ZERAKI ACHIEVERS' EXAMINATIONS (2021)
Term 3 - 2021
CHEMISTRY (QUESTION PAPER)
FORM ONE (1)
Time: 2½ Hours

Name: …… **Adm No**: …….

School: …….. **Class**: ……..

Signature: …….. **Date**: ……...

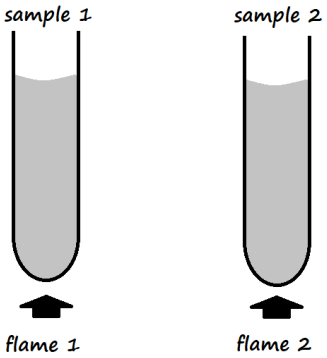
Instructions to candidate

a) Write your name, admission number, and stream in the spaces provided.
b) Answer **ALL** questions in the spaces provided
c) All working **MUST** be clearly shown where applicable
d) KNEC mathematical tables and silent non-programmable electronic calculators may be used
e) This paper consists of *11 printed pages*
f) The candidate should check the question paper to ascertain that all the pages are printed as indicated and that no question is missing

FOR EXAMINERS' USE ONLY

Question	Maximum Score	Candidate's Score
1 – 25	**80**	

1. Equal volumes of water in two separate boiling tubes were separately heated using two different Bunsen burner flames.



Sample 1 registered a higher temperature than sample 2.

a) Name and draw flame 2 (2 Marks)

Name _____

b) State the condition under which flame 1 is produced by a Bunsen burner (1 Mark)

_____

_____

2. The table below shows the colours obtained when some indicators were added to various solutions

Solution	**Phenolphthalein Indicator**	**Methyl Orange Indicator**	**Indicator W**
Distilled water			Green
Ammonium hydroxide	Pink		Blue
Hydrochloric acid		Red	Red
Sodium hydroxide			Violet

a) Fill in the blank spaces in the table above? (3 Marks)

b) State the possible identity of Indicator **W**. (1 Mark)

_____

c) What is the advantage of using Indicator **W**? (1 Mark)

_____

3. State the laboratory rules that should be applied to prevent the following accidents:
   a) Mistaking hydrochloric acid to be distilled water (1 Mark)

_____

_____

   b) A student got burnt after secretly lighting up a magnesium ribbon (1 Mark)

_____

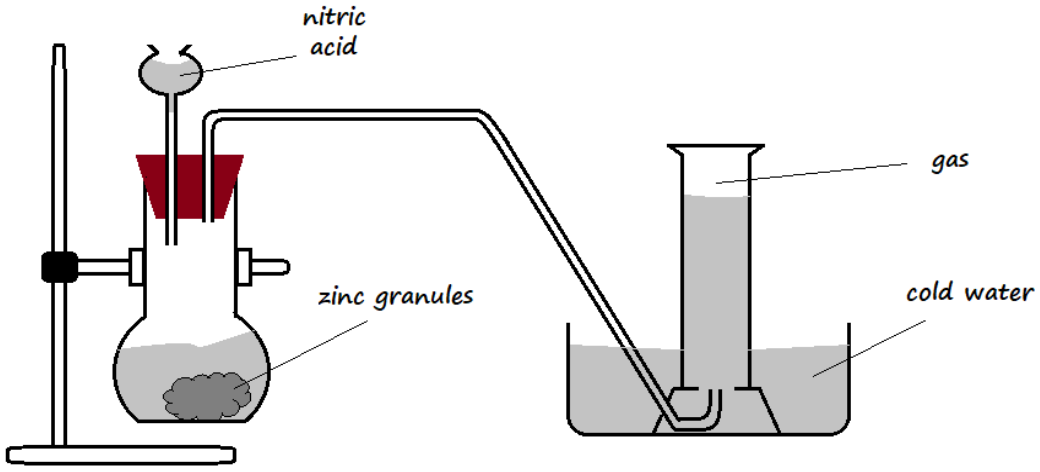
_____

   c) A student got severe stomach upset after eating some bread during a Chemistry laboratory session (1 Mark)

_____

_____

4. The setup below was arranged for the collection of **dry** hydrogen gas in the laboratory. Use it to answer the questions that follow.



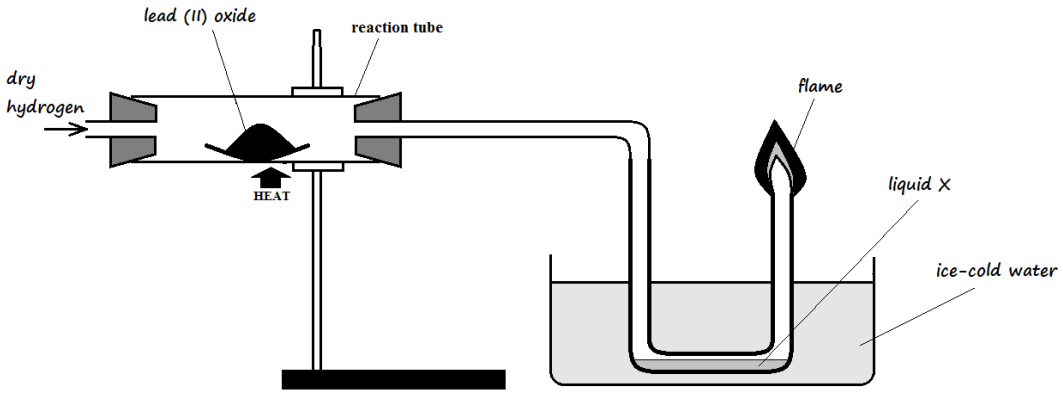
   a) Identify **two** mistakes in the set-up (2 Marks)

_____

_____

b) Suggest remedies for the mistakes identified in **a)** above (2 Marks)

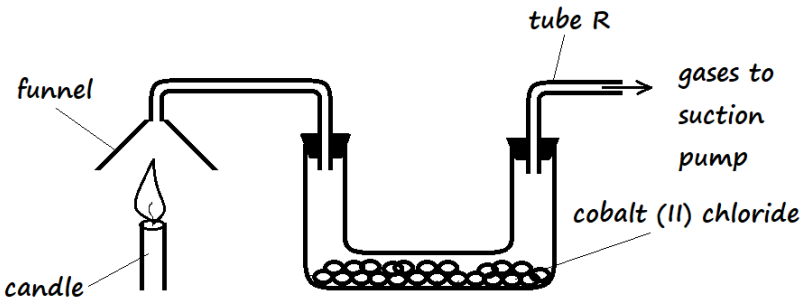
5. Dry hydrogen gas was passed over heated lead (II) oxide in a combustion tube as shown in the diagram below.



a) State **two** observations that were made in the combustion tube (2 Marks)

b) Write a word equation for the reaction taking place in the combustion tube (1 Mark)

6. The products of a burning candle were passed through a U-tube containing anhydrous cobalt (II) chloride as shown in the diagram below



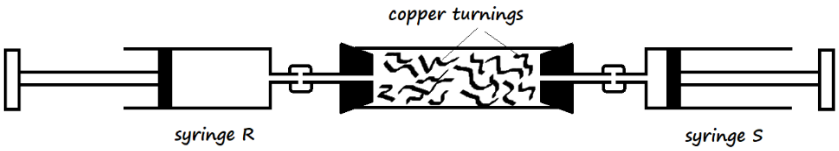
a) State the observation that was made in the U-tube (1 Mark)

b) Write a word equation for the reaction taking place in the U-tube (1 Mark)

c) Name the gas that came out through tube **R** (1 Mark)

_____

7. Copper turnings were packed in a combustion tube connected to two syringes as shown in the diagram below. Syringe **R** contained 120cm^3 of air while syringe **S** was empty.



The copper turnings were heated strongly as air was being passed from syringe **R** to syringe **S** slowly and repeatedly, until there was no further change in volume of air in syringe **R**. The final volume of air was 95.5cm^3.

a) Why was air passed over the heated copper turnings slowly and repeatedly? (2 Marks)

_____

_____

b) State **one** observation made in the combustion tube during the experiment (1 Mark)

_____

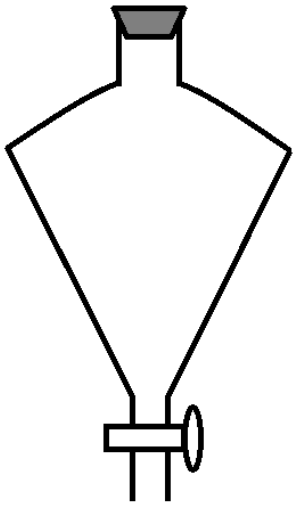
c) Determine the percentage of oxygen used during the experiment (2 Marks)

_____

_____

_____

8. The apparatus below was used to separate a mixture of liquid **A** and **B**



State **two** properties of the liquids that make it possible to separate them using this apparatus (2 Marks)

_____

_____

9. A mixture contains iron filings, sulphur, and table salt. Describe a procedure that a student can use to separate the mixture and recover all the components of the mixture. (3 Marks)

_____

_____

_____

_____

10.

a) Draw **two** separate diagrams to differentiate a flat-bottomed flask of 250ml and a volumetric flask of 250ml (2 Marks)

Flat-bottomed flask	Volumetric flask

b) State the main use of a volumetric flask (1 Mark)

_____

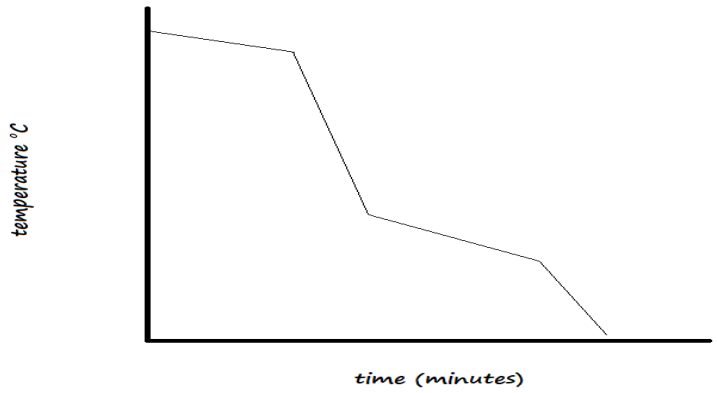
_____

c) Flat bottomed flasks and volumetric flasks are made of glass. Explain (1 Mark)

_____

_____

11. The diagram below shows the cooling curve of a certain substance



Is this substance pure or impure? Explain (2 Marks)

_____

_____

12. Write word equations for the following reactions: (3 Marks)
    a) Sodium and water

    _____

    b) Calcium oxide and nitric acid

    _____

    c) Magnesium carbonate and hydrochloric acid

    _____

13. Salt is normally sprinkled on roads during winter in temperate countries.
    a) State and explain why salt is put on roads during winter (2 Marks)

    _____

    _____

    b) Why is this practice of great concern to motorists (1 Marks)

    _____

    _____

14. Explain how each of the following components is removed from a sample of air, before the fractional distillation of liquefied air:
    a) Carbon (IV) oxide (1 Mark)

    _____

    _____

    b) Water vapour (1 Mark)

    _____

    _____

    c) Solid impurities (1 Mark)

    _____

    _____

    d) Why is it important to remove carbon (IV) oxide from the air sample? (1 Mark)

    _____

    _____

15. Name the constituent element in each of the following compounds:

a) Copper (II) sulphate (1½ Marks)

_____

b) Sodium nitrate (1½ Mark)

_____

c) Potassium iodide (1 Mark)

_____

16.

a) Complete the table below (3 Marks)

English Name	Symbol
Sodium	
	P
Lead	
	K
	Au
	Hg

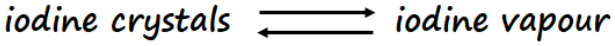
b) State the difference between a compound and a mixture (2 Marks)

_____

_____

_____

17. The diagram below represents a change



a) What type of change is represented above? (1 Mark)

_____

b) Give **four** characteristics of the change (2 Marks)

_____

_____

_____

_____

18. Give any **three** apparatus that are used to measure accurate volumes of liquids and solutions in the laboratory (3 Marks)

_____

_____

_____

19. Define the following:
    a) Boiling point (1 Mark)

    _____

    _____

    b) Matter (1 Mark)

    _____

    _____

    c) Indicator

    _____

    _____

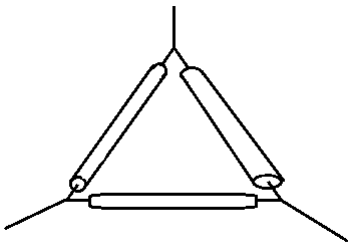
20. Substance **W** is highly soluble in propanone, while substance **M** has low solubility in propanone. Which of the two substances will travel the shortest distance on an adsorbent material during paper chromatography? Explain (3 Marks)

_____

_____

_____

21. Name the following apparatus and state its use in the laboratory (2 Marks)



_____

_____

22. When separating solid copper (II) sulphate from a copper (II) sulphate solution, the solution was first heated then transferred to a water bath. Why was it important to heat the solution over a water bath? (2 Marks)

_____

_____

23. State **two** major differences between the properties of solids and those for gases (2 Marks)

_____

_____

24. After carrying out the process of distillation, describe how one can confirm that the distillate contains no dissolved solute (2 Marks)

_____

_____

25. Which method of separation can be used to obtain the following:
    a) Petrol from crude oil (1 Mark)

    _____

    b) Oil from sunflower seeds (1 Mark)

    _____

    c) Distinguish between a homogenous mixture and heterogenous mixture (2 Marks)

    _____

    _____