

B G C S E

CHEMISTRY

EXAMINATION PAPERS

UNDERSTAND • PRACTICE • SUCCEED





THE OPENHANDED CLASSROOM

LEARN MORE. ACHIEVE MORE. SMILE MORE.



BGCSE CLASSES

- ✓ Exam-Focused Learning
- ✓ Past Papers & Strategies
- ✓ Stronger Understanding
- ✓ Better Grades, Brighter Future



[**CLICK HERE**](#)



SAT CLASSES

- ✓ Smart Test Strategies
- ✓ Stronger Scores
- ✓ Time Management Skills
- ✓ College & Scholarship Ready



[**CLICK HERE**](#)



BJC CLASSES

- ✓ Clear, Simple Explanations
- ✓ Focus on Understanding
- ✓ Help That Fits Your Pace
- ✓ Build Confidence, Get Results



[**CLICK HERE**](#)



EXPERT TEACHING.
PROVEN RESULTS.



LEARN SMARTER.
ACHIEVE MORE.



FOCUSED SUPPORT.
REAL RESULTS.



THEOPENHANDEDCLASSROOM:
(242) 426-8891



THE OPENHANDED CLASSROOM

BGCSE FREE SOLUTIONS MANUALS

COMPLETE SOLUTIONS FOR ALL
MAJOR SUBJECTS

- ⦿ MATHEMATICS
- ⦿ ENGLISH LANGUAGE
- ⦿ HISTORY
- ⦿ RELIGIOUS STUDIES
- ⦿ ACCOUNTS
- ⦿ SCIENCES (BIOLOGY, PHYSICS,
COMBINED SCIENCE)
- ⦿ FOREIGN LANGUAGE
(FRENCH AND SPANISH)

UNDERSTAND. PRACTICE. SUCCEED.

[CLICK HERE](#)

EXAM-REAL.

EXAM-PROVEN.

FREE LISTENING COMPREHENSION — AUDIO FILES —



THE **EXACT AUDIO** USED
IN PAST BJC & BGCSE EXAMS



REAL EXAMS

The exact listening
comprehension audio
from past papers.



REAL PREPARATION

Hear what you'll
hear in the
real exam.



REAL RESULTS

Practise with purpose.
Improve your confidence
and performance.

AVAILABLE FOR:



BJC
ENGLISH



BGCSE
ENGLISH
LANGUAGE



BJC
FRENCH



BJC
SPANISH



BGCSE
FRENCH



BGCSE
SPANISH

WHY THESE AUDIO FILES MATTER



EXACT AUDIO

The exact recordings
used in past
BJC & BGCSE exams.



EXAM FAMILIARITY

Get used to the real
voices, speed, accents
and exam conditions.



STRATEGIC ADVANTAGE

Walk in confident
knowing exactly
what to expect.



100% FREE

High quality.
No cost.
Just results.



CLICK HERE

DOWNLOAD • START PRACTISING



BETTER PREPARATION.
BETTER RESULTS.

You've got this!

PAST EXAMS. **REAL AUDIO**. BETTER PREP. GREATER CONFIDENCE.

School Number	Candidate Number
Surname and Initials	

CHEMISTRY

PAPER 3
(80 marks)

Thursday 1 JUNE 2023 12:00 NOON–1:30 P.M.
(1 hr. 30 mins)

Additional materials:
Graph paper
Calculator

MINISTRY OF EDUCATION
NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials at the top of this page as well as at the top of all lined paper submitted.

Answer **ALL** the questions in **Section A** in the spaces provided on this question booklet and any **TWO** questions from **Section B** on the lined pages provided at the back of this question booklet.

Equations and diagrams should be given wherever they are helpful.

Essential working must be shown.

The intended marks for each question or part question are given in brackets [1].

Relative atomic masses are given in the Periodic Table printed on page 2.

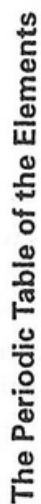
ADDITIONAL INFORMATION

s.t.p. ($t = 0^{\circ}\text{C}$, $p = 1 \text{ atm.}$)

The volume of one mole of gas at room temperature and pressure (r.t.p.) is $24\,000 \text{ cm}^3$ (24 dm^3).

For Examiner's Use	
Section A	
1	
2	
3	
4	
Section B	
5	
6	
7	
TOTAL	

This question paper consists of 15 printed pages, 1 blank page and 4 lined pages.



The Periodic Table of the Elements

140	Ce	141	Pr	144	Nd	Pm	150	Sm	152	Eu	157	Gd	159	Tb	162	Dy	165	Ho	167	Er	169	Tm	173	Yb	175	Lu	
58	Cerium	59	Praseodymium	60	Neodymium	61	Promethium	62	Samarium	63	Europium	64	Gadolinium	65	Terbium	66	Dysprosium	67	Holmium	68	Erbium	69	Thulium	70	Ytterbium	71	Lutetium
232	Th	238	U	92	Uranium	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr
90	Thorium	91	Protactinium	92	Uranium	93	Neptunium	94	Plutonium	95	Americium	96	Curium	97	Berkelium	98	Californium	99	Einsteinium	100	Fermium	101	Mendelevium	102	Nobelium	103	Lawrencium

*58-71 Lanthanoid series
†90-103 Actinoid series

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

Key

a	X
b	

SECTION A

Answer **all** questions in this Section.

1. (a) Nitric acid is a strong acid and ethanoic acid is a weak acid.
- (i) Give **one** difference between a strong acid and a weak acid.
- _____
- _____ [2]
- (ii) Write the ionic equation for ethanoic acid.
- _____ [2]
- (b) In a titration experiment, 20 cm^3 of calcium hydroxide solution of unknown concentration was titrated with dilute nitric acid. The concentration of nitric acid was 0.08 mol dm^{-3} and the volume of acid required in the reaction was 30.00 cm^3 .
- (i) Write a balanced chemical equation for this reaction.
- [2]
- (ii) Determine the number of moles of nitric acid used in the titration experiment.
- [2]
- (iii) Calculate the number of moles of calcium hydroxide that was neutralised.
- [1]

- (iv) Determine the concentration of calcium hydroxide solution.

[1]

TOTAL MARKS [10]



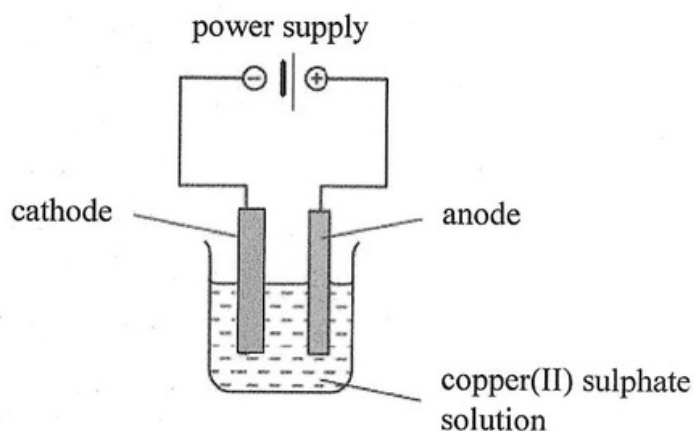
BLANK PAGE

2. A student conducts **two** experiments.

Experiment 1 – Purification of copper using copper(II) sulphate as an electrolyte.

Experiment 2 – Electrolysis of copper(II) sulphate using carbon electrodes.

The diagram represents **Experiment 1**.



- (a) State the type of reaction that occurs at the cathode.
- _____ [1]
- (b) Write the ionic half equation for the reaction that occurs at the cathode.
- _____ [2]
- (c) Explain why it is important that the electrolyte is in aqueous or molten state and not in a solid state.
- _____
- _____ [1]



(d) In **Experiment 2**, the electrolysis of copper(II) sulphate was conducted with carbon electrodes.

(i) Write the formula of the ions that are discharged at the anode and cathode in **Experiment 2**.

Anode: _____

Cathode: _____

[2]

(ii) State **two** observations that would be made during **Experiment 2**.

Observation 1: _____

Observation 2: _____

[2]

(iii) Universal indicator is added to the electrolyte.

State the final colour of universal indicator in **Experiment 2**, and explain why this colour is seen.

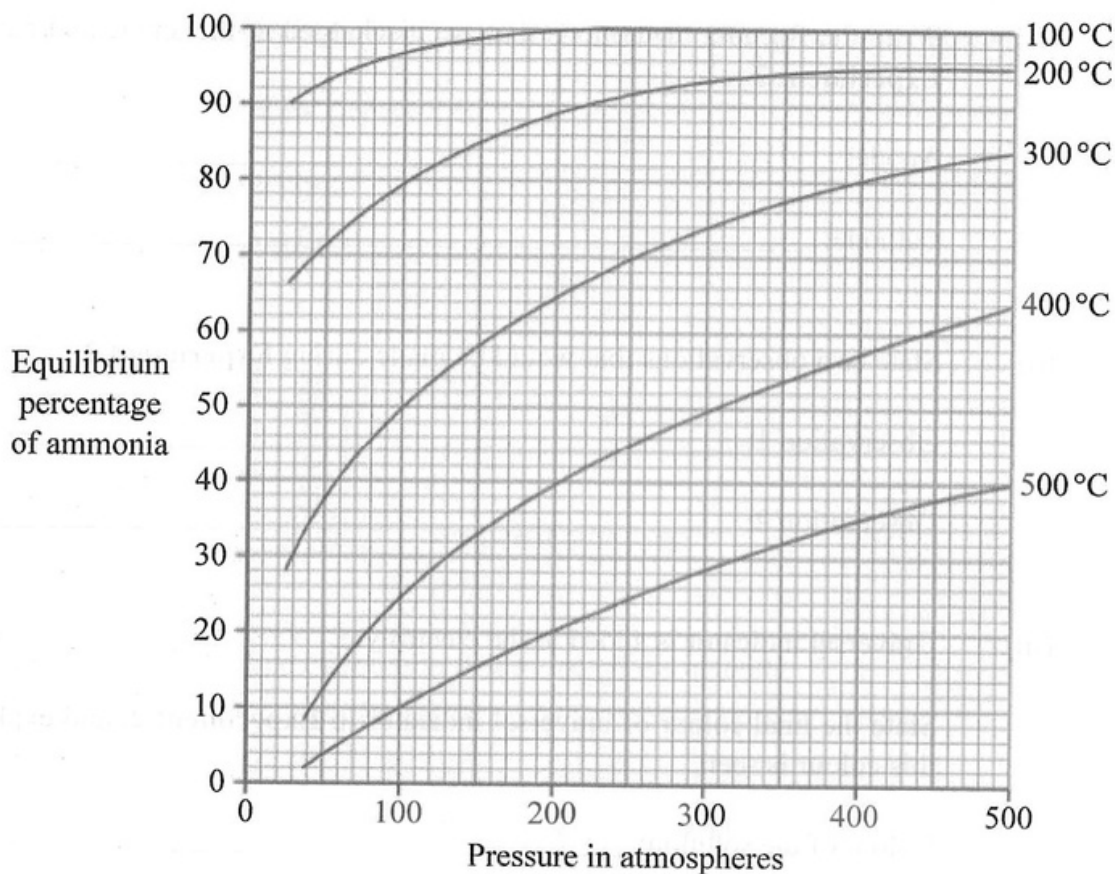
Colour of the solution: _____

Explanation: _____

[2]

TOTAL MARKS [10]

3. The graph shows how the equilibrium percentage of ammonia produced changes as both temperature and pressure change.



- (a) During the manufacture of ammonia, introducing changes to the equilibrium can affect the amount of ammonia produced. The ΔH for this reaction is -92 kJ/mol .

In terms of Le Chatelier's Principle, explain what would be the effect on the yield of ammonia at equilibrium if

- pressure is increased



- the temperature is decreased.

[4]

- (b) Explain the effect on the yield of ammonia of adding a catalyst.

[1]

- (c) (i) Write a balanced chemical reaction for the formation of ammonia in the Haber process. State symbols must be shown.

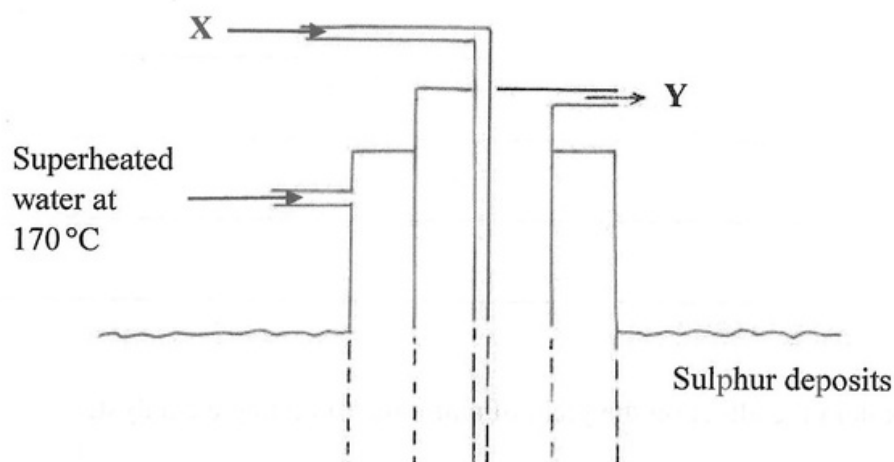
[3]

- (ii) Calculate the volume of hydrogen needed to produce 24.8 dm^3 of ammonia gas at r.t.p. Show your working.

[2]

TOTAL MARKS [10]

4. The diagram shows the Frasch process.



- (a) (i) Describe briefly the purpose of the Frasch process.

_____ [1]

- (ii) Identify what enters and leaves the concentric tubes at X and Y on the diagram.

X _____

Y _____

[2]

- (iii) Give a reason for the use of superheated water at 170 °C.

_____ [1]

- (b) The manufacture of nitric acid is called the Ostwald process. The first step in the process is ammonia being oxidised to nitrogen oxide.

- (i) Name the catalyst used in this step of the process.

_____ [1]



In step 2 nitrogen monoxide gas reacts with oxygen to give nitrogen dioxide gas.



- (ii) Give the oxidation state of the nitrogen in nitrogen monoxide and nitrogen dioxide.

Oxidation state of nitrogen in NO _____

Oxidation state of nitrogen in NO₂ _____

[2]

- (iii) Write a balanced chemical equation for the word equation showing step 3 of the Ostwald process. State symbols must be given.

nitrogen dioxide + water → nitric acid + nitrogen monoxide

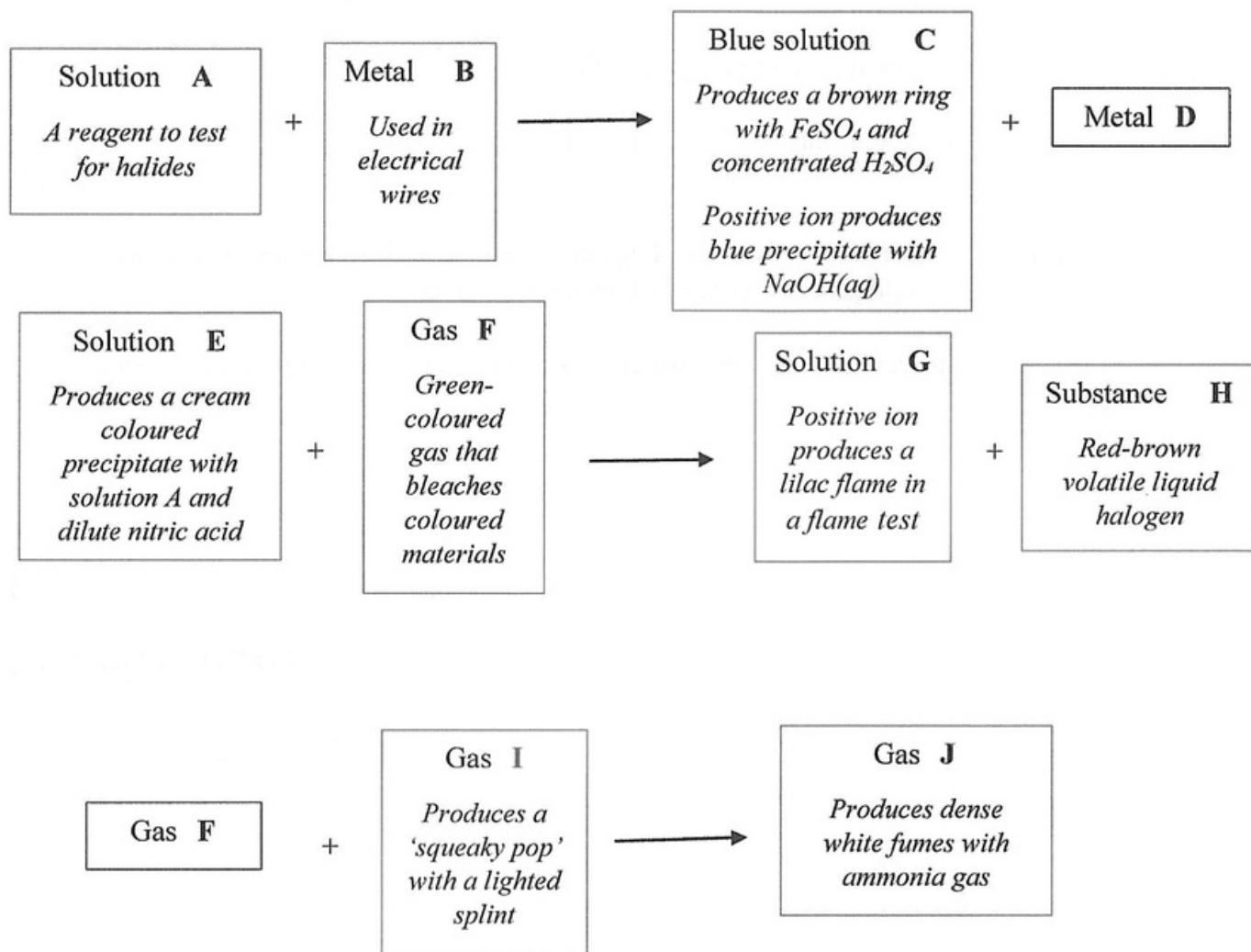
[3]

TOTAL MARKS [10]

SECTION B

Answer **two** questions from this section.

5. (a) Identify the lettered unknown substances **A – J**.



[10]



- (b) (i) Write a balanced chemical equation for the word equation shown.
iron(II) chloride + chlorine $\rightarrow$ iron(III) chloride [2]
- (ii) State which substance in the reaction is oxidised and which one is reduced. [1]
- (c) When sodium hydroxide is added to iron(II) chloride, a coloured precipitate forms.
- (i) State the colour of the precipitate. [1]
- (ii) Write the chemical formula of the precipitate. [1]
- (d) Steel is an alloy of iron.
- (i) Explain why steel is harder than iron. [3]
- (ii) Give **one** use of steel. [1]
- (e) Both iron and steel rust when exposed to oxygen and water.
- Identify **one** way to prevent rusting. [1]

TOTAL MARKS [20]

6. Equal moles of powdered aluminium and zinc were reacted separately with excess dilute hydrochloric acid at room temperature and pressure. In each experiment 0.002 moles of metal were used to produce the chloride of the metal and hydrogen gas.

Time/minutes	0	1	2	3	4	5	6	7	8
Volume of hydrogen produced with aluminium/cm ³	0	28	52	67	71	72	72	72	72
Volume of hydrogen produced with zinc/cm ³	0	17	30	41	50	58	65	70	72

- (a) (i) Plot a graph of the volume of hydrogen produced in each experiment using the same axes. Indicate the name of each metal on the curves drawn. [5]
- (ii) The experiment with aluminium is repeated using dilute hydrochloric acid with higher temperature. All other conditions remain the same.
- Draw a line on the graph to show the volume of hydrogen produced when hydrochloric acid with a higher temperature is used. Label your graph with an H. [2]
- (iii) Determine the volume of gas produced in the first 30 seconds for the aluminium experiment. [1]
- (b) (i) Write a balanced chemical equation for the reaction between aluminium and hydrochloric acid. (Include state symbols.) [3]
- (ii) Calculate the mass of aluminium that was used to completely react with excess hydrochloric acid. [1]
- (c) Aluminium oxide is amphoteric.
- (i) Give the meaning of the word amphoteric. [1]
- (ii) Name **one** neutral oxide. [1]
- (d) Explain why aluminium does **not** corrode away like iron. [3]



- (e) Zinc and aluminium are metals. One property of metals is that they are malleable.
Explain why metals are malleable. [2]
- (f) Suggest **one** advantage the recycling of aluminium has over the production of aluminium from its ore. [1]

TOTAL MARKS [20]

7. (a) The following are reactions that occur with organic compounds.



- (i) Name the type of reaction occurring in **A** and the type of reaction occurring in **B**. [2]
 - (ii) Suggest **one** importance of reaction **A**. [1]
 - (iii) State the general formula for alkenes. [1]
 - (iv) State the colour change that would be observed in reaction **B**. [1]
 - (v) Use the balanced chemical equation below, to calculate the volume of carbon dioxide produced, when 4.2 g of octane was burnt in oxygen at r.t.p. [4]

$$2\text{C}_8\text{H}_{18} + 25\text{O}_2 \rightarrow 16\text{CO}_2 + 18\text{H}_2\text{O}$$
 - (vi) Draw the structure for the compound with four carbon atoms in an alkane. [1]
 - (vii) Draw an isomer of the compound drawn in part (a) (vi). [2]
- (b)
- (i) An analysis of rubbing alcohol indicates that the substance contains 60% carbon, 13.4% hydrogen and 26.6% oxygen. Determine the empirical formula of rubbing alcohol. [3]
 - (ii) Use your answer from part (b) (i) to determine the molecular formula for the compound that has a molecular mass of 180 g/mol. [1]
 - (iii) Name the reagent that is used to convert alcohol to an organic acid. [1]
 - (iv) Name the reaction in part (b) (iii). [1]
 - (v) Write a balanced chemical equation for the reaction between ethanol and ethanoic acid. [2]

TOTAL MARKS [20]



Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question

Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.