O. (2 marks)

25. (a) When a hydrocarbon is completely burnt in oxygen 4.2g of Carbon (IV) oxide and 1.71g of water were formed.

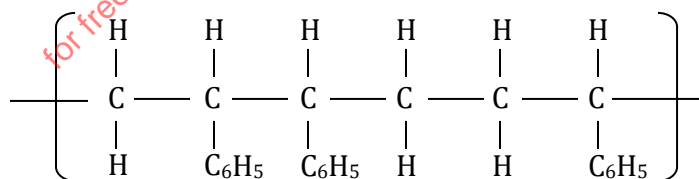
(a) Determine the empirical formular of the hydrocarbon. (3 marks)

(b) Given that formula mass of compound above is 28. Find the molecular formular. (1 mark)

26. (a) Name the **two** types of polymerization. (1 mark)

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(b) Study the section of the polymer below and answer the questions that follow.



(i) Give the name of the polymer above. (1 mark)

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