ZERAKI ACHIEVERS' EXAMINATIONS (2021)
Term 3 - 2021
CHEMISTRY (QUESTION PAPER)
FORM TWO (2)
Time: 2 Hours

Name: …… **Adm No**: …….

School: ……... **Class**: …….

Signature: ……...**Date**: ……...

INSTRUCTIONS:

- *Write your **name** and **other details** on the space provided above*
- *Answer **all** the questions in the spaces provided for each question.*
- *All working **must** be clearly shown where necessary.*
- *Mathematical tables and non-programmable electronic calculators may be used.*

For Examiners Use Only

Questions	Total marks	Student's score
1 - 26	**80**	

This paper consists of 10 printed pages. Students should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. Draw a diagram of the apparatus used to measure accurately 250 cm^3 of liquids or solutions.

(1 mark)

2. In the laboratory, there are two types of flames; **with reasons**, state which flame is used for:

   (a) Heating……
   …… (1 mark)

   (b) Lighting……
   …… (1 mark)

3. Define the term drug abuse. (1 mark)

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4. Shanty accidentally mixed iron fillings, iron (III) chloride crystals and sulphur powder. Describe how she would obtain each of the substances separately. (3 marks)

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5. Classify the following as either chemical or physical changes. (5 marks)

Process	Type of change
Electrical conductivity by copper wire	
Rusting of an iron nail	
Sublimation of iodine	
Burning candle wax	
Attraction of iron filings by a magnet	

6. Matter exists in three states. Describe how particles behave in each state according to kinetic theory of matter.
   (a) Solid state: (2 marks)

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(b) Liquid state: (2 marks)

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(c) Gaseous state: (2 marks)

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7. Explain how acid rain can be formed. (2 marks)

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8. Solutions may be classified as strongly basic, weakly basic, neutral, weakly acid, or strongly acidic. The information below gives solutions and their pH values. Study it and answer the questions that follow.
   Classify the solutions in the table using the stated classifications. (2 Marks)

Solution	pH value	Nature of solution
B	0.5	
C	6	

9. A farmer tested soil in his farm and found out that its pH was 5.5. This was below the recommended pH of 7.0. Suggest how the farmer could achieve the recommended pH of soil in his fam. (1 mark)

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10. Name **three** gaseous components of unpolluted air. (3 marks)

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11. (a) Zinc reacts with dilute sulphuric (VI) acid to produce a colourless gas. Write an equation for the reaction. (1 mark)

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(b) Describe a test for the colourless gas. (2 marks)

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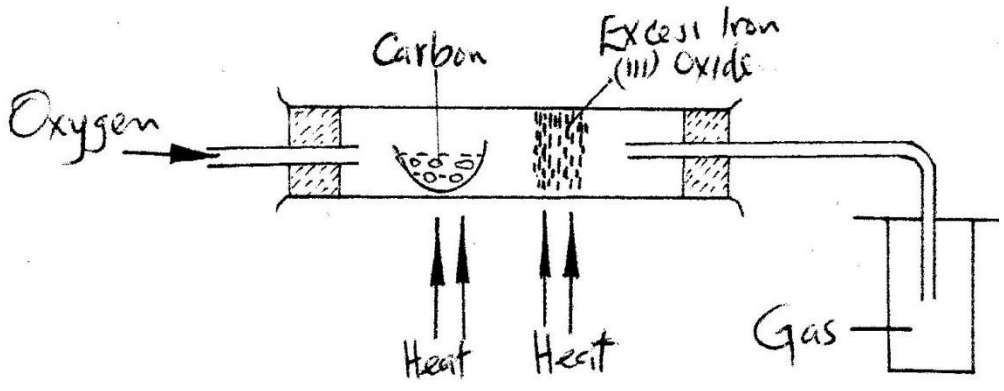
12. The set – up below was used to obtain a sample of iron metal.



(a) Write **two** equations for the reactions which occur in the combustion tube. (2 marks)

Equation 1:

.....

Equation 2:

.....

(b) Name the gas collected in the gas jar. ..... (1 mark)

(c) Give **two** uses of carbon (II) oxide that are also uses of hydrogen. (2 marks)

……

……

13. (a) Name **one** natural source of water for a chemical industry. (1 mark)

……..

(b) Kerosene is a **hydrocarbon**. Name the product of burning kerosene that is a liquid at room temperature. …… (1 mark)

(c) Metal **Y** can displace metal **X** from its oxide. Hydrogen can reduce the oxide of metal **X**. Metal **X** does not react with water, while metal **Y** reacts with water moderately. Metal **Z** reacts with explosively with water. Arrange the metals and hydrogen from the most reactive. (1 mark)

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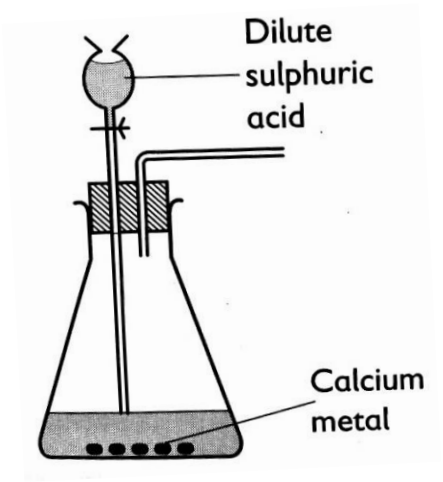
14. The set-up below was used to prepare a gas **Q**.



(a) Complete the diagram to show how a dry sample of gas **Q** may be collected. (2 marks)

(b) Give a reason why calcium is not the most appropriate metal for use in this preparation. (1 mark)

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(c) Write an equation for the reaction for the formation of gas **Q**. (1 mark)

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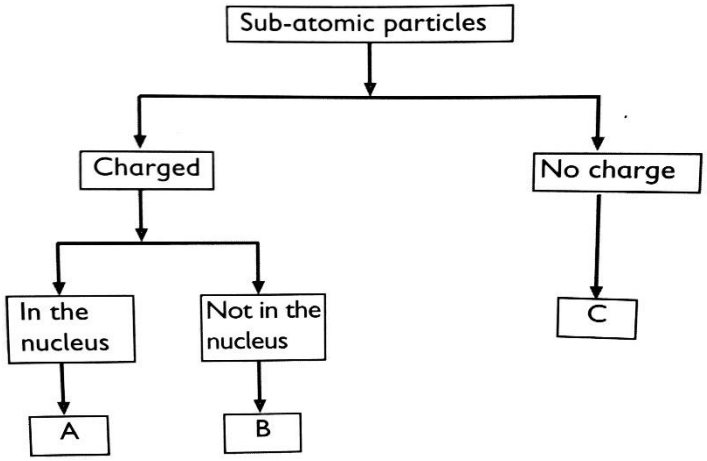
15. Complete the key shown below for sub atomic particles. (3 marks)



Key

A ……

B……

C ……

16. The relative atomic mass of element Y which consists of the isotopes ^{20}Y and ^{22}Y is 20.2. Calculate the percentage of the atoms in the isotopic mixture. (3 marks)

17. The ionic radii of the ions of Q and R are given as follows: Q^{2+} = 2,8,8 and R^{-} = 2,8.

(a) Complete the table below: (2 marks)

Element	**Group**	**Period**
Q		
R		

(b) Write the formula of the product formed when Q and R react. (1 mark)

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18. The halogens are a group of non-metals in Group VII of the Periodic Table.

(a) Describe an experiment which shows that chlorine is more reactive than iodine. Include an equation in your answer. (3 marks)

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(b) State **two** observations made when warm sodium metal in a deflagrating spoon is lowered in a gas jar full of chlorine gas? (2 marks)

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(c) Write an equation for the reaction in (b) above. (1 mark)

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19. The following table gives the number of protons in the nucleus of some elements. The letters do not represent the actual symbols of elements. Use it to answer the questions that follow.

Element	E	F	G	H	I	J	K	L
Number of protons	3	12	6	17	10	19	14	35

(a) Which elements belong to the same group of the periodic table? (2 marks)

……

(b) How will the reactivity of element **F** compare with that of element **K**? Explain. (2 marks)

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20. The atomic numbers of elements **X** and **W** are 11 and 16 respectively.

(a) Write the electronic arrangements of the elements. (1 mark)

Element X…… Element W……

(b) Predict the type of bonding in the product formed if elements **W** and **X** were to be reacted. Give the formula of the resulting compound. (2 marks)

Type of bond…… Formula of compound ……

21. The table below show the physical properties of some substances. Use it to answer the questions that follow.

Substance	**Melting point (°C)**	**Boiling point (°C)**	**Electrical conductivity**	
			Solid	**Liquid**
U	1083	2595	Good	Good
V	801	1413	Poor	Good
W	6	80	Poor	Poor
X	-114	-84	Poor	Poor
Y	3550	4287	Poor	Poor

(a) Which substance is likely to be; (1 mark)

(i) An element …… (ii) A liquid at 22^{o}C ……

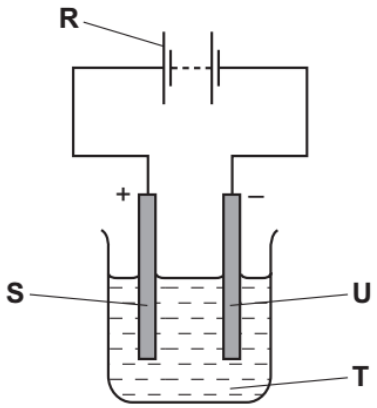
(b) Which substance is likely to have the following structures? (3 marks)

(i) Simple molecular structure ……

(ii) Giant ionic structure ……

(iii) Giant atomic structure ……

22. The diagram below shows the apparatus used for the electrolysis of molten sodium bromide.



(a) What does the term electrolysis mean? (1 mark)

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(b) Which letter **R, S, T** or **U** on the diagram represents the cathode? (1 mark)

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(c) State the observation made at the anode. (1 mark)

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(d) Which **condition** is missing in the set-up? …… (1 mark)

(e) Write the half equation for the reaction at: (2 marks)

(i) Cathode: ……

(ii) Anode: ……

23. State Graham's Law of diffusion. (1 mark)

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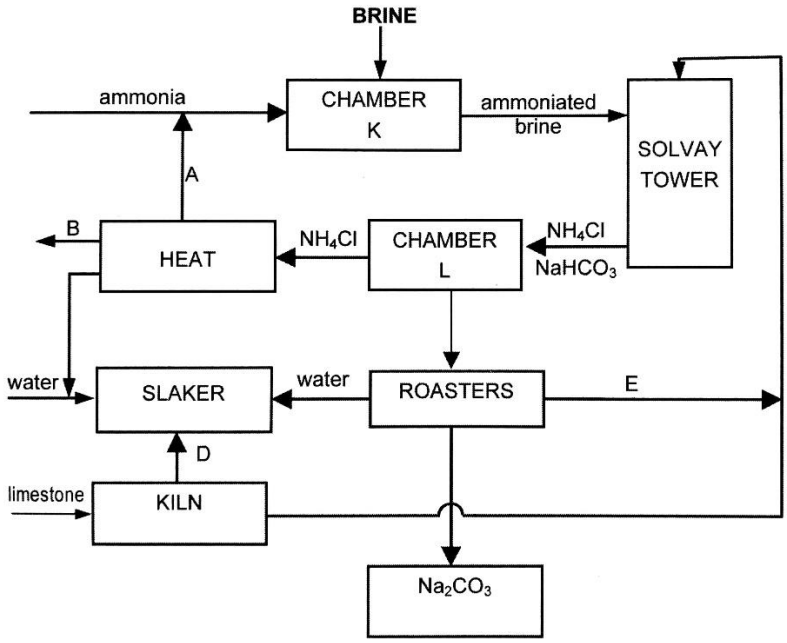
24. Sketch a curve to illustrate the relationship between the volume of a fixed mass of a gas and its pressure at constant temperature. (1 mark)

25. Study the flow chart below and use it to answer the questions that follow.



(a) Name the substances labelled **A, B, D** and **E**. (2 marks)

A……B……

D……E……..

(b) Cold water is made to circulate around **chamber K**. Suggest a reason for this. (1 mark)

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(c) Give **one** reason for recycling in this process. (1 mark)

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(d) Write down the equations for the reactions taking place in:

(i) The kiln (1 mark)

……

(ii) Solvay tower (overall equation) (1 mark)

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(e) Give **two** uses of substance **B**. (1 mark)

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26. Describe an experiment that can be used to prepare a solid sample of sodium hydrogen carbonate in the laboratory starting with sodium metal. (3 marks)

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