

NAME: ..... INDEX NO: .....

SCHOOL: ..... DATE : .....

CANDIDATE'S SIGNATURE:.....

233/1

CHEMISTRY

PAPER 1

THEORY

JULY / AUGUST 2014

TIME: 2 HOURS

## NANDI NORTH SUB-COUNTY JOINT EVALUATION 2014

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

CHEMISTRY

PAPER 1

TIME: 2 HOURS

### INSTRUCTIONS TO CANDIDATES

- Write your **Name**, **School** and **Index Number** in the spaces provided above.
- Answer **all** the questions in the spaces provided after each question.
- Mathematical tables and non-programmable electronic calculators **may be** used.
- **ALL** working must be clearly shown where necessary.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.
- **ALL** answers must be written in English.

### FOR EXAMINER'S USE ONLY

QUESTIONS	MAX SCORE	CANDIDATE'S SCORE
1 – 30	80	

1. Two elements A and B have electronic configurations 2.8.3 and 2.6 respectively.

(a) To which group and period does element B belong? (1mk)

Group: .....

Period:.....

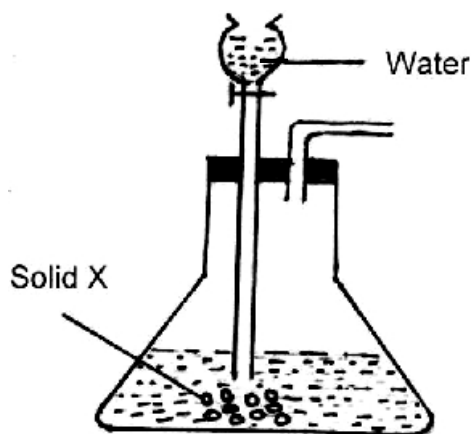
(b) If the two react, what is the formula of the compound they form? (1mk)

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2. The setup below was used to prepare a sample of oxygen gas. Study it and answer the questions that follow.



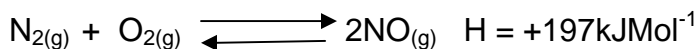
(a) Complete the diagram to show how oxygen is collected. (2mks)

(b) Identify solid X. (1mk)

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(c) Write equation for the reaction between solid X and water. (1mk)

3. Nitrogen reacts with oxygen according to the equation.



What is the effect of increase in the following in the position of equilibrium? Explain. (3mks)

(i) Pressure:.....

.....

(ii) Temperature:.....

.....

4. (a) Define the term isomerism.

(1mk)

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(b) Draw and name two isomers of butane.

(2mks)

5.  $60\text{cm}^3$  of oxygen gas diffused through a porous hole in 50 seconds. How long will it take  $80\text{cm}^3$  of sulphur (iv) oxide to diffuse through the same hole under the same conditions? (3mks)

(S = 32.0, O = 16.0)

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6. In the manufacture of sodium carbonate by the Solvay process, ammoniacal brine trickles down the carbonator while carbon (IV) oxide rises up the same tower.

(a) What is ammoniacal brine?

(1mk)

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(b) Write two equations taking place in the carbonator.

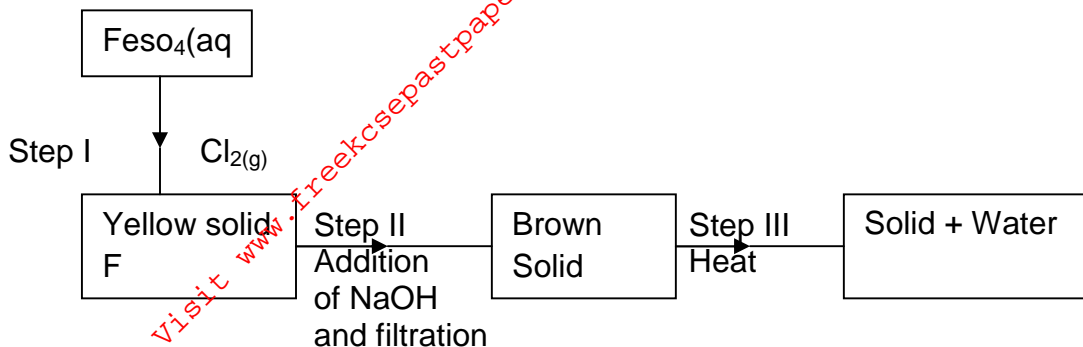
I. .... (1mk)

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II. .... (1mk)

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7. Study the scheme below and answer the questions that follow:-



(i) Write down the formula of the yellow solid F. (1mk)

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(ii) What property of Chlorine is shown in Step I. (1mk)

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(iii) Write an equation for the reaction which occurs in step III. (1mk)

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8. Describe how a solid sample of lead (II) sulphate would be prepared using the following reagents. Dilute nitric (V) acid, solid lead (II) carbonate. (3mks)

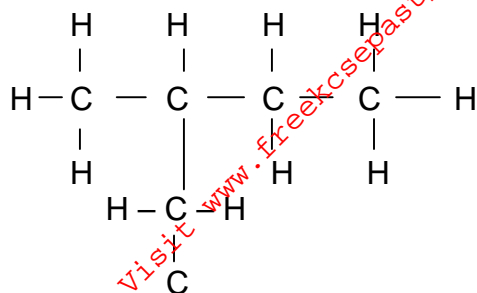
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9. 22.2cm<sup>3</sup> of sodium hydroxide solution containing 4.0g per litre sodium hydroxide were required for complete neutralization of 0.1g of a dibasic. Calculate the relative formula mass of the dibasic acid. (Na = 23, O = 16, H = 1) (3mks)

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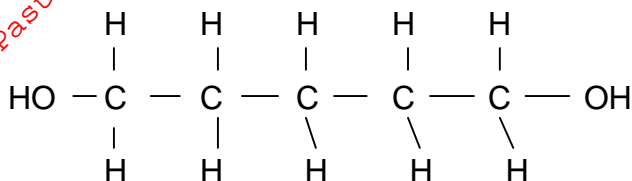
10. Give the systematic IUPAC names of the following compounds.

(a)



(1mk)

(b)



(1mk)

11. Using dots (•) and crosses (x), show bonding in:

(a) The compound formed when nitrogen reacts with fluorine.

(2mks)

(Atomic numbers F = 9, N = 7)

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(b) Sodium Oxide. (Atomic numbers Na = 11, O = 8)

(1mk)

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12. Name the products formed when ammonia:

(a) Decomposes when heated.

(1mk)

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(b) Is burnt in air enriched with oxygen.

(1mk)

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(c) Is oxidized in presence of platinum catalyst.

(1mk)

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13. The grid below is part of a periodic table. Study it and answer the questions that follow:-

R				S				T
	U						V	
	W							

(a) What name is given to the family of elements to which elements U and W belong? (1mk)

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(b) Explain why Hydrogen can be placed either in group I or group VII. (1mk)

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(c) Give one use of element T. (1mk)

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14. In an experiment, the quantity of electricity passed to deposit 1.2g of metal W from its salt was 3860 coulombs. R.a.m of W = 120, IF = 96500C.

(i) How many faradays of electricity are required to deposit 1 mole of W. (1mk)

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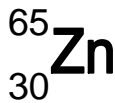
(ii) One of the ions present in the solution of the salt of W has the formula  $W^{x+}$ . What is the numerical value of X. (2mks)

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15. Classify the following processes as either chemical or physical.

Process	Type of change
(a) Heating of Copper (II) sulphate crystals	(1mk)
(b) Obtaining kerosene from crude oil.	(1mk)
(c) Souring of milk	(1mk)

16. Consider the symbol of Zinc shown below:



Determine the number of protons and neutrons in the nucleus.

(2mks)

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17. M grammes of a radioactive isotope decayed to 5 grammes in 100 days. The half-life of the isotope is 25 days.

(a) What is meant by half-life?

(1mk)

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(b) Calculate the initial mass M of the radioactive isotope.

(2mks)

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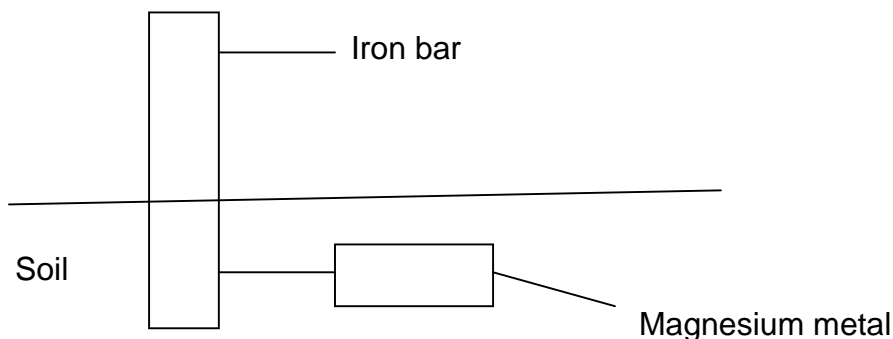
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18. The diagram below shows an iron bar, which supports bridge. The iron bar is connected to piece of Magnesium metal.



Explain why it is necessary to connect magnesium metal to the iron bar.

(2mks)

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19. Calculate the solubility of sugar in water at 40°C from the following information.

(2mks)

Mass of evaporating dish = 23.0g

Mass of evaporating dish + sample of saturated solution = 192.0g

Mass of evaporating dish + solid after evaporation of solution = 142.0g

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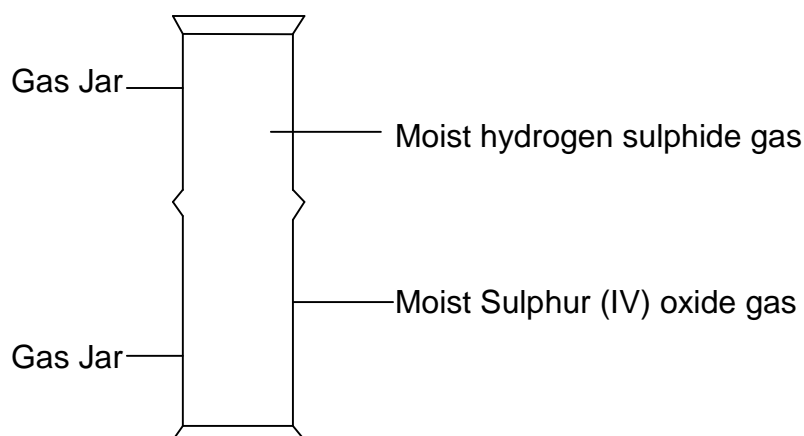
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20. State the observation made in the set-up below.



(a) Observations

(1mk)

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(b) Explain the observation in (a) above.

(1mk)

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21. The reaction between hot concentrated Sodium Hydroxide and Chlorine produces Sodium Chlorate (V), Sodium Chloride and water.

(a) Write the equation for the reaction.

(1mk)

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(b) Give **one** use of Sodium Chlorate (V).

(1mk)

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22. Determine the oxidation number of:

- (i) Manganese in  $\text{KMnO}_4$  (1mk)

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- (ii) Chromium in  $\text{Cr}_2\text{O}_7^{2-}$ . (1mk)

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23. An element X has atomic number 3, relative atomic mass 6.94 and consists of two isotopes of mass numbers 6 and 7 respectively.

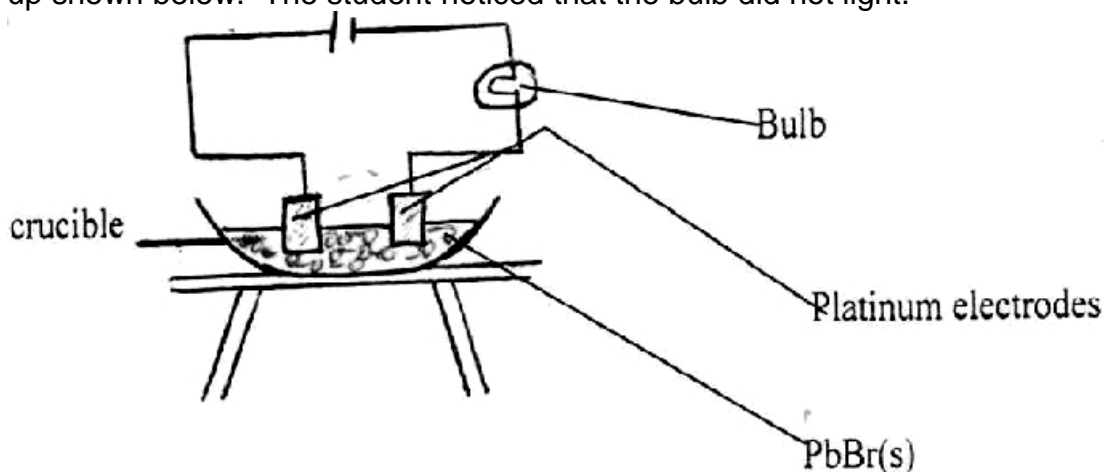
- (a) What is the mass number of the more abundant isotope of X? (1mk)

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- (b) Calculate the relative abundance of each of the isotopes. (2mks)

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24. In an experiment to investigate the conductivity of substance, a student used the set up shown below. The student noticed that the bulb did not light.



- (i) What had been omitted in the set-up? (1mk)

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- (ii) Explain why the bulb lights up when the omission is corrected. (1mk)

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25. Chlorine gas was bubbled through a solution of Potassium Iodide in a boiling tube.

- (i) State the observations that were made. (1mk)

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- (ii) Name the oxidizing agent in the reaction. Explain. (2mks)

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26. (i) State the Gay Lussac's Law. (1mk)

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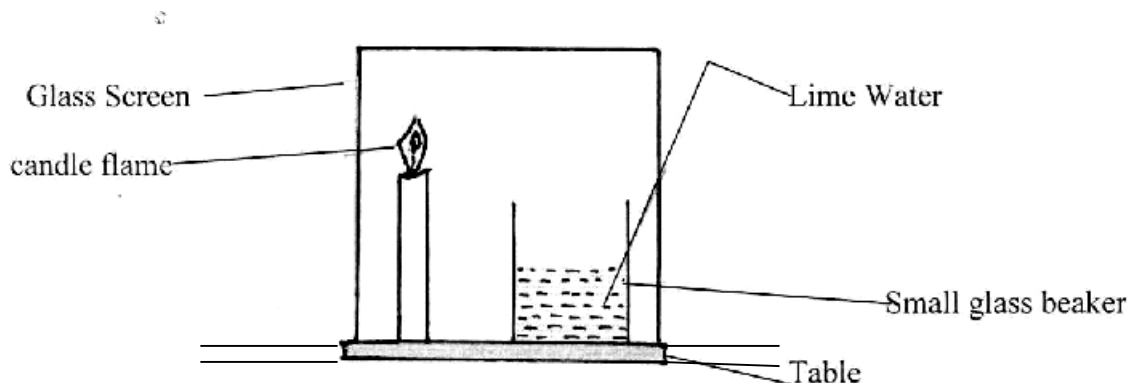
- (ii) What volume of methane gas would remain if a burner containing  $40\text{cm}^3$  of methane gas burns in  $40\text{cm}^3$  of enclosed air? (Assume oxygen is 20% by volume of air) (2mks)

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27. Why does a luminous flame produce light and soot? (3mks)

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28. Study the arrangement below and answer the questions that follow.



Explain what will be observed after some time.

(2mks)

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29. Explain the following:

(a) Helium is used instead of Hydrogen gas in balloons for metrological research.

(1mk)

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(b) The boiling and melting points of alkali metal decreases down the group whereas the melting and boiling points of halogens increase down the group. (2mks)

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30. Name the process that takes place when:

(i) Fats or oils are hydrolyzed using an alkali.

(1mk)

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(ii) Sulphur is added to rubber in the manufacture of rubber tyres.

(1mk)

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