

545/2

CHEMISTRY

Paper 2

April 2018

2 Hours

END OF TERM ONE EXAMINATIONS 2018

S.4 CHEMISTRY

Paper 2

2 Hours

INSTRUCTIONS TO CANDIDATES

This paper is made up of two sections A and B

Section A consists of 10 structured questions. Answer all questions in this section

Section B consists of 4 semi-structured questions

Answer any two(2) questions from this section

Answers must be written in the answer sheets provided

In both sections, all workings must be clearly shown

Where necessary

(H=1, C=12, N=14, O=16, Pb=207, S=32, Na=23, Si=28, Cl=35.5, Al=27)

1 mole of a gas occupies 24dm^3 at room temperature

1 mole of a gas occupies 22.4dm^3 at s.t.p

For Examiner's use only

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	TOTAL

SECTION A (50MARKS)

Answer all questions in this section

All workings must be shown clearly in the spaces provided

1. a) Give any two reasons why water is a compound but not a mixture.
(1mk)

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- b) A house girl poured paraffin accidentally on water in a transparent bottle

- i) State what was observed $\frac{1}{2}$ mk

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.....

- ii) Identify the type of liquid mixture formed $(\frac{1}{2})$ mks

.....

.....

iii) In the space below, draw a diagram to show the behavior of the liquid mixture above. (1mk)

C(i) Explain why the mixture behaves as in b(ii) above. (1/2mks)

.....

.....

ii) Name one piece of apparatus that can be used to separate the above liquid mixture. (1/2mks)

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.....

iv) Name one other example of a mixture that behaves in a similar way as the above. (1/2 mks)

.....

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2. a(i) Name the suitable acid used to react with Marble chips to produce carbondioxide gas in the laboratory. (1mk)

.....

.....

ii) Write the equation that leads to the formation of carbon dioxide gas. ($1\frac{1}{2}$ mks)

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.....

b) A piece of burning of magnesium ribbons was lowered into a gas jar of carbon dioxide gas.

(i) state what was observed ($\frac{1}{2}$ mk)

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.....

ii) Write the equation of the reaction that took place ($1\frac{1}{2}$ mks)

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3. a) what is an electrolyte? (1mk)

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.....

b) Both copper metal and molten copper (II) bromide conduct electricity. Identify the conducting particles in;

(i) Copper metal ($\frac{1}{2}$ mk)

.....
.....

ii) Molten copper (II) bromide

($\frac{1}{2}$ mk)

.....
.....

c) If molten copper (II) bromide is electrolyzed, state what was observed at the

i) Cathode

($\frac{1}{2}$ mk)

.....
.....

ii) Anode

($\frac{1}{2}$ mk)

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.....

4. Concentrated ammonia solution was placed in one corner in a room and a smell of ammonia gas was heard after sometime

a(i) Identify the process by which ammonia smell was heard. (1mk)

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.....

ii) Explain your answer above

($1\frac{1}{2}$ mks)

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b) A beaker of ammonia gas was inverted into a gas jar containing hydrogen chloride gas.

(i) State what was observed (1/2mk)

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.....

ii) Write the equation that took place (1/2mk)

.....
.....

5. a) A solid X reacts with water to produce oxygen gas in the laboratory.

(i) Identify the solid X (1/2mk)

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.....

ii) Write the equation for the reaction that took place.

(1 1/2 mks)

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.....

b) Burning magnesium ribbon was placed in a gas jar of oxygen gas.

(i) state what was observed (1mk)

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.....

ii) Write the equation for the reaction that took place. (1mk)

.....
.....

6. An element T belongs to group (II) and period 4 in the periodic table

a(i) State the atomic number of T (1/2mk)

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.....

ii) Write the electronic structure of T (1/2mk)

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.....

iii) Write the formula for the nitrate of T (1/2mk)

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.....

b) If the nitrate above was strongly heated,

(i) state what was observed (1 1/2 mks)

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.....
.....

ii) Write the equation for the reaction that took place

(1 1/2 mks)

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.....

7. a) copper metal was heated with concentrated sulphuric acid to produce a gas Q in the laboratory

(i) Identify the gas Q (1/2mk)

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.....

ii) Write the equation for the reaction leading to the formation of a gas Q. (1 1/2mks)

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b(i) Name one reagent that can be used to test for the colorless gas Q in the laboratory (1mk)

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ii) State what is observed when the reagent was used. (1/2mk)

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.....

c) Sodium hydroxide solution was added to the solution above until in excess.

(i) state what was observed (1/2mk)

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ii) Write the ionic equation for the reaction that took place. (1 1/2mks)

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(i)state what was observed (1/2mk)

(1mk)

(2mks)

10. Name one reagent that can be used to distinguish between each of the following pair of ions and in each case state what was observed

a) Pb^{2+} and Al^{3+}

(1½ MKS)

Reagent.....
.....

Observation.....
.....
.....

b) HCO_3^- and CO_3^{2-}

Reagent

(1½ MKS)

.....
.....

Observation

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.....
.....
.....

c) SO_4^{2-} and Cl^-

Reagent

(1½ MKS)

.....
.....

Observation

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SECTION B(30 MARKS)

Answer any two questions from this section

11.a (i) write the equation for the reaction that show how lead(II) oxide reacts with dilutennitric acid. (1 $\frac{1}{2}$ mks)

ii) Describe briefly how crystals of lead (II) nitrate can be prepared. (3mks)

b) Dry crystals of lead (II) nitrate was heated strongly until there was no further change

i)state what was observed
(1 $\frac{1}{2}$ mks)

ii) Write the equation for the reaction that took place. (1 $\frac{1}{2}$ mks)

c) State what is observed when lead (II) nitrate solution is added to;

i) Sodium iodide solution (1/2mk)

ii) Magnesium powder (1/2mk)

d(i) write the ionic equation that took place in c(i) above (1mk)

ii) Explain your observation in c(ii) above (3mks)

- a) zinc nitrate decompose on heating according to the equation below
heat



Calculate the total volume of the gas produced when 3.78g of zinc nitrate was heated strongly at room temperature.

(Zn=65,N=14,O=16, 1 mole of a gas occupies 24dm^3 at room temperature)
(21/2mks)

12.a) What is meant by the term rate of a chemical reaction? (3mks)

b) Explain how each of the following factors affect the rate of a chemical reaction

(i) Temperature (2mks)

ii) Surface area (2mks)

c) With aid of a diagram,describe briefly how the rate of reaction between zinc powder and dilute hydrochloric acid can be determined. (4mks)

d) The table below shows the variation of mass of calcium carbonate with time when reacted with dilute hydrochloric acid.

Mass of CaCO_3 (g)	84	64	49	27	11	9	5
Time (minutes)	0	1	2	4	7	8	9

i) Sketch a graph to show the variation of mass of CaCO_3 with time.
(3mks)

ii) From your graph, determine the;

-rate of reaction at 3 minutes (1mk)

-time taken by half the mass of calcium carbonate to react. (1mk)

e) State at least two ways which can increase the rate of production of carbon dioxide. (1mk)

13. a) iron metal can be extracted by reduction process from the ore and limestone which are mixed with coke in the blast furnace

Name one ore and write the formula of the ore from which iron metal can be extracted (2mks)

b) Using equations for the reaction in each case, state the roles of;

i) Limestone (41/2mks)

ii) Coke (3mks)

c) Dry chlorine gas was passed over heated iron filings

i) state what was observed (1mk)

ii) Write the equation for the reaction that took place (11/2mk)

d) The product above in (c) was dissolved in water and the solution was divided into two portions.

(i) To the first portion, sodium hydroxide was added drop wise until in excess. State what was observed and write the ionic equation that took place. (2mks)

ii) To the second portion, silver nitrate was added, state what was observed and write the ionic equation for the reaction that took place. (1mk)

14. Explain the following observations where necessary write the equation for the reaction that occur in each case. (2mks)

a) Pure water does not conduct electricity but acidified water conduct electricity (3mks)

b) Hard water is safe for drinking than using it for washing (3mks)

c (i) Name one word that means soap formation (1mk)

ii) Name two sources of vegetable oils from which soap can be made.
(1mk)

iii) Describe briefly how soap can be obtained from oils. (31/2mks)

d) Soap was added to a solution of calcium hydrogen carbonate in a beaker.

i)state what was observed

ii) Explain your observation above with the equation

e) State one;

i) advantage of using detergents over soap

ii) disadvantage of using detergents

*******END*******

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