

Dawood Public School
Cambridge O Level Chemistry Syllabus Code 5070
Course Outline 2020-21
Grade XI

Text book:

Tin Yin Toon and John Sadler Chemistry Matters, 2007, Mc Grawhill.

Introduction:

This syllabus is designed to place more emphasis on factual material and greater emphasis on the understanding and application of scientific concepts and principles.

Successful Cambridge O Level Chemistry candidates gain lifelong skills, including:

- A better understanding of the technological world in which they live, and take an informed interest in science and scientific developments
- Knowledge of the basic principles of chemistry through a mix of theoretical and practical studies
- An understanding of the scientific skills essential for further study at Cambridge International A Level,
- skills which are useful in everyday life
- How science is studied and practiced, and an awareness that the results of scientific research can have both good and bad effects on individuals, communities and the environment

Syllabus aims and assessment objectives**Aims**

The aims of the syllabus, which are not listed in order of priority, are to:

1. Provide, through well designed studies of experimental and practical chemistry, a worthwhile educational experience for all students, whether or not they go on to study science beyond this level and, in particular, to enable them to acquire sufficient understanding and knowledge to:
 - a) Become confident citizens in a technological world, able to take or develop an informed interest in matters of scientific import
 - b) Recognize the usefulness, and limitations, of scientific method and to appreciate its applicability in other disciplines and in everyday life
 - c) Be suitably prepared for studies beyond Cambridge O Level in pure sciences, in applied sciences or in science-dependent vocational courses
2. Develop abilities and skills that:
 - a) Are relevant to the study and practice of science
 - b) Are useful in everyday life
 - c) Encourage efficient and safe practice
 - d) Encourage effective communication
3. Develop attitudes relevant to science such as:
 - a) Concern for accuracy and precision
 - b) Objectivity
 - c) Integrity
 - d) Enquiry
 - e) Initiative
 - f) Inventiveness
4. Stimulate interest in and care for the local and global environment.
5. Promote awareness that:
 - a) The study and practice of science are co-operative and cumulative activities, and are subject to social, economic, technological, ethical and cultural influences and limitations
 - b) The applications of sciences may be both beneficial and detrimental to the individual, the community and the environment

Assessment objectives

The assessment objectives describe the knowledge, skills and abilities that candidates are expected to demonstrate at the end of the course. They reflect those aspects of the aims that are assessed.

AO1 Knowledge with understanding

Candidates should be able to demonstrate knowledge and understanding in relation to:

1. Scientific phenomena, facts, laws, definitions, concepts and theories

2. Scientific vocabulary, terminology and conventions (including symbols, quantities and units)
3. Scientific instruments and apparatus, including techniques of operation and aspects of safety
4. Scientific quantities and their determination
5. Scientific and technological applications with their social, economic and environmental implications.

Syllabus content defines the factual material that candidates may be required to recall and explain.

Questions testing these objectives will often begin with one of the following words:

- define
- stated
- describe
- explain
- outline

AO2 Handling information and solving problems

Candidates should be able, in words or using symbolic, graphical and numerical forms of presentation, to:

1. Locate, select, organise and present information from a variety of sources
2. Translate information from one form to another
3. Manipulate numerical and other data
4. Use information to identify patterns, report trends and draw inferences
5. Present reasoned explanations for phenomena, patterns and relationships
6. Make predictions and hypotheses
7. Solve problems

These assessment objectives cannot be precisely specified in the syllabus content because questions testing such skills may be based on information that is unfamiliar to the candidate. In answering such questions, candidates are required to use principles and concepts that are within the syllabus and apply them in a logical, deductive or reasoned manner to a new situation. Questions testing these skills will often begin with one of the following words: predict, suggest, calculate or determine

AO3 Experimental skills and investigations

Candidates should be able to:

1. Follow a sequence of instructions
2. Use techniques, apparatus and materials
3. Make and record observations, measurements and estimates
4. Interpret, evaluate and report upon observations and experimental results
5. Design/plan an investigation, select techniques, apparatus and materials
6. Evaluate methods and suggest possible improvements.

Nomenclature, units and significant figures

The proposals in 'Signs, Symbols and Systematics' (The Association for Science Education Companion to 16–19 Science)' will generally be adopted, although the traditional names sulfate, sulfite, nitrate, nitrite, sulfurous and nitrous acids will be used in question papers. Sulfur (and all compounds of sulfur) will be spelt with f, not ph. To avoid difficulties arising out of the use of l as the symbol for litre, use of dm³ in place of l or litre will be made.

In accordance with current ASE convention, decimal markers in examination papers will be a single dot on the line. Candidates are expected to follow this convention in their answers.

Candidates should be aware that misuse of units and/or significant figures, i.e. failure to quote units where necessary, the inclusion of units in quantities defined as ratios or quoting answers to an inappropriate number of significant figures, is liable to be penalised.

SCHEME OF ASSESSMENTS:

Students are required to enter:

1. In monthly and surprise tests;
2. In mid-year and final exams give two papers;

Total marks for both papers are 100

Paper	Type of Paper	Duration	Marks
1	Multiple Choice	30 minutes	25
2	Theory	1 hour 30 minutes	75

Instructions:

1. Students should have her own text book in the class.
2. Students are allowed to note the lecture points and ask questions after the lecture.
3. Students shall only submit their journals weekly on the allotted days after completing their work.
4. Students are allowed to ask and share their problems any time.
5. Students must write the name of the chapter and date on their work.
6. Students must draw diagrams where necessary and write neatly in journals.
7. Students are not permitted to use correction fluids in exams and in class work.
8. Talking, doing any other subject's work during class will be strictly penalized.
9. Sharing of stationery during test and exams is not allowed.

SYLLABUS CONTENT

FIRST TERM

August

Chapter 1: Introduction to Organic Chemistry

Learning and assessment objectives

Students should be able to:

- Define the terms, understand nomenclature of organic compounds
- State uses of fractions of crude oil
- Describe fractional distillation of crude oil
- State the types of compounds present, given a chemical name ending in _ene, -ane, -ol, or – oic acid, or given a molecular structure.
- Name natural gas and petroleum as source of fuel
- Name methane as the main constituent of natural gas
- Describe general characteristics of homologous series
- Describe and identify isomers

Contents:

- Fractional distillation of crude oil
- Fuels
- Homologous series

Assignments:

Write about the importance of organic chemistry in daily life and in industries

Chapter: Alkanes

Learning and Assessment objectives

Students should be able to:

- Describe the properties of (physical and chemical) alkanes
- Draw the structure of branched and unbranched alkanes

Assignment:

Exercise from the book

Resources and References:

Chemistry by Richard Harwood pg. 306-308

Chemistry for O level By Christopher N Prescott pg. 312-315

Chemistry Matters pg. 390-399

Chemistry by Jane Morris pg. 242-249

Chemistry by Roger Norris pg. 197-199

www.nyu.edu/pages/mathmol/library

click on 'hydrocarbons'

<http://antoine.frostburg.edu/cgi-bin/senese/tutorials/isomer/index.cgi>

September

Chapter: Alkenes

Learning and Assessment objectives

Students should be able to:

- Describe the manufacture of alkenes and hydrogen by cracking
- Describe the properties of alkenes
- Distinguish between saturated and unsaturated hydrocarbons from molecular structures:
 - by using aqueous bromine
- Describe the formation of poly(ethane) by addition polymerization
- State some uses of poly(ethane)

Contents:

- Structure of alkenes
- Manufacturing alkenes by cracking
- Chemical properties of alkenes
- Comparing alkanes and alkenes

Assignments:

- Exercise from the book

Resources and References:

Chemistry by Richard Harwood pg. 311-312

Chemistry for O level By Christopher N Prescott pg. 317-325

Chemistry Matters pg. 400-413

Chemistry by Jane Morris pg. 242-249

Chemistry by Roger Norris pg. 197-199

www.chemsoc.org/networks/learnnet/classic_exp.htm

Look at experiment 96

<http://www.btinternet.com/~chemistry.diagrams/cracking.htm>

Chapter: Alcohols**Learning and assessment objectives**

Students should be able to:

- Describe the formation of ethanol by fermentation and by the catalytic addition of steam to ethane
- Describe the properties of ethanol
- State uses of ethanol

Contents:

- Structure of alcohols
- Properties of alcohol
- Manufacturing ethanol
- Uses of ethanol

Assignments:

- Exercise from the book
- Collect information about the medicinal use and abuse of alcohol

Resources and References:

Chemistry by Richard Harwood pg. 353, 312, 315-318

Chemistry for O level By Christopher N Prescott pg. 326-330

Chemistry Matters pg. 414-431

Chemistry by Jane Morris pg. 242-249

Chemistry by Roger Norris pg. 197-199

www.wpbschoolhouse.btinternet.co.uk/page10/page10.htm

www.chemsoc.org/networks/learnnet/classic_exp.htm

www.wpbschoolhouse.btinternet.co.uk/page10/page10.htm

Click on 'Extra Organic Chemistry'

This section contains information of relevance to the whole unit. Click on 'Compiled tables of data'

October**Chapter: Carboxylic Acids****Learning and Assessment objectives**

Students should be able to:

- Describe the formation of ethanoic acid by oxidation of ethanol
- Describe ethanoic acid as an acid
- Describe the reaction of ethanoic acid with ethanol to give an ester

Contents:

- Structure of carboxylic acid
- Properties of carboxylic acid
- Ester

Assignments:

- Exercise from the book
- Collect information on industrial importance of esters

Resources and References:

Chemistry by Richard Harwood pg. 353, 320-321, 317

Chemistry for O level By Christopher N Prescott pg. 330-339

Chemistry Matters pg. 431-446

Chemistry by Jane Morris pg. 242-249

Chemistry by Roger Norris pg. 197-199

<http://library.thinkquest.org/3659/orgchem/carboxylicacids.html>

click on 'visit site' when web page appears

www.s-cool.co.uk/contents.asp

click on 'GCSE revision' then 'Chemistry' then choose topic: 'products from crude oil' . Use the 'Quick learn' section.

Recycling symbols: <http://www.cswd.net/recycling/symbols.html>

Chapter 6: Macromolecules**Learning and Assessment objectives**

Students should be able to:

- Describe macromolecules in terms of large molecules built up from small units; different macromolecules have different units and links
- Deduce the structure of polymer product from a given alkene and vice versa
- Describe the formation of nylon and terylene by condensation polymerization
- Name some typical uses of manmade fibers
- Name some typical uses of manmade fibers
- Describe the pollution problems caused by non-biodegradable polymers
- Name proteins, fats and carbohydrates as the main constituents of food
- Describe protein as possessing the same linkage as nylon but with different units
- Describe the hydrolysis of protein to amino acid
- Describe fat as ester possessing the same link as terylene but with different structure
- Describe the acid hydrolysis of carbohydrates
- Describe soap as a hydrolytic product of fat

Contents:

- Macromolecules
- Addition polymerization
- Condensation polymerization
- Plastics and pollution

Assignments:

- Exercises from the book

Resources and References:

Chemistry by Richard Harwood pg. 340-344, 354, 321

Chemistry for O level By Christopher N Prescott pg. 340-353

Chemistry Matters pg. 431-446

Chemistry by Jane Morris pg. 242-249

Chemistry by Roger Norris pg. 197-199

www.scool.co.uk/contents.asp

November –

Revision for Mid-Year Examination
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December

December - Mid-Year Examination
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FINAL TERM**January**

Revision of syllabus taught in Grade IX
 Topical past papers – Paper I and Paper II (MCQ & Theory)
 ATPs

Practical:

1. Determine the presence of ions in the given salts
2. Perform acid base titration

February

Revision of syllabus taught in Grade X

Practical:

1. Determine the presence of different inks in black ink by chromatography
2. Determine boiling and melting points of given substances

March - Revision**April- Mock Examination**Resource List:

Students may also find references to the following books helpful; these are suitable for use with this syllabus.

- ❖ Harwood, R Chemistry (edition 2, 2003), Cambridge University Press
- ❖ Berry, R IGCSE study guide for chemistry (2005) Hooder Murray
- ❖ Clegg, A Chemistry for IGCSE (2006) Heinemann
- ❖ Eral, B & Chemistry John Murray, Hooder Murray (2003) Wilford, L D R
- ❖ Hill, g Chemistry counts Hooder and Stoughton (2003)
- ❖ Lewis & Thinking Chemistry (GCSE edition) Oxford University press (2004) Waller

Websites for general use:

- ❖ http://www.chemsc.org/networks/learnnet/classic_exp.htm
- ❖ <http://www.thecatalyst.org/>
- ❖ <http://www.wpbschoolhouse.btinternet.co.uk/page10.htm>
- ❖ <http://www.s-cool.co.uk/contents.asp>
- ❖ <http://www.howstuffworks.com/>