

KENYA HIGH SCHOOL

MOCK 2019

CHEMIST PAPER 1

INSTRUCTION TO CANDIDATES

- Write your name and index number in the spaces provided above.
- Sign and write the examinations in the spaces provided above.
- Answer ALL the questions in the spaces provided in the question paper.
- KNEC mathematical tables and silent non-programmable electronic calculators may be used.
- All working MUST be clearly shown where necessary.
- Candidates should answer the questions in English.

For Examiner's Use Only

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

SECTION A:

- A small crystal of potassium manganate VII was placed in a beaker containing water. The beaker was then left standing for two days without shaking. State and explain the observations that were made. (2mks)
- An atom of Z has two isotopes. It contains 90% of Isotope $^{16}_8\text{Z}$ and 10% of Isotope $^{18}_8\text{Z}$. Calculate the Relative Atomic mass of element Z. (2mks)
- Zinc carbonate was accidentally mixed with sodium chloride. Explain how solid sodium chloride salt could be obtained from the mixture. (3mks)

4. The grid below is part of a periodic table. Use it to answer the questions that follow (The letters are not actual symbols of the elements.)

						R	S	
N	Q						T	U
P								

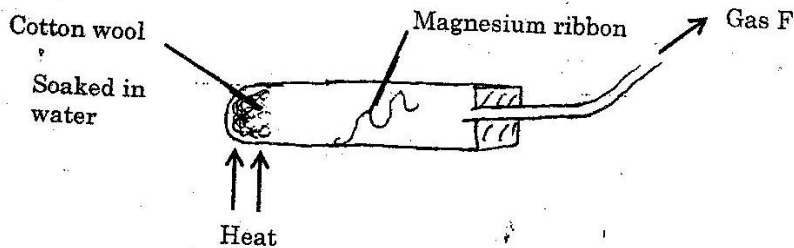
- (a) Indicate on the grid, the position of an element represented by letter V, whose atomic number is 14. (1mk)
- (b) Select a letter which represents a monoatomic gas. (1mk)
- (c) Write an equation for the reaction between Q and T. (1mk)
5. Starting with copper metal, describe how a sample of crystals of copper II chloride may be prepared in the laboratory. (3mks)

6. The table below gives atomic numbers of elements represented by the letters A, B, C and D.

Element	A	B	C	D
Atomic number	15	16	17	20

- (a) Name the type of bonding that exists in the compound formed when A and D react. (1mk)
- (b) Select the letter which represents the best oxidizing agent. Give a reason. (2mks)
7. What is the name given to each of the following:
- (a) ability of a metal to be made into a wire (1mk)
- (b) minimum energy required for a chemical reaction to start. (1mk)
- (c) type of force that holds atoms of neon together. (1mk)

8. A student used the set-up below in order to study the reactions of some metals with steam. The experiment was carried out for 10 minutes.



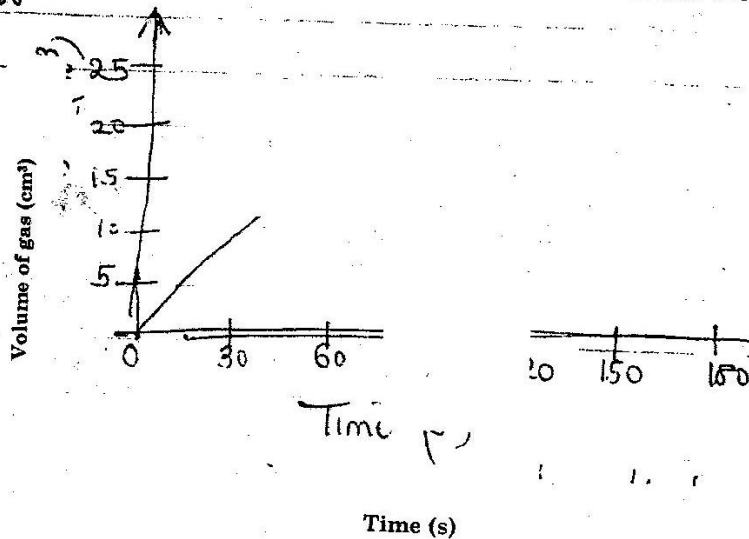
- (a) What observation would be made if gas F is ignited? (1mk)
- (b) When the experiment was repeated using iron powder instead of magnesium ribbon, very little of gas F was obtained.
- (i) Give a reason for this observation. (1mk)
- (ii) What change in conditions of the experiment should the student have made in order to increase the volume of gas F produced? (1mk)

9. The following reaction is in equilibrium in a closed container.



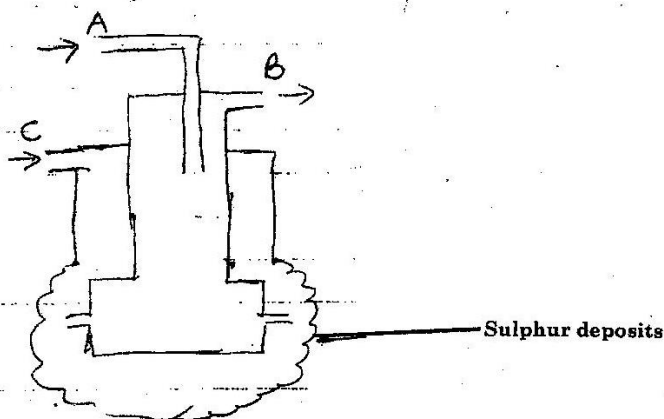
State giving reasons, how an increase in pressure would affect the amount of hydrogen. (2mks)

10. A certain mass of a metal E, reacted with excess dilute hydrochloric acid at 25°C. The volume of hydrogen gas liberated was measured after every 30 seconds. The results were presented as shown in the graph below.



- (a) Name one piece of apparatus that may be used to measure the volume of the gas produced. (1mk)
- (b) (i) On the same axis, sketch the curve that would be obtained, if the experiment was repeated at 35°C. (1mk)
- (ii) Explain the shape of your curve in b (i) above. (1mk)

11. The diagram below shows extraction of sulphur from its deposits.



- (a) Name the process that is used to extract sulphur from its deposits. (1mk)
- (b) Name the substances that pass through pipes A, B and C. (3mks)
- A: _____
- B: _____
- C: _____
12. State and explain what happens to the masses of the following substances when they are separately heated in open crucibles.
- (a) Potassium manganate VII (2mks)
- (b) Zinc oxide (2mks)
13. Aluminium oxide reacts with both acids and bases.
- (a) Write an equation for the reaction between Aluminium oxide and hydrochloric acid. (1mk)
- (b) Using equation (a) above, calculate the number of moles of hydrochloric acid that would react completely with 153g of Aluminium oxide ($Al = 27, O = 16$) (2mks)

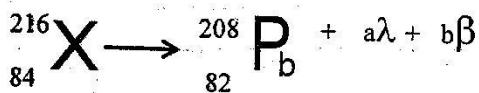
14. Explain why there is a general increase in the first ionization energies of the elements in period 3 of the periodic table from left to right. (2mks)

15. An alkanol has the following composition by mass; hydrogen 13.5%, oxygen 21.6% and carbon 64.9%

(a) Determine the empirical formula of the alkanol (C = 12, H = 1, O = 16) (2mks)

(b) Given that the empirical formula and molecular formula of the alkanol are the same, draw the structure of the alkanol. (1mk)

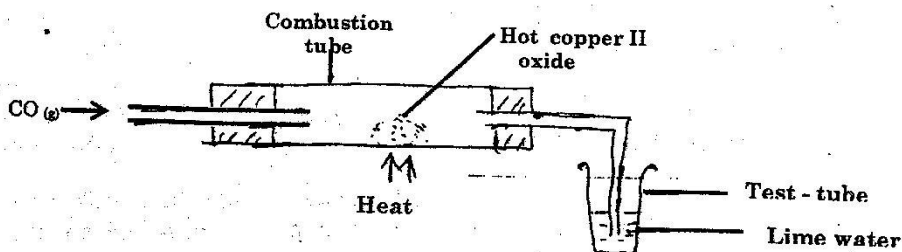
16. A radioactive element X₈₄ decays as follows:



Determine the values of a and b.

(2mks)

17. Carbon II oxide gas is passed through hot copper II oxide as shown in the diagram below.

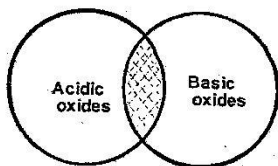


(i) State the observation made in the combustion tube at the end of the experiment. (1mk)

(ii) Write an equation for the reaction that occurred in the combustion tube. (1mk)

(iii) Using equations only show, what happens in the limewater. (2mks)

18. The diagram below show acidic and basic oxides fit into the general family of oxides.

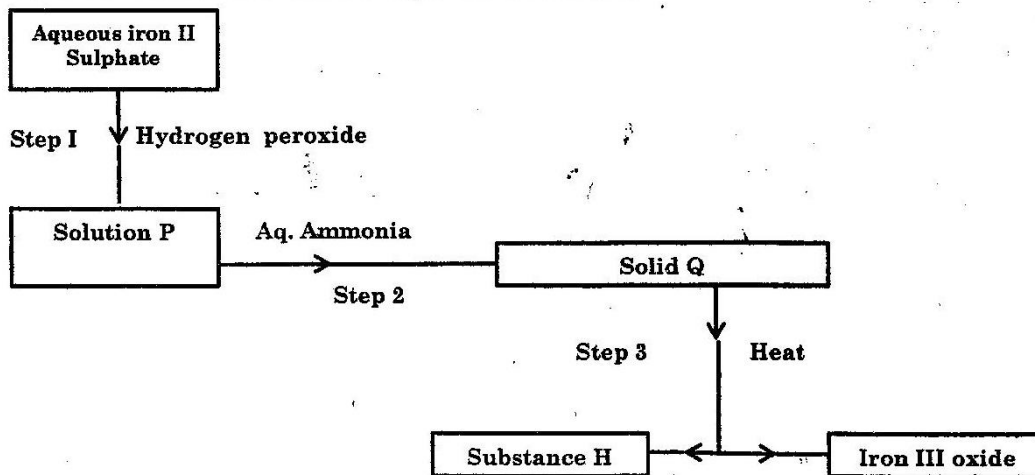


(a) State the name given to oxides in the shaded area? (1mk)

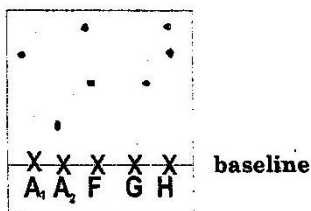
(b) Give the formula of an example of an oxide in the shaded area. (1mk)

19. Using dots (.) and crosses (x) show bonding in;
- (a) the compound formed when nitrogen reacts with fluorine (Atomic numbers F = 9, N=7); (1mk)
- (b) Sodium oxide (Atomic numbers, Na = 11; O = 8) (1mk)

20. Use the flow chart below to answer the questions that follow:



- (a) What observation would be made in Step I? (1mk)
- (b) Name another substance that could be used in step 2? (1mk)
- (c) Give the name of substance H. (1mk)
21. The boiling point of water is 100°C, while the boiling point of hydrogen sulphide is -61°C; yet both are molecular substances. Explain why they show different trends in their boiling points. (2mks)
22. Samples of urine from three participants F, G and H in a sports meeting were spotted onto a chromatography paper alongside two from illegal drugs A₁ and A₂. A chromatogram was run using methanol as shown below.



- (a) identify the athlete who had used an illegal drug. (1mk)
- (b) Which drug is more soluble in methanol. (1mk)

23. (a) State Graham's law of diffusion. (1mk)
- (b) The molar masses of gases W and X are 16 and 44 respectively. If the rate of diffusion of W through a porous material is $12\text{cm}^3/\text{sec}$, calculate the rate of diffusion of X through the same material. (2mks)

24. Calculate the table below by writing the products formed at the electrodes during electrolysis (3mks)

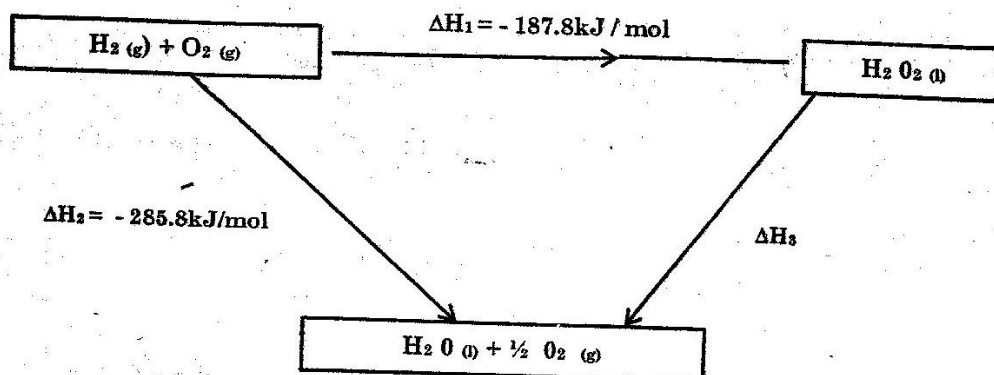
Electrolyte	Product at anode	Product at cathode
Aqueous sodium sulphate using inert electrodes	($1/2$ mk)	($1/2$ mk)
Aqueous copper II sulphate using copper electrodes	($1/2$ mk)	($1/2$ mk)

25. The pressure of nitrogen gas contained in 1dm^3 cylinder at -196°C was 10^7 pascals. Calculate the;

(a) Volume of the gas at 25°C and 10^5 pascals. ($1\frac{1}{2}$ mks)

(b) Mass of nitrogen gas (molar gas volume = 24dm^3 , $N = 14$.) ($1\frac{1}{2}$ mks)

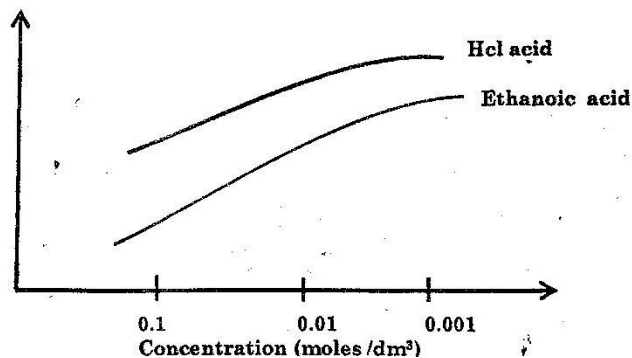
26. The figure below shows an energy cycle



(a) Give the name of the enthalpy change, ΔH_1 (1mk)

(b) Determine the value of ΔH_3 . (2mks)

27. The curves below show how the electrical conductivity of hydrochloric acid and ethanoic acids vary with concentration.



- Explain why the electrical conductivity of 0.01M HCl acid is higher than that of 0.01M ethanoic acid. (2mks)
28. Carbon II oxide is described as a “silent killer.”
- (a) State one physical property of carbon II oxide that makes it a “silent killer”. (1mk)
- (b) State and explain one chemical property that makes carbon II oxide poisonous to human beings. (2mks)
29. In an experiment, to prepare nitrogen I oxide, ammonium nitrate was gently heated in a flask.
- (a) Write the equation for the reaction that took place. (1mk)
- (b) State and explain how the gas was collected. (1mk)
- (c) A sample of the gas was tested with damp blue and red litmus papers. What observations were made? (1mk)