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CENTRE NAME

CANDIDATE IDENTIFICATION NUMBER SUBJECT CODE PAPER NUMBER

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GENERAL CERTIFICATE OF EDUCATION BOARD ORDINARY LEVEL EXAMINATION

SUBJECT TITLE

CHEMISTRY

SUBJECT CODE PAPER NUMBER

2

0515

EXAMINATION DATE: **JUNE 2023**

Two and a half hours

Enter the information required in the boxes above.

This paper is arranged in three Sections; A, B and C.

Section A: *ANSWER* ***ALL 5*** *questions. You will be graded)*

Section B: ANSWER ***ALL*** *2 questions in this section.*

Section C: ANSWER 2 ***QUESTIONS*** *OUT OF* 3:

will be considered.

Section

B

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the best 4 answers

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In calculations, you are advised to show all

Calculators are allowed

attempt more ***than 2 questions,*** *only the*

steps in your working, giving your answer at each stage.

You are *reminded* ***of*** *the necessity* ***for good*** *English* and *orderly presentation in your answers.*

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USEFUL **DATA**:

Relative Atomic Masses

Hydrogen (H) = 1.0

Carbon (C) = 12.0

Oxygen (O) = 16.0

24000cm3,

1 Faraday = 96000
coulombs.

Molar volume of a gas at r.t.p.

23

Specific heat Capacity of water = 4.2J/g/°C to
morin Avogadro Number = 6.02x10
enggolomart O°C = 273K

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Reason:

SECTION A

ANSWER ***ALL 5*** *questions. You will be graded for the best* **4** *answers*

1. An element, **A,** has atomic number 19 and readily reacts with cold water.

Write the electronic configuration of **A.**

ii) Is, **A**, a metal or a non-metal? Give a reason for your choice.

Give one other element belonging to this group.

eentify

the

group

on the Periodic Table

to

which

the

elemen

t **A**,

belong

S.

(c) Using electron dot and cross diagrams

show how the bond between **A** and Oxygen is formed.

(2 marks)

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State one observation when **A** reacts with cold water.

(e) Write the formula of the chloride of **A.**

2. Ethanol is a member of a homologous series of organic compounds.

(a) i) What is a homologous series?

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ii) To which homologous series does ethanol belong?

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(b)

the first member of this homologous series.

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(c) State the observation when PCI, is added to a solution of ethanol.

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(1 mark)

..(1 **mark)**

Total = 10 marks)

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(2 marks)

(1 mark)

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(d) Give the reagent and reaction conditions necessary to convert:

i) Ethanol to ethene

Reagent:

ii) Ethanol to Ethylethanoate

Reagent:..

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Condition:....

Condition:...

(e) State one source and one large scale use of ethanol.

Source:

3. Carbon exhibits allotropy

(a) i) What is allotropy?

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ii)

- Allotropes:

- Difference:....

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(4 marks)

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(2 marks)

(Total 10 marks)

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Act 2moilonon oil 101 anosups in WHY

ii) Name two allotropes of carbon and give one physical difference between the two

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101 Dinalue (D) ignor to oljuk nguondì bozzaq 21 A01 to instvo **(4 marks)**

(b) Carbon dioxide and carbon monoxide are two oxides of carbon ni baanq yliontools to withsup

i) Identify a compound that will react with dilute hydrochloric acid to give carbon dioxide

Meacid

g an equation only, show how carbon dioxide is converted to carbon monoxide

iii) Briefly describe the chemical test that is used to distinguish between carbon dioxide and carbon monoxide

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iv) Give one industrial use of carbon dioxide

(c) Identify the form of carbon that is used as an industrial fuel:

...(1 **mark**)

Jumat vahelino or **(Total** 10 **marks)**

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4.

An aqueous solution of copper (II) sulphate is electrolysed using graphite electrodes.

(a) Draw a labelled diagram of the electrolytic cell used.

(b) Identify the products formed at each electrode:

Cathode:

Cathode

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(c) The graphite electrodes are replaced with copper electrodes.

Anode:

i) Write equations for the reactions taking place at each electrode:

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ii) State the difference in the observations at the anode when the inert electrodes re replaced by copper electrodes.

(extra(d) A current of 1.0A is passed through a solution of copper (II) sulphate for 50 minutes. Calculate the

quantity of electricity passed in coulombs.ibow

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(3 marks)

marks)

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5. The following equation represents a reversible reaction used **in** an industrial process.

$$N_2(g) + 3H_2(g)$$

(a) Identify the source of nitrogen and hydrogen

Nitrogen: Hydrogen:

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*****2NH3(g)

tort

AH-92 KJ/mol

(Total = 10

(3 marks)

(2 marks**)**

marks**)**

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(b) What is a reversible reaction?

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(2 marks**)**

..(1 mark)

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jad(c) What is the enthalpy

for the backward reaction?

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(d) State what will happen to the yield of ammonia, NH3 when:

i) The temperature is increased

ii) The pressure is decreased

i) Identify the catalyst

ii) State the role played by the catalyst..

(f) State Le Chatelier's principle.

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SECTION B

dequate ANSWER **ALL 2** QUESTIONS IN THIS SECTION

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6. In order to determine the of two salts **A** and **B** and an organic compound **O,** a student out a series of tests using the following: aqueous Barium chloride, dilute HCl, aqueous NaOH, solid PCl,, material for flame test and test tubes

(a) i) A flame test was carried out on salt **A.** A lilac flame colour was observed.

Briefly describe the procedure for flame test.

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(2 marks)

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What does a lilac flame colour indicate?

(2 marks**)**

(1 **mark)**

ii) To 2cm3 of a solution of **A** is added 2-3 drops of aqueous Barium chloride followed by dilute hydrochloric acid. Complete the following table.

Observation

A white precipitate is formed.

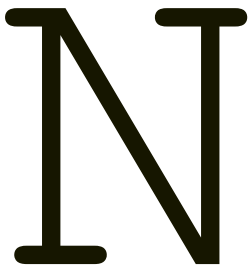
The

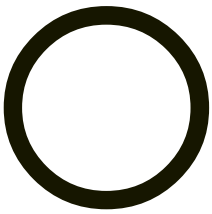
is insoluble in excess HCl

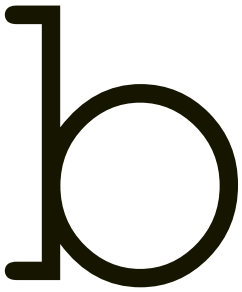
inference

Give the chemical identity of salt **A.**

(b) i) A solid sample of salt **B** was strongly heated in a test tube. A brown gas was observed. What conclusions can you draw from the observation?







(2 marks)

(TOTAL 10 Marks)

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(1 mark**)**

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ueous NaOH. A dirty green precipitate is observed.

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ii) A certain test is carried out on a solution of salt B using
Briefly outline the test procedure and state your conclusion from the results

Procedure:

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..(3 marks)

ntachloride (
(PC15).

Conclusion

Inferences

(c) i) To 2cm3 of the organic compound **O** is added a pinch of solid phosphorus

Complete the following table.

Observation

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White fumes are evolved

(1 mark)

ii) The compound **O** has no effect on both blue and red litmus.
belongs.

the family of organic

to which **O**

..(1

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48
60
66
66

160
240
300
360

(d). A student investigated the rate of production of carbon dioxide by adding dilute hydrochloric acid to chalk. The

volume of carbon dioxide produced over an interval of time is shown on the following table.

Volume of 0

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i) Using the

he grid provided, plot a graph of volume of CO2 collected (on the vertical axis) against time.

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no bob & br

20

35

CO2(g)/cm3

Time /s

0

60

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ii) Using your graph, determine the time taken for the reaction to come to an end.

(e) Why do we wear hand gloves while working the laboratory?

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(2 marks)

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(1 mark)

(TOTAL 20 Marks)

7. The following diagram was used by a student to carry out a Titration experiment involving an acid and a base.

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A

B

(a) Identify the equipment labelled A and B.

A.....

B.....

(b) In which of the apparatus is the indicator usually put during titration?

(c) Why is it always advisable to put the NaOH in apparatus A and not in B?

i)

(2 marks)

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(d) In one of such experiment, the student used 25cm3 of 0.2M NaOH solution, dilute

phenolphthalein indicator.

Briefly describe the procedure for the titration.

(1 mark)

ochloric acid and

dilute hydrochloric acid.

NaOH(aq) + HCl(aq)

ii) State the colour change at the end point.

Initial colour.....

.....(4 marks)

bas A abhicchi

iii) If the volume of the dilute hydrochloric acid at the end point was 15cm3, calculate the concentration of the

otev bus onsausol

Final colour....

NaCl(aq)

+ H2O(1)

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...(2 marks)

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(e) In order to prepare and collect a dry sample **of** carbon dioxide, *a* student was provided with **the** following:

A thistle funnel, 2 flat-bottomed flasks, a gas jar, delivery tubes, rubber bungs, solid calcium carbonate, dilute hydrochloric acid, concentrated Sulphuric acid.

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i) State one observation made when dilute hydrochloric acid is added to **a** lump of calcium carbonate in a test

tube?

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ii) Draw up you would use to prepare

the egas.

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Liqu

i

aceion

(4 marks)

Identify a reagent the student would use to prove that the gas is Carbon dioxide and state the observation

Reagent:

Observation:

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(f) The following experimental setup

experimental setup was used by a student to test the electrical

DURAK 21

battery

(2marks)

of two liquids **A** and **B.**

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graphite rod

(edium b)

-liquid under test

i) Liquids **A** and **B** are kerosene and water. State the observation at the level of the bulb for liquid B.

(1 mark)

ched **(TOTAL 20 MARKS)**

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your answers

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ANSWER 2 QUESTIONS OUT OF *3*. ***If*** you attempt *more* **than *2 questions***, *only* ***the first two*** *will be ANSIVER 2 QUESTIONS OUT* OF *3*. ***If*** *you* attempt mor

considered. Where appropriate, equations and diagrams should be used to illustrate your answer. Writ

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(5, 5, 5, 5 marks)

8. Using suitable examples and balanced chemical equations, write short notes on each of the following reaction types in Chemistry.

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on the sheets that follow **Section C.**

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the temperature of 200cm3 of water was raised from

(b) In one of such experiments, when 0.4g of ethanol was b Combustion of ethanol in the laboratory. Your

(a) Thermal decomposition (b) Neutralization reaction (c) Addition polymerization
Substitution reaction

9. (a) Describe an experiment that is used to determine the enthalpy description should end with collection of data.

25.2°C to 50.0°C. Determine the enthalpy of combustion.

10. You are given the following equation

CaCO3(s) +
2HCl(aq)"

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CaCl2(aq) + **CO2(g)** +

H2O(1)

(a) List any three (3) factors that affect the rate of this reaction. (b) Describe the effect of change of each of the factors on the reaction rate.

(c) Name the equipment that can be used to record the volume of carbon dioxide evolved over an interval of time.

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