

# Edexcel International AS/A Level

## IAL Chemistry

Event: 181BAS03

## Getting Ready to Teach

Event Code:

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First teaching in 2018, first assessment 2019

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# Aims and Objectives

**During the session you will:**

- **Get an overview of the main changes in the new specification**
- **Explore possible teaching and learning strategies that may be employed for the new specification**
- **Look at Sample Assessments and Mark Schemes**
- **Look at planning and organisation for the new specification**
- **Explore the support and resources available from Pearson to guide you through teaching the new specification**
- **Have the opportunity to network, discuss best practice and share ideas with other teachers**

# Session Agenda

10:00 – 10:15	Introduction
10:15 – 11:15	Overview of IAL Chemistry
11.15 – 11:30	Break
11:30 – 13:00	AS units and practical skills
13:00 – 14:00	Lunch
14:00 – 15:30	A2 units and extended writing questions
15:30 – 16:00	Support and final questions

# About your trainer

# Welcome to Pearson Edexcel

Welcome to Pearson Edexcel,  
the world's leading learning company  
and the UK's largest awarding body.

We set the standard for worldwide  
recognised qualifications, built on the  
UK educational system and accepted  
by universities worldwide.

We have a simple mission:  
**to help make a measurable impact on  
improving people's lives through learning.**

*“We judge  
ourselves – and  
invite others to  
judge us – not by  
the products that  
we make but by the  
impact on  
learners.”*

**John Fallon,**  
Chief Executive Officer, Pearson

# World-class features

All Edexcel qualifications are developed to meet Pearson's **World Class Qualification design principles**

Developed using an understanding and benchmarking of **all educational systems**



Endorsement of educational **thought-leaders and assessment experts** from across the globe

Qualifications that support young people to **develop the capabilities** they need to **progress** and prosper in their lives

# The global transferable skills framework

## COGNITIVE

Core skills brain uses to think, learn and reason – used to carry out any task.

**Critical Thinking, Problem Solving, Analysis, Decision-making, Creativity**

## INTRAPERSONAL

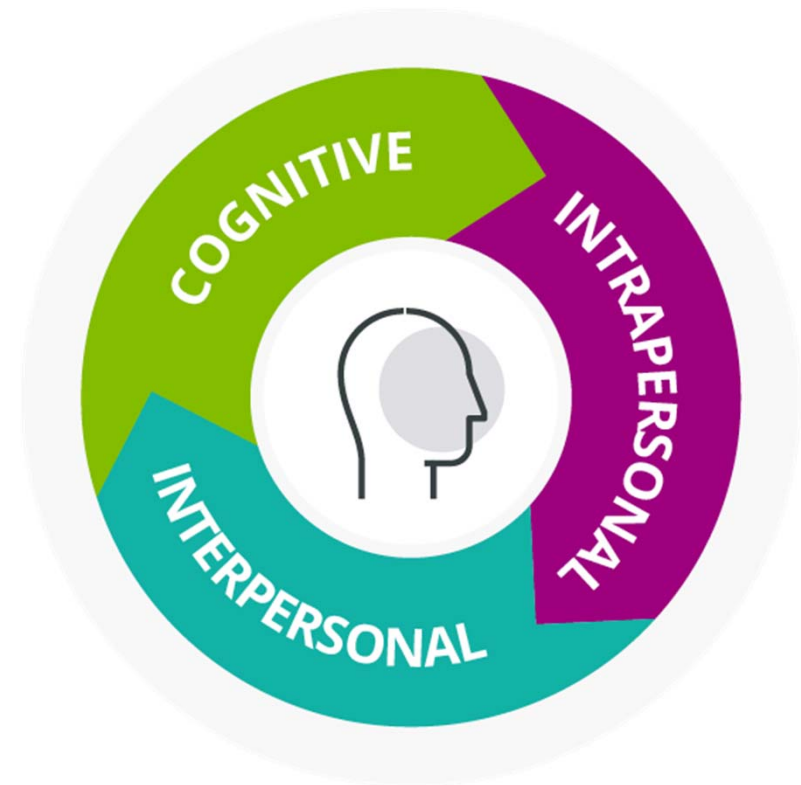
Emotional intelligence, ability to know, understand and manage own emotions and learning.

**Adaptability, Continuous Learning, Intellectual Curiosity, Work Ethics, Self-Evaluation**

## INTERPERSONAL

Life skills used every day to communicate and interact with others, individually and in groups.

**Teamwork & Collaboration, Communication, Negotiation, Empathy, Leadership**



# International Advanced Level (IAL)

**A qualification with an international outlook**

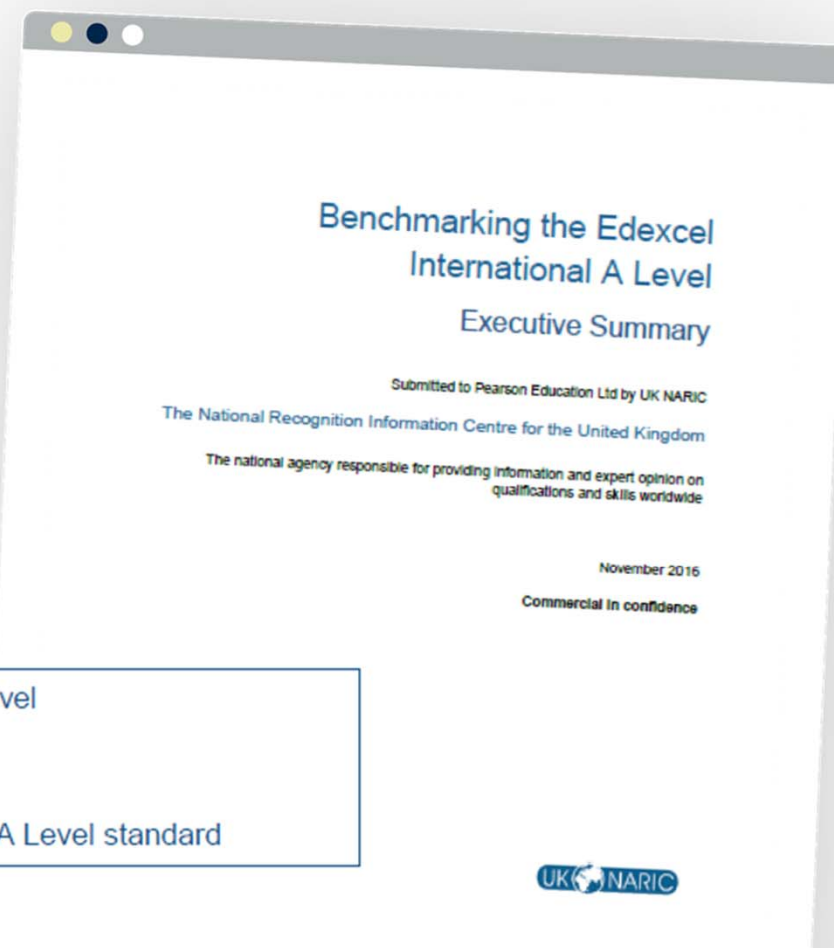
Developed in consultation with the international school community, including a large number of teachers and university lecturers, designed to be engaging for international learners and to give them the necessary skills to support progression to higher and further study.

- Modular structure with synopticity
- AS results contribute to A Level results
- Students can resit individual units
- Exams available in January, June & October\*
- IALs are comparable to the GCE A Level standard - NARIC
- 100% externally assessed
- Designed with WCQ principles in consultation with teachers & HEIs



# Updated NARIC report for Edexcel IAL

The executive summary confirms that Edexcel IALs are considered comparable to the GCE A Level standard following reforms to the UK regulated qualifications.



<b>Qualification:</b>	Edexcel International Advanced Level
<b>Awarding Institution:</b>	Pearson Education Ltd
<b>Comparability:</b>	Is considered comparable to GCE A Level standard

# IAS and IAL subjects

Biology	Chemistry	Physics	Mathematics	Further Mathematics	Pure Mathematics
Information Technology	Business	Economics	Accounting	English Language	English Literature
History	Geography	Psychology	Arabic	French	German
Greek	Spanish	Law			

**I wanted to study subjects that were relevant to a future career. Pearson Edexcel IAL provides learners with a firm knowledge base.**

**Nasim Mirzajani**, now studying Chemical Engineering at Yale University, USA

# IAL Chemistry 2018

## Introduction to the new specification

# Key qualification features

We've used your feedback to keep several key features of the IAL, including:

- modular assessment, offered at different times of year to suit your delivery model
- practical skills assessed through an examination unit both at AS (Unit 3) and at A Level (Unit 6)
- comparable content with the UK GCE A Level – giving comparability between specifications
- a range of types of questions in exams – testing breadth, as well depth of knowledge and understanding

## In IAL Chemistry, students will...

- develop knowledge and understanding of chemistry
- apply concepts in this specification to a range of different problems
- apply mathematical skills to the problems
- develop practical skills through 16 core practical activities
- widen their learning through key transferable skills.

# IAL Chemistry 2018

## Structure of the new specification

# Structure

- Both the International AS and the International A Level in Chemistry are modular qualifications.
- Three written papers at IAS level (externally assessed).
- Three further written papers at IA2 (externally assessed).
- Students can claim the IAS for completing Units 1-3
- Students can claim the full International Advanced Level for completing all six units (IAS and IA2 units).

# IAS Chemistry

## Unit 1

- Formulae, Equations and Amount of Substance
- Atomic Structure and the Periodic Table
- Bonding and Structure
- Introductory Organic Chemistry and Alkanes
- Alkenes

## Unit 2

- Energetics
- Intermolecular Forces
- Redox Chemistry and Groups 1, 2 and 7
- Introduction to Kinetics and Equilibria
- Organic Chemistry: Alcohols, Halogenoalkanes, Spectra

## Unit 3

- Students develop experimental skills by carrying out a range of practical experiments and investigations in Units 1 and 2.
- This unit will assess students' knowledge and understanding of experimental procedures and techniques that were developed in Units 1 and 2.



# IAS Chemistry

Unit 1	Unit 2	Unit 3
1h 30 mins	1h 30 mins	1h 20 mins
80 marks	80 marks	50 marks
120 UMS	120 UMS	60 UMS
Worth 40% of IAS (or 20% of the full IAL)	Worth 40% of IAS (or 20% of the full IAL)	Worth 20% of IAS (or 10% of the full IAL)
Available June, October and January	Available June, October and January	Available June, October and January

# IAL Chemistry

## Unit 4

Kinetics  
Entropy and Energetics  
Chemical Equilibria  
Acid-base Equilibria  
Organic Chemistry:  
Carbonyls, Carboxylic  
Acids, Chirality

## Unit 5

Redox Equilibria  
Transition Metals and their  
Chemistry  
Organic Chemistry: Arenes  
Organic Nitrogen  
Compounds  
Organic Synthesis

## Unit 6

Students develop further their experimental skills by carrying out a range of practical experiments and investigations in Units 4 and 5.

This unit will assess students' knowledge and understanding of the experimental procedures and techniques that were developed in Units 4 and 5

# IAL Chemistry

## Unit 4

1h 45 mins

90 marks

120 UMS

Worth 20% of the full IAL

Available June, October and January

## Unit 5

1h 45 mins

90 marks

120 UMS

Worth 20% of the full IAL

Available June, October and January

## Unit 6

1h 20 mins

50 marks

60 UMS

Worth 10% of the full IAL

Available June, October and January

# Features of our question papers

- Our question papers are clear and accessible for students of all ability ranges, with straightforward mark schemes.
- We use a series of well-defined command words.
- Papers assess relevant mathematical skills – 20% of marks cover maths skills.
- Question papers contain a mixture of question types, with an initial MCQ section.

# Assessment objectives

**A01** Demonstrate knowledge and understanding of science.

**A02** (a) Application of knowledge and understanding of science in familiar and unfamiliar contexts.  
(b) Analysis and evaluation of scientific information to make judgements and reach conclusions.

**A03** Experimental skills in science, including analysis and evaluation of data and methods.

## Data booklet

- A revised Data Booklet has been produced for the new specification.
- It provides values for key constants, as well as spectroscopic data, electronegativity values, electrode potentials and indicator ranges
- A Periodic Table is also provided

# Grading

# Unit results

- No change to the UMS scale
- Units 1, 2, 4 and 5 have a maximum of 120 UMS
- Units 3 and 6 have a maximum of 60 UMS

## Units 1, 2, 4 and 5

Unit grade	Maximum uniform mark	A	B	C	D	E
	120	96	84	72	60	48

## Units 3 and 6

Unit grade	Maximum uniform mark	A	B	C	D	E
	60	48	42	36	30	24



# Qualification results

- IAS – total of 300 UMS
- IAL – total of 600 UMS
- The A\* for IAL is calculated in the same way as now

## International Advanced Subsidiary (cash-in code: XCH11)

Qualification grade	Maximum uniform mark	A	B	C	D	E
	300	240	210	180	150	120

Students with a uniform mark in the range 0–119 will be Unclassified (U).

## International Advanced Level (cash-in code: YCH11)

Qualification grade	Maximum uniform mark	A	B	C	D	E
	600	480	420	360	300	240

Students with a uniform mark in the range 0–239 will be Unclassified (U).

# Unit availability

Unit	January 2019	June 2019	October 2019	January 2020	June 2020
1	✓	✓	✓	✓	✓
2	x	✓	✓	✓	✓
3	x	✓	✓	✓	✓
4	x	x	x	✓	✓
5	x	x	x	x	✓
6	x	x	x	x	✓
IAS award	x	✓	✓	✓	✓
IAL award	x	x	x	x	✓

- IAS first Award – June 2019
- IAL first Award – June 2020

# Unit 1:

# The Core Principles of Chemistry

# Topic 1: Formulae, Equations and Amount of Substance

- the use of  $pV = nRT$  in calculations involving gases and volatile liquids has been added
- Core Practical 1 on measurement of the molar volume of a gas has been added
- calculations will be unstructured.

## Topic 2: Atomic Structure and the Periodic Table

- understanding that ions in a mass spectrometer may have a +2 charge has been added
- be able to predict the mass spectra, including relative peak heights, for diatomic molecules, including chlorine, given the isotopic abundances has been added
- explaining the decrease in first ionisation energy down a group has been added.

# Topic 3: Bonding and Structure

## 3A: Ionic bonding

- understanding the effects of ionic radius and ionic charge on the strength of ionic bonding has been added
- the Born-Haber cycle and lattice energy calculations have been moved to Unit 4 but candidates are expected to understand the meaning of the term 'polarisation' as applied to ions, that the polarising power of a cation depends on its radius and charge, and the polarisability of an anion also depends on its radius and charge.

# Topic 3: Bonding and Structure

## 3B: Covalent bonding

- bonding and structures of diamond, graphite and graphene have been moved from Unit 2 to Unit 1
- intermediate bond and bond polarity have been moved from Unit 2 to Unit 1.

## 3C: Shapes of molecules

- This has been moved from Unit 2 to Unit 1 and the content is almost the same with just the shape of  $\text{C}_2\text{H}_4$  added.

## 3D: Metallic bonding

- This is the same as the legacy specification.

## Topic 4: Introductory Organic Chemistry and Alkanes

### 4A: Introduction

- classification of reactions as addition, substitution, oxidation, reduction or polymerisation has moved from Unit 2 to Unit 1
- understand that bond breaking can be homolytic, to produce free radicals, or heterolytic, to produce ions, has moved from Unit 2 to Unit 1
- definitions of the terms 'free radical' and 'electrophile' have moved from Unit 2 to Unit 1.



# Topic 4: Introductory Organic Chemistry and Alkanes

## 4B: Alkanes

- more detail on pollutants produced during the combustion of alkane fuels has been added
- the concept of carbon neutrality has been added.

# Topic 5: Alkenes

- the addition of steam to alkenes has been added
- in mechanisms, curly arrows must start from a bond or a lone pair of electrons.

## Sample question – Q20(c)

A sample of bromine gas occupied  $200 \text{ cm}^3$  at a temperature of  $77^\circ\text{C}$  and a pressure of  $1.51 \times 10^5 \text{ Pa}$ .

Calculate, using the ideal gas equation, the amount in moles of bromine molecules in this sample.

$$[pV = nRT \text{ and } R = 8.31 \text{ J mol}^{-1}\text{K}^{-1}]$$

**How would you award the 4 marks?**

# Sample mark scheme

See page 36 of the accompanying SAMs booklet

## Note

- Candidates can score full marks for the final answer without any working. However, we advise working to be shown as, if the final answer is incorrect, transferred error marks can then be awarded.
- For example, if the candidate does not convert the volume, a final answer of 10383 would score 3 marks if working is shown but 0 if there is no working.

# **Unit 2:**

# **Application of Core Principles of**

# **Chemistry**

# Topic 6: Energetics

This has moved to Unit 2 from Unit 1.

- candidates will not be provided the expression for calculating an enthalpy change from a temperature change
- calculations will be unstructured
- Core Practical 2 on determining the enthalpy change of a reaction using Hess's Law has been added.

# Topic 7: Intermolecular forces

There are no significant changes to the legacy specification.

The statements have just been rewritten to provide extra clarity.

# Topic 8: Redox Chemistry and Groups 1,2 and 7

## 8A: Redox chemistry

- writing names of substances with oxidation numbers has been added
- writing formulae from oxidation numbers has been added
- there is more clarification on determining oxidation numbers
- explaining redox reactions in terms of gain and loss of electrons has been added
- there is more emphasis on oxidising and reducing agents.



# Topic 8: Redox Chemistry and Groups 1,2 and 7

## 8B: The elements of Groups 1 and 2

- patterns in properties and reactions of Group 1 elements has been added
- tests for carbonate, hydrogencarbonate, sulfate and ammonium ions have been added
- Core Practical 3 on finding the concentration of a solution of hydrochloric acid has been added
- Core Practical 4 on preparing a standard solution of a solid acid and using it to find the concentration of a solution of sodium hydroxide has been added.

# Topic 8: Redox Chemistry and Groups 1,2 and 7

## 8C: Inorganic chemistry of Group 7

(limited to chlorine, bromine and iodine)

- there is more emphasis on understanding the reasons for the trends in physical properties and reactivity
- there is more emphasis on understanding the redox reactions of the elements with halide ions, metals and disproportionation reactions
- iodine/thiosulfate titrations have moved to Unit 5.

# Topic 9: Introduction to kinetics and equilibria

## 9A: Kinetics

- calculating the rate of a reaction from:
  - i the time taken for a reaction, using  $\text{rate} = 1/\text{time}$
  - ii the gradient of suitable graph, by drawing a tangent, either for initial rate, or at a time,  $t$  has been added
- drawing the reaction profiles for uncatalysed and catalysed reactions, including the energy level of the intermediate formed with the catalyst has been added.

# Topic 9: Introduction to kinetics and equilibria

## 9B: Equilibria

- evaluate data to explain the necessity, for many industrial processes, to reach a compromise between the yield and the rate of reaction has been added.

# Topic 10: Organic Chemistry: Alcohols, Halogenoalkanes and Spectra

## 10A: General Principles

This is taken from the legacy specification 2.11.

# Topic 10: Organic Chemistry: Alcohols, Halogenoalkanes and Spectra

## 10B: Halogenoalkanes

- reaction between halogenoalkanes and alcoholic KCN to produce nitriles (where the cyanide ion acts as a nucleophile) has been added as an example of a reaction to increase the length of the carbon chain
- the hydrolysis of primary haloalkanes using aqueous silver nitrate in ethanol has been added
- Core Practical 5 (investigating the rates of hydrolysis of halogenoalkanes) has been added
- Core Practical 6 (chlorination of 2-methylpropan-2-ol with concentrated hydrochloric acid) has been added

# Topic 10: Organic Chemistry: Alcohols, Halogenoalkanes and Spectra

## 10C: Alcohols

- the reaction with sodium is no longer required
- reactions to produce bromoalkanes and iodoalkanes have been added
- tests for aldehydes and carboxylic acids have been added
- specific techniques for the preparation and purification of an organic liquid have been added
- Core Practical 7 (oxidation of propan-1-ol to produce propanal and propanoic acid) has been added.

# Topic 10: Organic Chemistry: Alcohols, Halogenoalkanes and Spectra

## 10D: Mass spectra and IR

- Core Practical 8 on the analysis of some inorganic and organic unknowns has been added
- understanding which molecules absorb IR radiation has been removed.

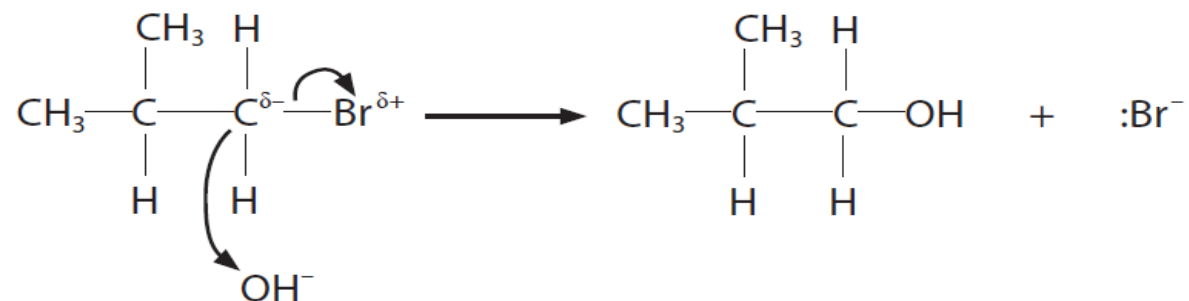
### Note

Most of Topic 2.13 on Green Chemistry is no longer required. Any statements that are required are listed in separate Topics, for example, carbon neutrality has been moved to Unit 1.



# Sample question – Q19(b)

1-bromo-2-methylpropane can be converted back to 2-methylpropan-1-ol by heating with aqueous alkali. A student suggested the following mechanism for the reaction.



Identify and correct the three mistakes in the mechanism shown.

(3)

What are the three marking points you would look for in this question?

# Sample mark scheme

**See page 76 of the SAMs booklet**

## **Note**

Curly arrows represent the movement of a pair of electrons so must start from an atom or a bond. If they start from an atom, the lone pair of electrons must be shown.

# Unit 3: Practical Skills in Chemistry 1

# Practicals in the specification

- The specification contains 16 Core Practical  
(8 at AS and 8 at A2 – **see handout**).
- It is strongly recommended that students complete these Core Practical in order to develop skills
- Other suggested practicals appear in the specification
- The suggested practicals are optional
- You may add – or substitute – your own practicals too!

# Practical skills

- Students will be assessed on practical skills in Units 3 and 6.
- This will include testing the skills of students in familiar and unfamiliar applications
- Students may be asked about planning, including risk management and the selection of apparatus, with reasons
- Other questions may cover data handling, including the use of significant figures, processing data and plotting graphs.

# Support for practical skills

- The approach is similar for the GCE A level, so many resources are being re-written for the IAL
- Practical Guide for Teachers and Students – introduces the practicals and has some questions
- Worksheets for students, teachers and technicians – to give further detail of the practical activities
- Lab Books – to save you having to photocopy worksheets!

# Assessing practical skills – Unit 3

- Unit 3 is a written practical examination, covering the skills and techniques developed during practical work in Units 1 and 2.
- The unit content contains eight core practical activities
- The examination may include questions where students apply their knowledge to new practical situations.
- Students should develop their practical skills by completing a range of different practicals that require a variety of different techniques.
- Suggested practicals are included at the end of each Topic.

# Questions may ask students to:

- recall and/or interpret observations relating to tests for ions and gases in Units 1 and 2
- recall and/or interpret observations relating to tests for organic functional groups in Units 1 and 2
- manipulate data and comment on experimental methods and techniques for a range of experiments involving measurements in Units 1 and 2, including molar mass calculations, titrations, thermochemical investigations and simple kinetics experiments
- comment on experimental methods and techniques in the preparation of inorganic or organic compounds in Units 1 and 2.



## Sample Question – Q4(d)

A class of students carried out experiments to determine the value of  $x$  in the formula of hydrated sodium carbonate,  $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$ .

Hydrated sodium carbonate was heated until no more water of crystallisation remained. The Data Book value for  $x$  is 10.

One student obtained a value for  $x$  of 8.63 and another student obtained a value for  $x$  of 10.79.

Explain the practical errors that could have led to each of these values. (4)

**What are the key points you would expect to see in the mark scheme for this question?**

# Sample mark scheme

See p115 of the SAMs booklet

## Note

Candidates will be expected to evaluate experimental results in this way.  
It would be helpful if they learnt about heating to constant mass.

# Unit 4: General Principles of Chemistry I

## – Rates, Equilibria and Further Organic Chemistry

# Topic 11: Kinetics

- The topic assumes knowledge of Topic 9A: Kinetics
- The content is almost the same as the legacy specification but has been re-ordered and clarified
- Heterogeneous catalysts have been moved from Unit 5 Transition metals
- Core Practicals 9a and 9b on following the rate of the iodine-propanone reaction by a titrimetric method and investigating a 'clock reaction' have been added.
- Core Practical 10 on finding the activation energy of a reaction has been added.

# Topic 12 Entropy and Energetics

## 12A: Entropy

No significant changes from the legacy specification – the statements have been rewritten to provide extra clarity.

## 12B: Lattice energy

- This topic has been moved from Unit 1 in the legacy specification; and some statements have been rewritten to provide extra clarity.
- The use of entropy and enthalpy changes of solution to predict the solubility of ionic compounds and discuss trends in solubility has been added.

# Topic 13: Chemical equilibria

- This topic assumes knowledge of Unit 2 Topic 9B: Chemical equilibria.
- The statements from the legacy specification Topics 4.5 and 4.6 have been rewritten to simplify and clarify this section of work.
- There is less emphasis on details of industrial processes, although questions could still be set on these processes using application of knowledge of the points in the new specification.

# Topic 14: Acid-base equilibria

- knowledge of early theories about acidity has been removed
- Core Practical 11 on finding the  $K_a$  value for a weak acid has been added.

# Topic 15: Organic Chemistry: Carbonyls, Carboxylic acids and Chirality

## Topics 15A: Chirality, 15B: Carbonyl compounds and 15C: Carboxylic acids

These are almost the same as the legacy specification, with just some rewriting to provide clarification.

## Topic 15D: Carboxylic acid derivatives

This is almost the same as the legacy specification but transesterification has been removed.



# Topic 15: Organic Chemistry: Carbonyls, Carboxylic acids and Chirality

## Topic 15E: Spectroscopy and Chromatography

- use of mass spectra data to 4 decimal places has been added
- use of  $^{13}\text{C}$  NMR spectroscopy has been added
- predicting the chemical shifts and splitting patterns of the  $^1\text{H}$  atoms in a given molecule has been added
- use of magnetic resonance imaging has been removed
- paper and thin layer chromatography have been added

## Sample Question – Q19(d)

Ethyl ethanoate has three isomers which are also esters.

(i) Draw the structures of these three isomers.

(2)

(ii) Explain to what extent it is possible to distinguish between the three isomers using carbon-13 NMR spectroscopy.

(2)

**Write the mark scheme for these items.**

# Sample Answer

See p150 – 151 of the SAMs booklet

# Unit 5: General Principles of Chemistry

## II – Transition Metals and Organic Nitrogen Chemistry

# Topic 16: Redox Equilibria

- Core Practical 12 on investigating some electrochemical cells has been added
- writing cell diagrams using the conventional representation of half-cells has been added
- Core Practicals 13a and 13b on redox titrations with iron(II) ions and potassium manganate(VII) and sodium thiosulfate and iodine have been added
- the breathalyser test has been removed

# Topic 17: Transition Metals and their Chemistry

- understanding that colour changes in transition metal ions may arise as a result of changes in oxidation number of the ion, ligand and coordination number of the complex has been added
- knowing that haemoglobin is a complex of iron(II) has been added
- understanding the interconversion of the oxidation states of vanadium in terms of  $E^\ominus$  values has been added
- more detail on homogeneous and heterogeneous catalysts, including autocatalysis, has been added
- Core Practical 14 on preparation of a transition metal complex has been added
- photochromic sunglasses has been removed

# Topic 18: Organic Chemistry – Arenes

- Addition of hydrogen to benzene has been removed

# Topic 19: Organic Nitrogen Compounds: Amines, Amides, Amino Acids and Proteins

- the preparation of primary aliphatic amines from halogenoalkanes and by the reduction of nitriles has been added
- the reaction of amino acids with ninhydrin has been removed
- Core Practical 15 on analysis of some inorganic and organic unknowns has been added.



# Topic 20: Organic Synthesis

- examples to illustrate the importance of synthesis in research for the production of useful products and explaining why sensitive methods of chemical analysis are important have been removed
- increasing the length of a carbon chain using Grignard reagents has been added
- understanding of the importance of the mechanism in the synthesis of stereo-specific drugs and combinatorial chemistry in drug research have been removed
- Core Practical 16 on the preparation of aspirin has been added

## Sample Question – Q17(a)

Benzene can be represented by either a cyclic triene or with a delocalised ring of electrons.

\*(a) Discuss evidence, including one example from each of spectroscopy, thermochemistry and the type of reaction normally undergone, that support the view that the better representation of benzene is with a delocalised ring of electrons.

(6)

**This is an example of an extended writing question.**

**What would you expect the indicative marking points to cover?**

# Sample Answer

**See p197 – 198 of the SAMs booklet**

# Extended writing questions

# Extended writing questions

- The previous IAL specification also had questions worth around 6 marks
- In general, these were “points mark”, but sometimes included a mark for “QWC”
- The new IAL specification has a 6-mark question on Units 2, 4 and 5

# Marking extended writing questions

- Up to 4 marks are given for chemical knowledge
- The chemistry is found in the “indicative marking points”
- There are usually 6 indicative marking points
- The table in the mark scheme shows how many marks are scored by different numbers of indicative points

# Marking extended writing questions

- Up to 2 marks are given for reasoning and logical presentation of ideas
- Note that this isn't about spelling and grammar – instead it is about linking the points together in a clear sequence
- In general, answers with fewer indicative points are unlikely to score both marks of the 2 available

# Activity – writing a question

You can choose any topic from Units 2, 4 and 5.

You should select just one command word from the list in the specification.

You can include a **limited** amount of clarification, such as ‘You should include equations in your answer’, but you should not give a list of bullet points.

Write the 6 indicative points for this question.



# Unit 6: Practical Skills in Chemistry II

# Practical skills

The points covered in Unit 3 also apply to Unit 6 except:

- students are expected to develop experimental skills and knowledge and understanding of the necessary techniques by carrying out a range of practicals while they study Units 4 and 5.

## Sample Question – Q3(c)

*This is part of a preparation of a complex salt.*

Step 6 To precipitate the complex salt, add cold ethanol to the mixture and filter the solid formed under reduced pressure.

Draw a labelled diagram of the apparatus used for filtration under Reduced pressure in Step 6.

**(3)**

**Write a mark scheme for this question.**

# Sample Answer

**See p225 of SAMs booklet**

## **Note**

- Fluted filter paper would not be acceptable.
- Students often forget to draw and label the filter paper.

# Common Issues

If you are concerned that there are not enough Sample Assessment papers for your students, you can still use all the past IAL and GCE papers that are available on the website



# Support and Services

# Support and services

[Getting Started Guide](#)

[Scheme of work](#)

[Practical Guide](#)

[Mathematics Support](#)

[Transition Guide](#)

[Mapping Guide](#)

[Curriculum Matched Publishing](#)

[Topic Guides](#)

[Exemplar Marked Responses](#)

[Access to scripts](#)

[ResultsPlus](#)

[Exam Wizard](#)

# Pearson IAL Science published resources

Developed for the new Pearson Edexcel International A Level (2018) specification, these resources are specifically designed for international students, with a strong focus on progression, recognition and transferable skills, allowing learning in a local context to a global standard.

- 100% curriculum-matched
- Comprehensive textbook
- Exam practice
- Internationally appropriate
- EAL support
- Transferable Skills signposting
- Online e-book
- Teacher support



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- Universities recognise and trust the quality of the Pearson Edexcel qualifications and accept them as being comparable to nationally recognised qualifications, offering excellence in learning and achievement.
- Students can equally pursue undergraduate study at a university closer to home as our qualifications are recognised for entry in their region of study.
- We provide a range of free support to help students progress, such as country study guides, case study blogs and interactive webinars.
- We have a proactive programme of student engagement activities such as advice from higher education experts, a specialised website page and social media communities.
- We are closely connected with higher education stakeholders.

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**[qualifications.pearson.com/en/support/Services/progress-to-university.html](https://qualifications.pearson.com/en/support/Services/progress-to-university.html)**

# Other useful links

## **1. Grade Boundaries**

This page shows the minimum marks needed to achieve a certain grade for all UK and international examinations. Also refer to the examiners report which is available for download with other documents.

## **2. Examination Results Statistics**

Results statistics summarise the overall grade outcomes of candidates sitting Pearson Edexcel examinations.

# Contact your dedicated Subject Advisor

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# Thank you for your time

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