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MACMILLAN
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Work Out

Chemistry

'A' Level

D. A. Burgess

M
MACMILLAN

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To my students, from whom I never cease to learn

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General Introduction

How to Use the Book

This book is intended for those studying for GCE 'A' level or Scottish 'H' Grade examinations. It is not a substitute for a textbook but aims to give a concise summary of a topic, followed by worked examples and further questions for the student to attempt.

The book could be used during a course of study to consolidate each topic as it is completed; at the end of a course as a major revision aid, or of course, both.

The summaries are intended to be sufficiently comprehensive to be useful as a quick reference source for questions other than those in the book. However, in some cases the worked examples give added information which it would have been tedious to repeat in the summary.

Questions have been selected from a variety of Examination Boards and include objective questions, structured questions and longer 'essay' questions. The worked examples do not give a model answer in the sense that nothing else will do; many questions may be treated in several ways, all equally acceptable. The real purpose is to help you to understand what an examiner is looking for in an answer. To this end, the author's comments are printed in **bold type**, to distinguish them from the suggested answer itself.

Objective questions come after the longer essay and structured questions simply because teaching points can more usefully be made in the longer questions in order to clear up difficulties and misconceptions. Later chapters often include a question which revises the work of earlier chapters, to show the links between topics. The great majority of questions in the book are of direct relevance to most syllabuses. Further questions with a star (*) have an answer in Section 16.2.

Questions that have deliberately been avoided because of limitations of space include (a) industrial processes, (b) special options such as biochemistry, metallurgy and colour chemistry, and (c) descriptive accounts of practical work.

Revision

- (a) Obtain a syllabus and past examination papers. These may be bought from the Examination Boards listed on page xi.
- (b) Keep a small booklet in which definitions, laws and principles may be stored. Make constant reference to it so that it becomes part of your 'armoury'. If your Board does not supply a Periodic Table for use in the examination, include in the booklet the first three rows (beginning with hydrogen, lithium and sodium, respectively). You should also add the first transition row. Persist until this upper part of the table can be written out from memory.

- (c) Select the most important 30 or so organic reactions and put each one on a small 'flip' card (about 8 cm × 4 cm), using both sides of the card somewhat as follows:

Side 2 gives the answer to the queries on side 1 and vice versa. You thus have 60 or so questions with immediate answers, to help in learning factual material. The idea can be extended to other parts of the syllabus, of course, but don't overdo it. The pack of cards should be small enough to be carried in a pocket, for use in odd moments, such as waiting for a bus or train.

- (d) Finally, *organise* your revision time. Use regularly certain evenings or days of the week and, if you are studying for two or more examinations, have a timetable. For example, Monday evening 7–8, chemistry; 8–8.30, break; 8.30–9.30, biology. No matter how interested or absorbed you become in chemistry(!), *stop* at 8 p.m. Have a timed break: put on a tape or record, have a coke, or whatever. Then resume with a different subject.

You must find your own best study hours; some people work best early in the morning, others in the evening. If you do not plan your revision systematically, it is quite astonishing how the weeks fly past with those ever-present good intentions never actually being implemented.

The Examination

- (a) When you sit down, make sure your desk is firm and does not wobble.
(b) Don't clutter your desk with materials which are not likely to be needed. Do not use correcting fluid – mistakes should be crossed out lightly; they may in fact get you some marks.
(c) When you have a choice of questions, read the whole paper carefully first. Apart from the rather obvious fact that the questions you choose first are those that you can answer well, there is evidence that the brain operates at an unconscious level so that a question which at first seems difficult or obscure may become much plainer an hour or so later.

Do not be mesmerised by what you cannot (or think you cannot) do. Remember, if you are able to answer correctly only 50% of each of the required number of questions, you will be successful.

- (d) Once again, keep a fairly strict timetable. Allocate a suitable time for each question (this can often be worked out from past papers beforehand). If it helps, write approximate times for changing over on the question paper.
(e) Try to classify each question; once you have realised the nature of the beast, you can decide whether to avoid it or tame it! This is where plenty of practice on past examination questions is of enormous help.

Don't be afraid (to change our metaphor) to abandon ship. If, after, say 15 or 20 minutes, you realise you are in a hopeless muddle, make a firm decision to leave it and try another.

- (f) Finally, in setting down your answer to an essay-type ('free response') question, do follow the numbering of each part *as given in the question*. Do not use (1), (2), (3) if the question is subdivided (a), (b), (c).

It is the author's hope that this book will help you to have the success that you want.

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The Associated Examining Board, Northern Ireland Schools Examination Council, Scottish Examination Board, Southern Universities' Joint Board, University of London School Examinations Board and University of Oxford Delegacy of Local Examinations for questions from past examination papers.

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Names and symbols used are in general those recommended by the Association for Science Education Report, *Chemical Nomenclature, Symbols and Terminology for Use in School Science*, 3rd edition. Numerical data were compiled from the *Chemistry Data Book*, by J. G. Stark and H. G. Wallace (1984) and the *Revised Nuffield Advanced Science Book of Data* (1984).

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Examination Boards for Advanced level

Syllabuses and past examination papers can be obtained from:

The Associated Examining Board (AEB)

Stag Hill House
Guildford
Surrey GU2 5XJ

University of Cambridge Local Examinations Syndicate (UCLES)

Syndicate Buildings
Hills Road
Cambridge CB1 2EU

Joint Matriculation Board (JMB)

78 Park Road
Altrincham
Cheshire WA14 5QQ

University of London School Examinations Board (L)

University of London Publications Office
52 Gordon Square
London WC1E 6EE

University of Oxford (OLE)

Delegacy of Local Examinations
Ewert Place
Summertown
Oxford OX2 7BZ

Oxford and Cambridge Schools Examination Board (O&C)

10 Trumpington Street
Cambridge CB2 1QB

Scottish Examination Board (SEB)

Robert Gibson & Sons (Glasgow) Ltd
17 Fitzroy Place
Glasgow G3 7SF

Southern Universities' Joint Board (SUJB)

Cotham Road
Bristol BS6 6DD

Welsh Joint Education Committee (WJEC)

245 Western Avenue
Cardiff CF5 2YX

Northern Ireland Schools Examination Council (NISEC)

Examinations Office
Beechill House
Beechill Road
Belfast BT8 4RS