Examination skills

INFO

This section covers the following ideas and material:

- the importance of planned active revision
- knowing the type of exam and the expectations
- practising exam questions
- writing sensible, thought-out answers

Do try to go back over your early work from time to time. This will keep it fresh in your mind so it will be much easier to learn it when you come to revise for your examinations. Use revision checklists to keep track of where you think you are and what you need to do. There are some revision checklists supplied for you on this CD, and you can also find some at www.cambridgestudents.org.uk/subjectpages/chemistry/igcsechemistry

Preparing for the examinations

As you near the end of your course, you will be thinking about revising. You will have revised for exams before, so you probably have a good idea of what works for you and what doesn't.

Revision only works if it is active. Your brain is bombarded with information all the time, and it has to 'choose' what to store away in your long-term memory and what to discard. To persuade it to keep your chemistry in your long-term memory, you have to convince your brain it is worthwhile doing this! Research shows that this means making your brain **do** something with the information you are trying to make it remember.

Simply sitting reading your textbook or reading your notes won't help you much. Here are some suggestions for making your revision active – try out a range of them and see what works for you.

Organisation of revision study

The first aim of this organisation should be to provide a focused situation to help and direct your concentration. Plan out a timetable of revision that uses short blocks of time, say 45 minutes to an hour maximum, for each subject.

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Your **revision timetable** should bear these points in mind:

- plan short sessions
- take regular short breaks
- change subject from one session to another
- make sure your plan is realistic and achievable; it should stretch you, but not be so depressing that you continually have to change it
- make sure you tackle the areas of a subject you are weakest at, and target your revision to cover the whole course.

Studies suggest that such a pattern best suits our ability to concentrate. Make sure that you know the content of the syllabus you are taking, and that you have a selection of past examination papers to try. However, don't think that revision is only trying past papers. As well as making sure that your knowledge and understanding of chemistry is good, it is certainly worth knowing your syllabus and examination(s) well.

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- Make sure you know **which** examinations you are taking.
- Check **how long** each examination is.
- Check **how many** questions you will need to do.
- Study the **style** of questions you will have to answer. For example, will you need to write answers of longer than a few sentences?
- Make sure you have practised basic examination **techniques**, such as graph drawing.
- Make sure that you have the necessary **equipment**.

Knowledge of your particular syllabus and the examinations you are taking means that you can choose practice questions to cover the correct areas. You will also need to become familiar with the wording of questions. Certain standard words are used in the phrasing of questions – 'define', 'describe', 'predict' and 'suggest' are among those commonly used. Be sure that you understand the meaning of these words when they appear in questions.

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Be careful of two phrases in particular:

- '**State and explain**' – make sure that you **do** offer some explanation. Do not simply repeat the question in different words.
- '**State what you would observe (see)**' – such a question requires a visual description of what happens. Simply to state what chemical substances are formed in a reaction would not gain you marks.

Do take note of the number of marks carried by a question. It is a good indicator of how much detail you need in your answer. The mark scheme gives a clear indication of how many points you would need to make. In more complex questions that are testing your comprehension, be careful not to be put off by detail that may not be relevant to the precise question. You need to be able to pick out the relevant material from the other detail (Figure 1). This is one area where practising questions prior to the examination can be a great help. Do not let your answers be too brief and, in particular, remember to show your working in calculations. That way, if you make a simple error in the final answer, you may still gain marks for your method. Remember, finally, that you are trying to communicate. Detail and sensible presentation – including good diagrams – can help you to succeed.

Q. Read this information about how lead is extracted and then answer the questions.

Lead is obtained from a mineral called galena. Galena contains lead sulfide. The lead is extracted by roasting galena in the air to form lead oxide and sulfur dioxide. Then the lead oxide is reduced by heating with carbon to form lead and carbon monoxide. Lead can be identified because it is shiny, it will mark paper and it conducts electricity.

(a) Name a **metallic element** mentioned in the information.

lead ..... [1]

(b) Name a **compound of sulfur** mentioned in the information.

lead sulfide ..... [1]

Parts (a), (b) and (c) – see highlights in passage.

(c) Find the word **reduced** in the information about lead. What does **reduced** mean?

reduction means the removal of oxygen from a compound ..... [1]

(d) The lead oxide was reduced by heating with carbon. Aluminium oxide is **not** reduced when it is heated with carbon. Explain why carbon will reduce lead oxide but not aluminium oxide.

Carbon is more reactive than lead and will remove oxygen from lead oxide. Aluminium is more reactive than carbon. Carbon cannot remove oxygen from aluminium oxide.. ..... [2]

Note you must comment on both parts of the question.

(e) Use the information given to write a word equation for the reaction between lead oxide and carbon.

lead oxide + carbon ⟶ lead + carbon monoxide ..... [2]

A word equation is all that is needed here – the reaction is spelt out in the fourth sentence.

Figure 1 You need to be able to pick out the relevant detail from the question that will help you with your answer.

Multiple-choice *not* multiple-guess!

Many students underestimate multiple-choice questions. After all, the answer is there in front of them and might help them to remember the point in question. However, the questions can be a trap for those who haven't prepared well. The incorrect alternatives to the answer are technically known as **distractors**! They can seem very much like the 'right answer' if you rush at them. Think through each possibility carefully. Beware of questions phrased in the negative, such as: 'Which property is **not** a characteristic of transition elements?'. If you find yourself having to take a stab at an answer, then help yourself by first narrowing the field. Cut out the obviously wrong alternatives and make an educated guess.

Short-answer questions

You will meet the short-answer question at whatever level of the IGCSE examination you are entered for. You will need to be able to write precisely and to the point. In this area, the mark scheme for the question can be a useful guide as to the detail needed in an answer. A single-word answer is not going to gain the maximum marks where an answer worth, say, 3 marks is required.

You must always read the question carefully and answer the question asked. If, for example, you are asked to '**name** the gas given off when limestone reacts with acid', then give the name – carbon dioxide – not the formula – CO_2. If asked for a **word equation**, then do not make the question more difficult by trying to give a balanced chemical equation – you are making the question more difficult than the examiner intended!

Figures **2** and **3** show some examples of poor examination technique. In most cases, the student is losing marks needlessly.

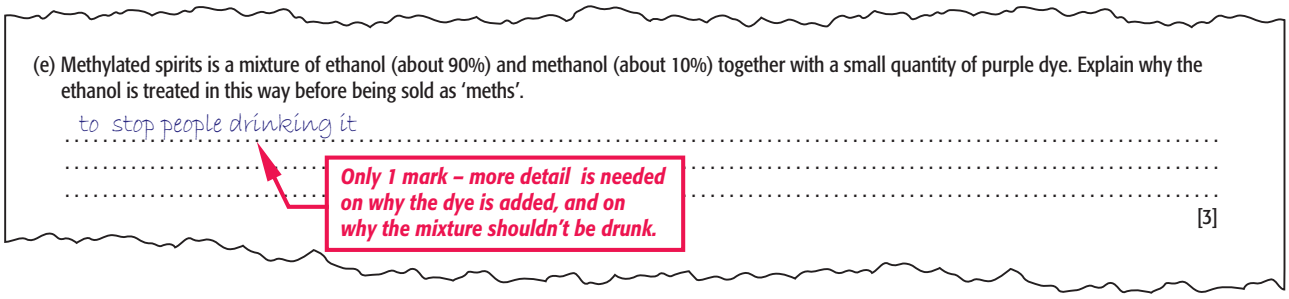

Figure 2 An example of poor examination technique.

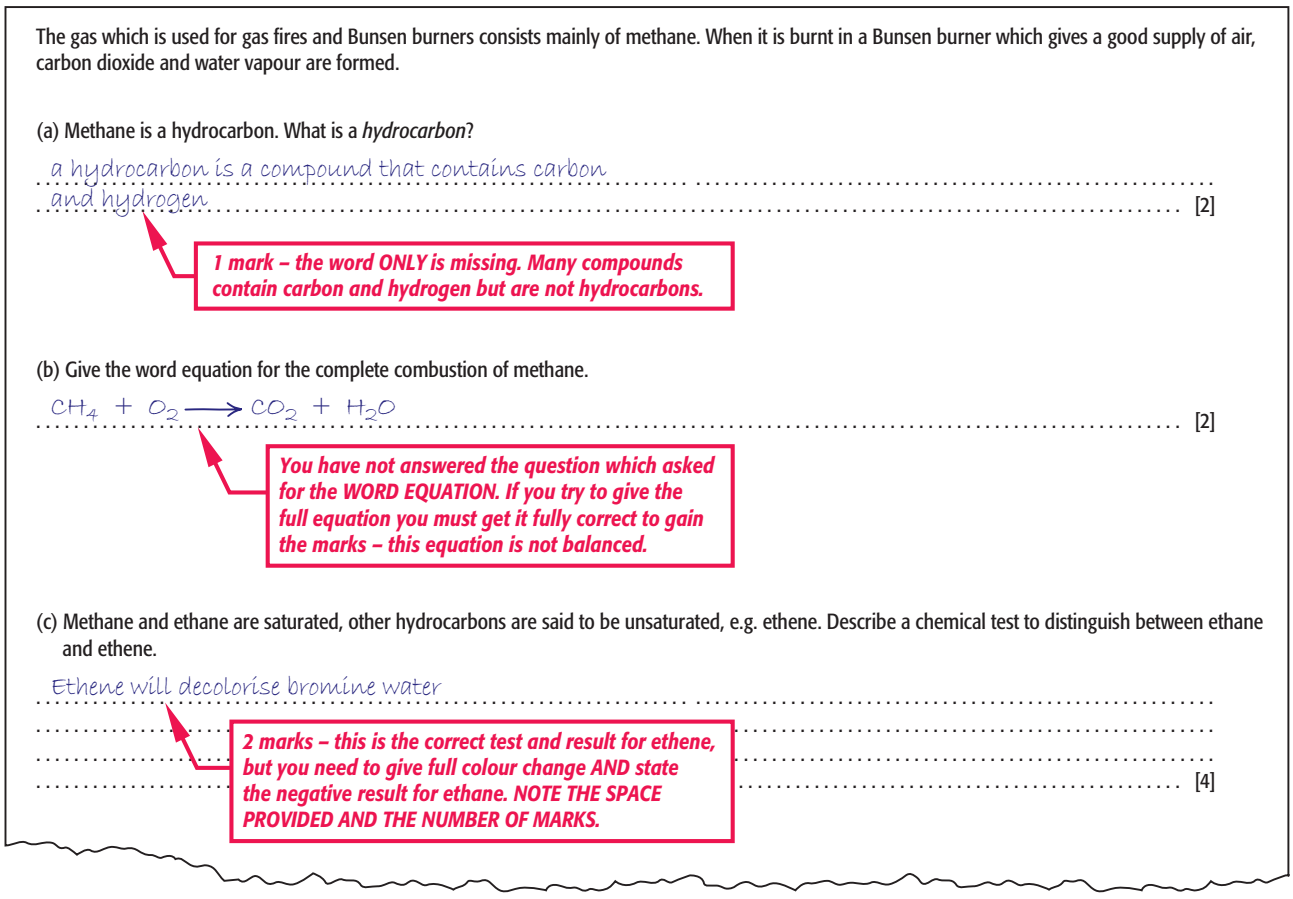

Figure 3 Poor exam technique can lose many marks.

Wherever comparisons are asked for in a question, always make a statement about **both** alternatives – even if one is a negative observation. Always mention the starting and finishing colours of a colour change.

Be careful not to overdo the word 'it' in your answers; be sure it is clear what the 'it' refers to (Figure 4).

In an examination, your diagrams need not be works of art (Figure 5). But you should remember the following points when drawing diagrams.

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- Diagrams must be **realistic**.
- A **ruler** should be used for straight lines.
- Diagrams should be **labelled** properly.
- Most important of all, the reaction shown should **work safely.**

Most of the marks you need to achieve a high grade will come from short-answer questions. They will be used to test your knowledge of the central ideas of chemistry and basic practical techniques, for example.

Zinc reacts with dilute hydrochloric acid to produce a colourless gas.
(i) How would you test to show that the gas produced is hydrogen?

When a lighted splint is placed near the tube it goes 'pop'

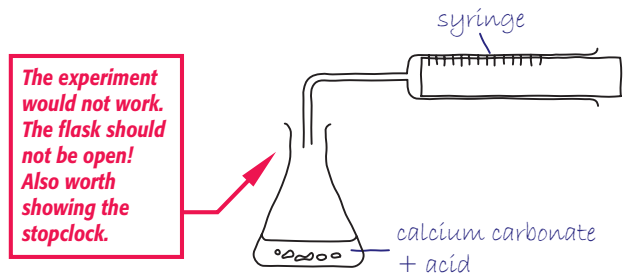
[2]

1 mark – WHAT GOES 'POP'?
The splint? The test tube? NEITHER.
It is the gas that explodes with a 'pop'.

Figure 4 Don't overdo 'it'!

Calcium carbonate reacts with dilute hydrochloric acid to produce carbon dioxide. The volume of gas produced can be followed against time by collecting the gas in a gas syringe. By plotting a graph of the volume of gas against time, the rate of reaction can be followed.

(a) Draw and label the apparatus you would use to do the experiment. [3]



The experiment would not work. The flask should not be open! Also worth showing the stopclock.

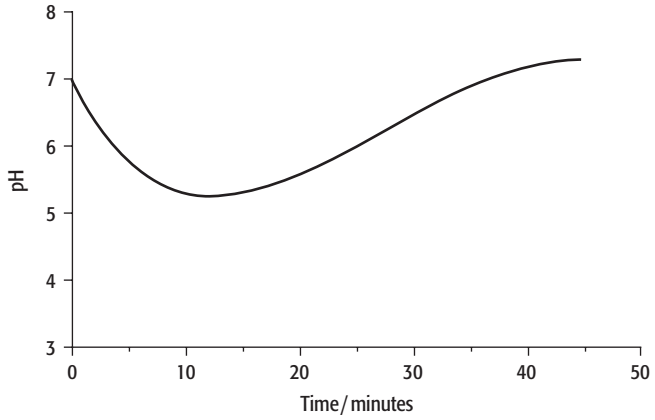
Figure 5 A neat drawing – but the experiment wouldn't work.

Finally, here are two 'model exam questions' that simply emphasise some basic points and the need to think carefully about your answers and to write your answers clearly.

Model Questions

When we eat, the first stages of the chemistry of digestion begin in the mouth with the action of saliva on our food. In this question a student has just eaten a sweet.

The diagram shows the changes in pH in the student's mouth after she has eaten the sweet.



a The process of eating causes changes in the pH in our mouths.
The graph shows those changes. Describe how the acidity in her mouth changes after the student has eaten the sweet. [2]

As she eats the sweet the pH falls over about. 10 minutes, then it rises over the next 20 minutes, back to normal.

HINT: Make sure to describe the whole sequence of the changes seen.

b **i** Chewing a sweet stimulates the formation of saliva. Saliva is slightly alkaline.
How does this information explain the shape of the graph? [2]

The release of saliva neutralises the acidity and the pH rises back to normal.

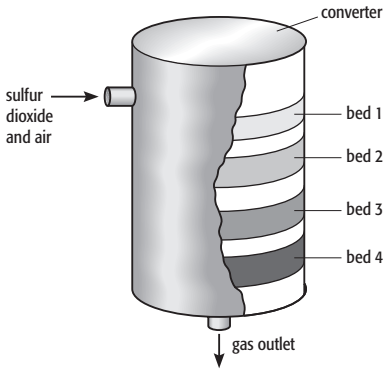
ii State the name of the type of reaction which occurs when an acid reacts with an alkali. [1]

A neutralisation reaction.

Model Questions

This question is about the second stage of the Contact process for making sulfuric acid. This stage involves the formation of sulfur trioxide from sulfur dioxide.

The diagram shows a converter used to convert sulfur dioxide into sulfur trioxide:



Vanadium(V) oxide bed	Temperature of gas before reaction / °C	Temperature of gas after reaction / °C	Percentage of SO_2 converted to SO_3
1	435	600	66
2	445	518	85
3	445	475	93
4	420	442	99.5

a Write a balanced chemical equation to show the reversible reaction in which sulfur dioxide is converted into sulfur trioxide. [3]

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

b What part does the vanadium(V) oxide play in this reaction? [1]

It is a catalyst.

HINT: Remember to learn the equations and conditions for the Contact and Haber processes.

c What do the differences in temperatures before and after the reaction show about this conversion? [1]

The temperature rises, so the reaction must be exothermic.

d What happens to the gases each time before they move on to the next bed of vanadium(V) oxide? [1]

the gases cool down

e What probably happens to the 0.5% unconverted sulfur dioxide that leaves the converter? [1]

It is recycled back through the catalyst beds.

f Name the gas that is present in the greatest percentage in the mixture of gases that leaves the converter. [1]

nitrogen

HINT: Something of a 'catch' question – air is fed into the system and the nitrogen will simply pass through unreacted.

To help you with your revision, there is a series of short multiple-choice tests on the CD-ROM based around those parts of the syllabus that are tested in this way on Paper 1 of the exam. Where possible these are organised to link to particular chapters in the book. The answers to these tests are also provided on the CD-ROM so that you can check yourself. There is also a practice paper of each of Papers 2, 3 and 6, together with their mark schemes, for you to assess yourself as the exams approach. Finally there are some simple comments on the different types of exam question.