SCHOOL CATEGORY:
GIRLS { }
BOYS { }
MIXED { }

KENYA HIGH SCHOOL

THE NATIONAL CHEMISTRY CONTEST 1ST EDITION

FORM 2

233 Chemistry

8TH June, 2024 Time: 1 1/2 Hours

NAME: …… CODE ……

Instructions to Candidates

a) Write your Name and the Code in the spaces provided above.
b) Indicate the School category in the space provided above.
c) Answer ALL the questions in the Answer Sheet provided only.
d) Mathematical tables and silent electronic calculators may be used.
e) This paper consists of 6 printed pages

For Examiner's Use Only

Questions	Max. Score	Candidate's Score
1 – 19	46	

1. Silicon is a group (IV) element in the periodic table, it reacts with oxygen to form an oxide.
   a) State the nature of the oxide formed. (1 mark)
   b) Write the equation for the reaction. (1 mark)

2. Write the electron configuration of following ions. (2marks)

a) Ca^{+} b)F^{2-}

3. Explain how the hotness of a flame can be increased. (1mark)

4. A small piece of burning sodium was lowered in a gas jar of chlorine.
   a) State the observation made. (1 mark)
   b) Name the suitable apparatus that is used to lower burning sodium into the gas jar with chlorine gas. (1 mark)
   c) Write down the equation for the reaction. (1 mark)

5. Element K belongs to period 3 and group (VI) of the periodic table.
   a) Draw a diagram to show the structure of element K. (1 mark)
   b) Give the oxidation number of element K. (1 mark)
   c) Give the valence electrons of element K (1 mark)

6. Fractional distillation is a method of separating miscible liquids applied in fractional distillation of liquefied air. At what temperature;
   a) Is water vapor removed from air before its liquefied.(1mark)
   b) Does argon distill off(1mark)

7. What is the chemical formula for rust? (1 mark)

8. The grid below represents a periodic table, the letters do not represent the actual symbols of the elements, use it to answer the questions that follows.

E									D
Q	L					Y			
C			B				N	R	F
S		**A**						K	

   a) How does electronegativity change as you move; (2marks)
      (i) Across a period.
      (ii) Down group on the periodic table.
   b) State two factors that contribute to the variation in melting and boiling points of elements C and B in the periodic table. (2marks)
   c) On the grid above give identify; (6 marks)
      (i) An element with the highest first ionization energy
      (ii) An element used in arch welding.
      (iii) A group VII element, which is the least reactive.
      (iv) Element which forms divalent anion.
      (v) Element which forms divalent cation
      (vi) Give the name of the elements which occupy the region labelled A

d) Give the valency of element Y (1 mark)

9. Explain why hydrogen forms compounds in which its oxidation state is either +1 or -1 (1mark)

10. A flame formed from an incomplete combustion of fuel produces a lot of light as compared to the one formed when combustion of fuel is complete. Explain (1 mark)

11. Explain why iodine has higher boiling point than chlorine (2marks)

12. Distinguish between dry and anhydrous substance. (1 mark)

13. When magnesium was burnt in air, a solid mixture was formed. On addition of water to the mixture a gas which turned moist red litmus paper blue was evolved.

a) Name the solid mixture (1 mark)

b) Write the equation for the reaction which produces the gas. (1 mark)

14. Salt is sprinkled on roads in Europe during winter to prevent formation of ice on roads. Explain how the salt works. (1 mark)

15. a) When a piece of potassium is dropped in water, it burst into lilac flame. Give reason. (1mark)

b) Write the equation for ignition in (a) above. (1 mark)

16. Hydrated copper (II) sulphate is heated, the compound formed is allowed to cool and the collected water is added to it. Name type of change it undergoes. (1mk)

17. a) What is ionization energy? (1mark)

b) An element X has the following ionization energies.

Ionization	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**
Energy (kJ/mole)	738	1,451	7,733	10,543	13,630	18,020

What is the formula of the chloride of X? (1mark)

18. Magnesium and calcium are Group (II) elements.

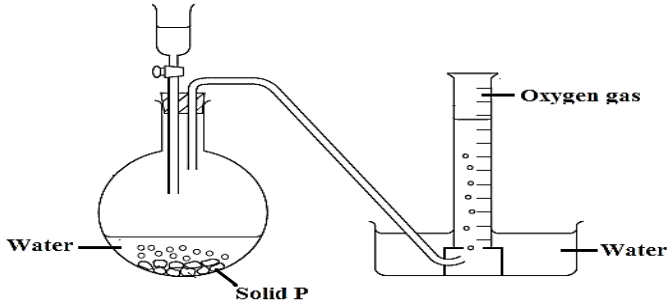
a) Write the electronic configuration of a calcium atom. (1mrk)

b) How is electronic configuration of a magnesium atom:

(i) Similar to the electronic configuration of a calcium atom? (1 mark)

(ii) Different from the electronic configuration of a calcium atom. (1mark)

19. The diagram below represents set-up that can be used to prepare and collect oxygen gas.



(a) Name solid **P** (1mark)

(b) Explain why Oxygen gas is collected using the above method. (1mark)

(c) Give reason why it is important not to collect any gas for the first few seconds of the experiment. (1mark)

(d) Write chemical equation for the reaction taking place in the flask. (1 mark)

(e) State one use of oxygen applied in medical fields. (1 mark)

233 Chemistry Answer Sheet

QUESTION		ANSWER	MARKS	TOTAL
1.	a)		(1 mks)	
	b)		(1 mks)	
2.	a)		(1 mks)	
	b)		(1 mks)	
3.			(1 mks)	
4.	a)		(1 mks)	
	b)		(1 mks)	
	c)		(1 mks)	
5.	a)		(1 mks)	
	b)		(1 mks)	
	c)		(1 mks)	
6.	a)		(1 mks)	
	b)		(1 mks)	
7.			(1 mks)	
8.	a) (i)		(1 mks)	
	(ii)		(1 mks)	
	b)		(2 mks)	
	c) (i)		(1 mks)	
	(ii)		(1 mks)	
	(iii)		(1 mks)	
	(iv)		(1 mks)	
	(v)		(1 mks)	
	(vi)		(1 mks)	
	d)		(1 mks)	
9.			(1 mks)	

10.			(1 mks)	
11.			(2 mks)	
12.			(1 mks)	
13.	a)		(1 mks)	
	b)		(1 mks)	
14.			(1 mks)	
15.	a)		(1 mks)	
	b)		(1 mks)	
16.			(1 mks)	
17.	a)		(1 mks)	
	b)		(1 mks)	
18.	a)		(1 mks)	
	b) (i)		(1 mks)	
	(ii)		(1 mks)	
19.	a)		(1 mks)	
	b)		(1 mks)	
	c)		(1 mks)	
	d)		(1 mks)	
	e)		(1 mks)	
TOTAL			**46**	

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