

Name: Class:

Candidate's signature Date.....

Index number
233/1

CHEMISTRY.

Theory

Paper 1

Time: 2 Hours

Kenya Certificate of Secondary Education

MINI-MOCK EXAMINATION, MARCH, 2014.

INSTRUCTIONS

- Answer ALL questions in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- All working MUST be clearly shown where necessary.

For examiners' use only.

Questions	Max-score	Candidates score
29	80	

NB: This paper consists of 14 printed pages. Students should check the question paper to ensure that all pages are printed as indicated and that no questions are missing.

1. a) Name two commonly abused drugs in Kenya. (1 Mark)

b) Differentiate between prescription drugs and over the counter drugs. (2 Marks)

2. a) Write an Ionic equation for the reaction between chlorine gas and aqueous iron (II) chloride solution. (1 Mark)

b) State the observation made when chlorine gas is bubbled through iron (II) chloride. (1 Mark)

3. Carbon (IV) oxide is prepared in the laboratory by reacting marble chips and dilute acid. Carbon (IV) oxide is bubbled in excess through sodium hydroxide. The resulting solution was crystallized and the solid heated to give white solid C.

a) Name solid C (1 Mark)

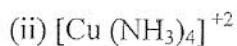
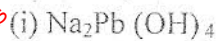
b) Write an equation for the reaction between sodium hydroxide and excess carbon (IV) oxide. (1 Mark)

c) State one use of solid C. (1 Mark)

4. a) What is a complex ion?

(1Mark)

b) Write the systematic name of the following.



(2 Marks)

5. 2.0g of a mixture of lead and zinc were dissolved in excess concentrated nitric acid. The resulting solution was heated with excess dilute sulphuric acid. The precipitate formed was purified and dried. It weighed 1.8g. Calculate the mass of lead and zinc in the mixture. (Pb=207, Zn=65, H=1, N=14, O=16 S=32)

(3 Marks)

6. A mixture of ammonium chloride and sodium nitrite was dissolved in water and the solution heated in a round bottomed flask. A colorless gas X was obtained.

a) Identify gas X.

(1 Mark)

b) What would be observed when the gas X is bubbled through lime water?

(1 Mark)

c) Write the equation for the formation gas X in the round bottomed flask.

(1 Mark)

7. State two reasons why graphite is used as an electrode in electric furnaces during electrolysis.

(1 Mark)

8. The results of an experiment to determine the solubility of potassium chlorate in water at 30°C were as follows.

Mass of dish = 15.86g

Mass of dish + saturated solution = 26.86g

Mass of dish + solid Potassium chlorate after evaporation to dryness = 16.86g

Calculate the mass of the saturated solution containing 60 g of water at 30°C .

(3 Marks)

9. 20 cm^3 of a gaseous hydrocarbon (C_xH_y) and 80 cm^3 of oxygen gas were burned. After the reaction the final gaseous mixture was cooled to room temperature and the residual gas occupied 70 cm^3 . After absorption by sodium hydroxide, 30 cm^3 of oxygen remained. Determine the value of X and Y.

(3 Mark)

10. Using dots (•) and crosses (×) to represent electrons, show bonding in the following compounds.

a) NH_4OH

b) Silicon fluoride

(Si=14, F=9, N=7, O=8, H=1)

(3 Marks)

11. A student heated solid ammonium carbonate in a hard glass tube. He noted that after sometime no residue remained.

a) State the colour of ammonium carbonate.

(1 Mark)

b) Explain why no residue remained.

(1 Mark)

c) State two tests the student should carry out to justify the observation above.

(1 Mark)

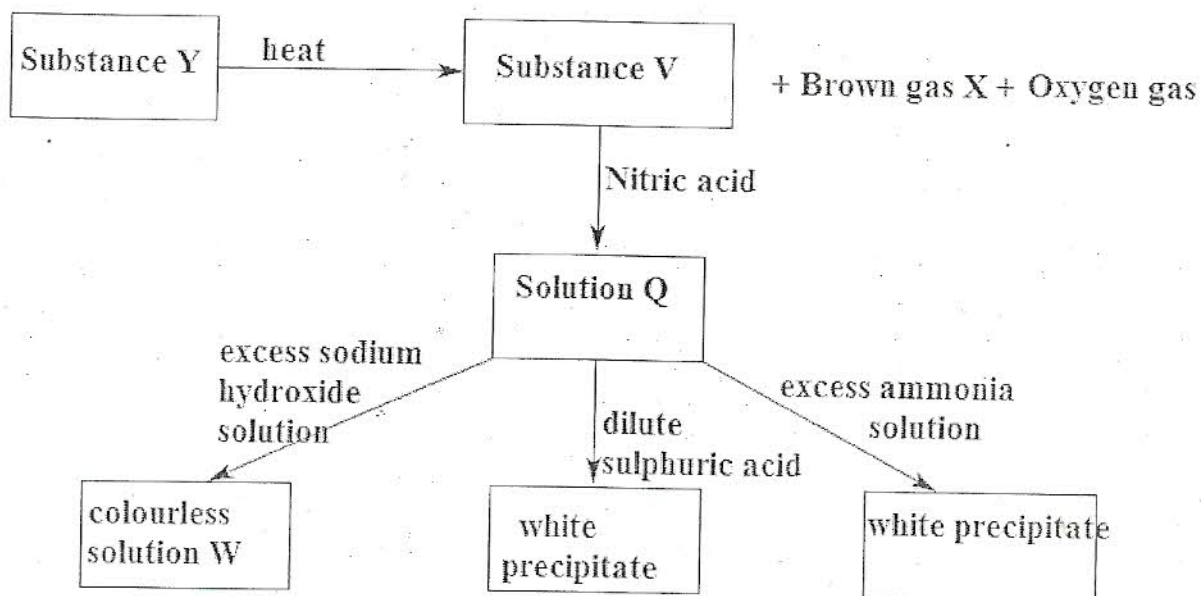
12. When molten Aluminium Oxide is electrolysed using graphite electrodes the following observations are made.

- Colourless gas is produced at the anode and the size of the anode gradually decreases.
- Silvery grey liquid is formed at the cathode.

Using equations explain these observations.

(3 Marks)

13. Study the reaction scheme below and answer the questions that follow



- a) Write the chemical formulae of substances
- (i) Y
- (ii) W

(2 Marks)

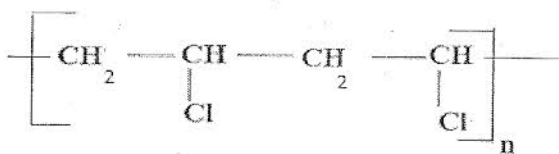
- b) Write a balanced chemical equation for the reaction between solution Q and dilute sulphuric acid.

(1 Mark)

14. Describe precisely how you would prepare a solid sample of Lead (II) chloride, starting with Lead (II) Oxide

(3Marks)

15. Study the structure below and answer the questions that follow.



- a) Name the polymer represented by the structure.
- (b) Draw the structure of the monomer and name it.

(1Mark)

Structure

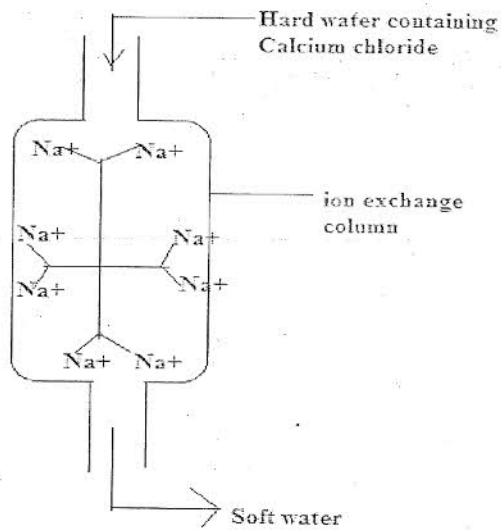
Name

(2Marks)

16. Describe briefly how you would obtain a sample of pure iodine and silver chloride from a mixture of the two.

(3mks)

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



(i) Draw the ion exchange column adjacent to the one above and show how it will appear at the end of softening process.

(2mks)

(ii) Name the type water hardness that is being removed in the set up.

(1 Mark)

18. Elements Q, U, T, R, S and P belong to the same period in the periodic table. The ions formed by the atoms of the elements are given below: Q^{2+} , U^{-} , T^{2-} , R^{3+} , P^{+} and S^{3-} .

(a) Arrange the elements in order of increasing atomic size.

(2Marks)

(b) Suggest a reason why elements P and Q cannot react with each other to form a compound.

(1mk)

19. A piece of phosphorus was burnt in excess air. The product obtained was shaken with a small amount of hot water to make a solution.

(a) Write a balanced equation for the burning of phosphorous in air.

(1Mark)

(b) State and explain the observation made when red and blue litmus papers are dipped into the solution.

(2mks)

20. The common apparatus used for heating in the laboratory is the Bunsen burner. It produces two types of flames. Name the hottest part of the flame that is used for heating.

(1Mark)

21. The table below shows substance A, B, C, D & E. Study it and answer the question that follow.

Substance	Boiling point (°C)	Melting point (°C)	Electrical conductivity	
			Solid state	Molten state
A	4627	3200	Does not conduct	Does not conduct
B	-78	-115	Does not conduct	Does not conduct
C	2501	1059	conducts	conducts
D	1314	799	Does not conduct	conducts
E	80	6	Does not conduct	Does not conduct

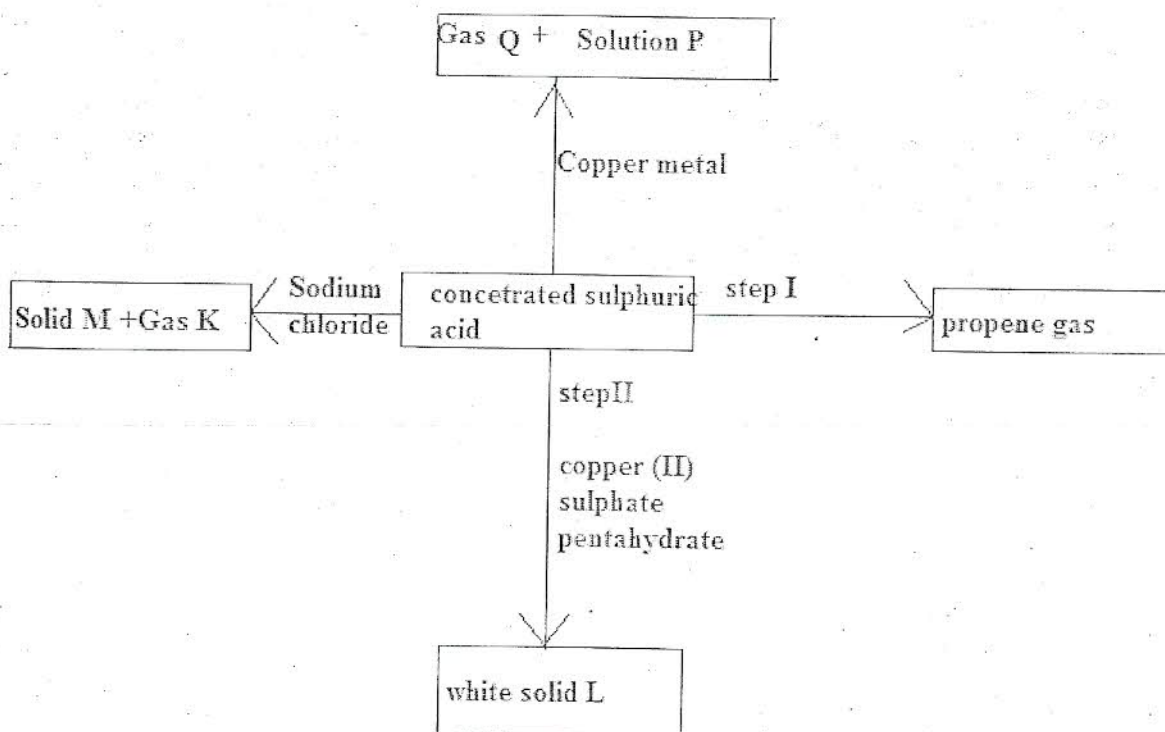
- a) State the particles that enable substance C conduct electricity. (1Mark)
- b) Explain whether substance D, dissolves in water or not. (1Mark)
- c) Which substance heated on water bath will change to a gas? (1Mark)
22. a) When a piece of magnesium ribbon is dipped into a solution of hydrogen chloride in water, effervescence is seen whereas in methylbenzene it is not seen. Explain this observation.

(2Marks)

b) Hydrogen chloride gas is passed through a solution of silver nitrate. State and explain the observation made.

(1Mark)

23. Study the reaction scheme below involving concentrated sulphuric acid and answer the questions that follow.



a) Name the type of reaction taking part in steps I and II.

(1Mark)

b) Name substances ;

K _____

M _____

P _____

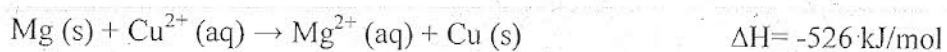
Q _____

(2Marks)

24. a) What is molar heat of displacement ?

(1Mark)

b) Study the following equation and answer the questions that follow.



Calculate the amount of heat liberated by 15.785g of copper is formed. (Cu= 63.5)

(2Marks)

25. Diamond has a melting point of about 3700.°C and graphite has a melting point of about 3300 °C.

(i) Explain why both diamond and graphite have very high melting points.

(2Marks)

(ii) Suggest why the melting point of graphite is lower than that of diamond.

(1Mark)

27. The table below shows some of the ores of iron.

Iron ore	formula
Haematite	Fe ₂ O ₃
Magnetite	Fe ₃ O ₄
Siderite	FeCO ₃

Determine which ore in the table contains the greatest percentage by mass of iron. (Fe =56, O=16)

(2Marks)

28. Carbon dioxide is a greenhouse gas. Carbon dioxide is given a greenhouse factor of 1. Other gases are given a greenhouse factor that compares their effect with carbon dioxide. The greenhouse effect increases as the factor value increases. The table gives some information about four different gases.

Gas	Greenhouse factor	% of gas in the atmosphere
CO ₂	1	0.036
CH ₄	30	0.0017
N ₂ O	160	3.0 x 10 ⁻⁴
CCl ₃ F	21000	2.8x 10 ⁻⁸

(a) State **one** possible consequence of an increased greenhouse effect.

(1Mark)

(b) Why is an increase in the percentage of methane more worrying than the same percentage increase of carbon dioxide?

(1Mark)

(c) What other environmental problem, beside its action as a greenhouse gas, is caused by CCl₃F?

(1Mark)

29. Sulphuric acid is a strong acid.

(i) What is meant by the term *acid*?

(1Mark)

(ii) What is the difference between a strong acid and a weak acid?

(2Marks)