TERM 2 - 2023

CHEMISTRY (233/1)

FORM ONE (1)

Time - 2 Hours

MARKING SCHEME

1. (a) Meshack, a form one student wanted to measure exactly $25cm^3$ of dilute hydrochloric acid for an experiment. Name the most suitable apparatus that he should use to take the measurement. (1mark)

   Pipette

   (b) Give one reason why a glass apparatus will be preferred when taking the measurement in (a) above. (1mark)

   i. ***Glass apparatus doesn't react with most laboratory chemicals***
   ii. ***Glass apparatus is transparent, making observations easy***

2. The table below shows the solubility of three solids P, Q, and R.

Solid	Cold Water	Hot water
P	Soluble	Soluble
Q	Insoluble	Insoluble
R	Insoluble	Soluble

   Describe how you would obtain pure samples of R, P and Q (3marks)

   Add cold water to the mixture and stir to dissolve P. Filter to get Q and R as residue. Heat the filtrate to evaporate to get P. Add hot water to the residue and stir to dissolve R and filter to obtain Q as residue. Heat the filtrate to evaporate to R.

3. The P^H values of some solutions are given below

P^H	14.0	1.0	8.0	6.5	7.0
Solution	M	L	N	P	Z

   (a) Identify the solution with the lowest concentration of hydrogen ion. Give reason for your answer (1mark)

   P: solution P is weakly acidic.

   (b) Which solution would be used as an anti-acid for treating stomach upset? Give a reason for your answer (1mark)

   N: solution N is weakly alkaline, and neutralizes the acid in the stomach.

(c) What are the natures of solutions M and L?

M is strongly basic while L is strongly acidic ***(***1mark***)***

(d) Which solution is likely to be that of calcium hydroxide? (1mark)

Solution N

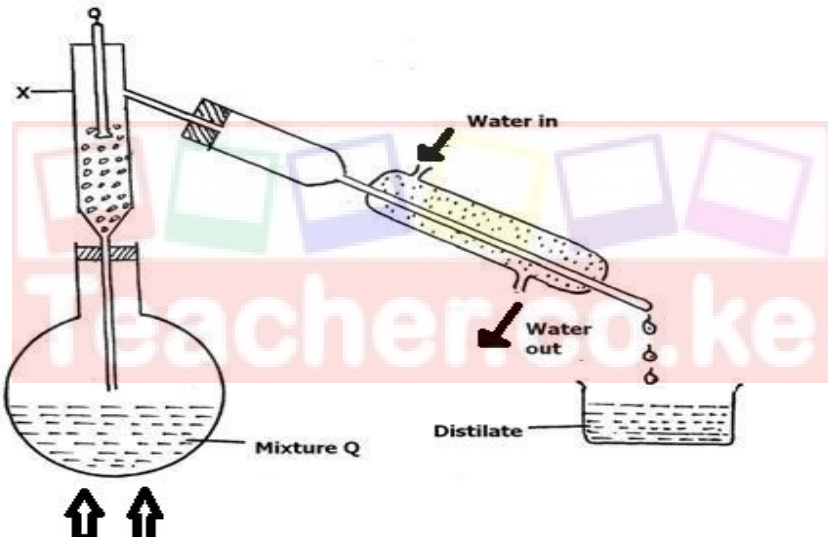
(e) Select the solution in which a sample of magnesium oxide is likely to dissolve. Give a reason for your answer (2marks)

L: magnesium oxide is basic and would dissolve in an acidic solution

4. Distinguish between a Mixture and a Compound (2marks)

A mixture is a group of two or more substances physically combined while a compound is a group of two or more elements chemically combined.

5. In an experiment to separate a mixture Q of two miscible liquids, Liquids N (B.P 56°C) and liquid M (B.P 118°C) a student set up the apparatus as shown.



a) What makes it possible to separate substances using this method? (1mark)

Difference but close boiling points

b) Name X (1mark)

Fractionating column

c) What is the purpose of the apparatus labelled X? (1mark)

To allow the vapours of the liquid whose boiling point has not been reached to condense and flow back into the flask.

d) Identify one mistake in the set up (1mark)

The water inlet and water outlet has been interchanged

e) Which liquid was collected in the beaker as the first distillate? (1mark)

N

f) What method would the student use to test the purity of the distillates obtained (1mark)

Determining if their boiling points is fixed.

g) Give any one way of increasing the efficiency of this method so as to produce purer components. (1mark)

Increasing the length of the fractionating column

Making the fractionating column narrower

Using more glass beads in the fractionating column.

h) Give any one industrial application of this method of separation of mixtures. (1mark)

Recycling of used oil

Separation of crude oil

Separation of components of air

6. A form one student mixes sodium chloride and water. Give the names of the following

(a) The solute (1mark)

Common salt

(b) The solvent (1mark)

Water

(c) The solution (1mark)

Brine

7. A Bunsen burner produces two types of flames.

(a) Name the two types of flames (1mark)
Luminous flame
Non luminous Flame

(b) Give any two differences between the two types of flames named in (a) above (2marks)

Luminous	***Non luminous***
Bright yellow in colour	***Pale blue in colour***
Has four zones	***Has three zones***

8. Describe how to obtain Elianto oil from maize seeds. (2marks)

Crush the seeds in a mortar using a pestle. Add propanone/ethanol as you continue to crush. Decant and evaporate the solution in the sun.

9. Dilute sulphuric (VI) acid was added to a compound P of zinc. The solid reacted with the acid to form a colorless solution Q, and gas R which formed a white precipitate when passed through lime water.

(a) Name:

(i) Compound P (1mark)

Zinc carbonate

(ii) Solution Q (1mark)

Zinc sulphate

(iii) Gas R (1mark)

Carbon (IV) oxide gas

(b) Write a word equation for the reaction which took place when dilute sulphuric (VI) acid was added to compound P. (1mark)

Zinc Carbonate + sulphuric (IV) acid → Zinc Sulphate + Carbon (IV) oxide

(c) State the observation that would be made if a similar compound of calcium was used in place of that of zinc. Explain. (2marks)

The reaction starts and stops after a short while. An insoluble salt, calcium sulphate, is formed, which coats the surface of the carbonate and prevents further reaction

10. (a) Distinguish between an acid and a base. (2marks)

An acid is a substance which dissolves and dissociate in solution to produce H^+ as the only positively charged ions, while a base is a substance which dissolves and dissociates in solution to produce OH^- as the only negatively charged ions.

(b). Consider the following reagents:

Soda, Quencher, Sodium Chloride solution, distilled water and wood ash solution.

Complete the table below using the above reagents: ($1\frac{1}{2}$ marks)

Nature	Reagent(s)
Acidic	***Soda, quencher,***
Basic	***Wood ash solution***
Neutral	***Distilled water*** ***Sodium chloride***

(c) Name the three common acid-base indicators and state their colours in acidic and basic media. ($4\frac{1}{2}$ marks)

Indicator	Colour in acid	Colour in a base
Litmus	***Red***	***Blue***
Phenolphthalein	***Colourless***	***Pink***
Methyl orange	***Pink***	***Yellow***

11. (a) Define the term 'element' ($\frac{1}{2}$ mark)

A pure substance which cannot be split into simpler substance by chemical means

(b).Name the elements present in each of the following compounds.

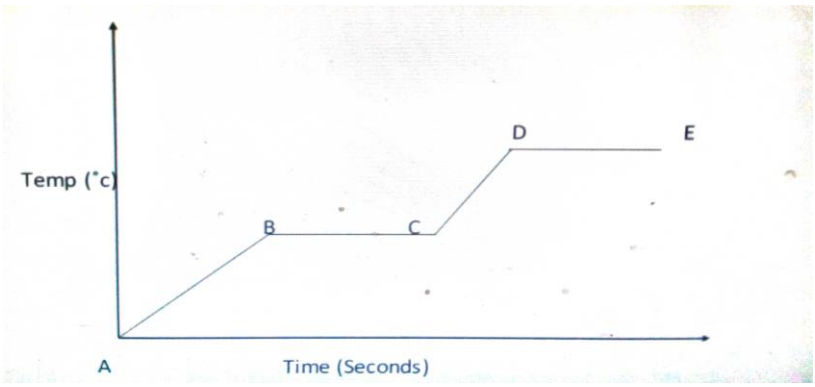
(i) Magnesium sulphate ($1\frac{1}{2}$ marks)

Magnesium, Sulphur and Oxygen

(ii) Iron (II)sulphide (1 mark)

Iron, Sulphur

12. The graph shown below is heating curve of solid substance. Use it to answer questions below



Using kinetic theory of matter explain what happens in the following regions

AB (2marks)

The temperature rises steadily. The solid absorbs heat energy. The kinetic energy of the solid particles increases. They vibrate within their mean positions until it melts at B.

BC (2marks)

The temperature remains constant. The heat absorbed is used to break the bonds holding the solid particles together. Melting occurs.

CD (2marks)

The temperature rises steadily. The liquid absorbs heat energy. The kinetic energy of the liquid particles increases. The particles move far apart until the liquid begins to boil at D

13. Explain the following

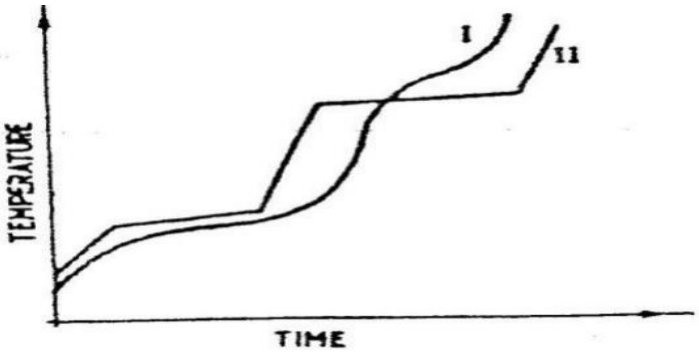
(a) Boiling tube is usually more suitable for boiling liquids than a test tube (1mark)

A boiling tube is wider than a test tube and this makes it more suited for boiling liquids as the liquid is less likely to bump during boiling.

(b) Round bottomed flask is preferred for fractional distillation and not a flat bottomed flask (1mark)

Round bottomed flask allows for even distribution of heat.

14. The curve below represents the variation of temperature with time when pure and impure samples of solid were heated separately



Which curve shows the variation of temperature for the pure solids? Explain (2marks)

Curve II. It has sharp melting point and boiling point

15. Complete the table below. (3marks)

Element	Latin name	Symbol
Potassium	***Kalium***	K
Sodium	Natrium	***Na***
Silver	Argentums	***Ag***
Gold	Aurum	***Au***

16. State the function of the following apparatus in the laboratory. (2marks)

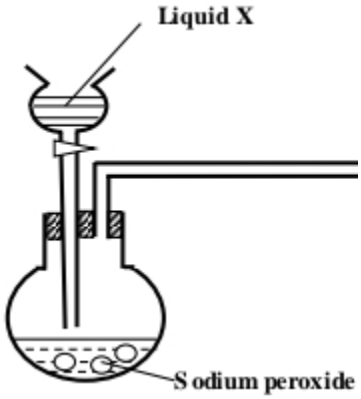
a) Deflagrating spoon

Holding solid substances being burned

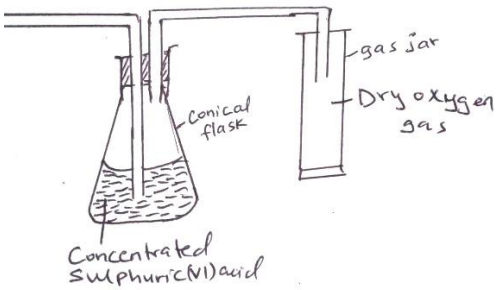
b) Desiccators

Keeping substances dry/away from moisture

17. The diagram below is a set up for the laboratory preparation of dry oxygen gas.



(a) Complete the diagram to show how a dry sample of oxygen gas can be collected. (3marks)



(b) Name liquid X (1mark)

Water

(c) Write a word equation for the reaction that took place in the flask. (1mark)
Sodium peroxide + Water → Sodium hydroxide + oxygen gas

18. State the best method to separate the following mixtures

a) Components of crude oil (1mark)

Fractional distillation

b) Oil from sunflower seeds (1mark)

Solvent extraction

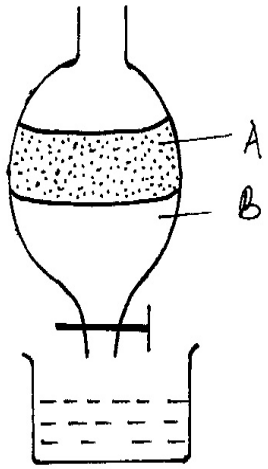
c) Coloured pigment from grass (1mark)

Chromatography

19. Hydrated copper (II) sulphate exists as blue crystals while anhydrous copper (II) sulphate is a white powder. Describe a laboratory experiment that can be used to show that the action of heat on hydrated copper (II) sulphate is a reversible reaction (3marks)
Gently heat the blue crystals and condense the vapours. Add the liquid formed to the white powder. The colour changes back to blue

20. A patient was given tablets with prescription 2 x 3 on the envelope. Clearly outline how the patient should take the tablets. (2marks)
Take two tablets three times a day, after every 8 hours, and repeat the same until all the medicine is finished.

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



(a) Name the method of separation shown. (1mark)
Use of a separating funnel

(b) Give the possible identities of liquids A and B (1mark)

A ***paraffin oil***

B ***water***

(c) State one property of the liquids that make it possible to separate them using such apparatus. (1mark)
Immiscibility
Difference in density

22. Pure naphthalene has a melting point of 80.2°C. What is the effect of adding camphor to the pure naphthalene on its melting point? (1mark)
It lowers the melting point of naphthalene.

23. What role do the following play in the commercial preparation of oxygen?
(a) Concentrated sodium hydroxide (1mark)
Absorbs carbon (IV) oxide

(b) Concentrated sulphuric(IV)acid (1mark)
Absorbs moisture