National Qualifications

Chemistry
Project-report
General assessment information

This pack contains general assessment information for centres preparing candidates for the project-report Component of Advanced Higher Chemistry Course assessment.

It must be read in conjunction with the specific assessment task for this component of Course assessment which may only be downloaded from SQA's designated secure website by authorised personnel.

Valid from session 2015/16 and until further notice

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Contents

Introduction

This is the general assessment information for Advanced Higher Chemistry project–report.

This project–report is worth 30 marks out of a total of 130 marks available for this Course. The Course will be graded A–D.

Marks for all Course Components are added up to give a total Course assessment mark which is then used as the basis for grading decisions.

This is one of two Components of Course assessment. The other Component is a question paper.

This document describes the general requirements for the assessment of the project–report Component of this Course. It gives general information and instructions for assessors.

It must be read in conjunction with the assessment task for this Component of Course assessment.

Equality and inclusion

This Course assessment has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled candidates and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: www.sqa.org.uk/sqa/14977.html

Guidance on inclusive approaches to delivery and assessment in this Course is provided in the *Course/Unit Support Notes*.

What this assessment covers

This project–report is worth 30 marks out of a total of 130 marks available for this Course.

The assessment will assess the skills, knowledge and understanding specified for the project–report in the *Course Assessment Specification*. These are:

- extending and applying knowledge of chemistry to new situations, interpreting and analysing information to solve complex problems
- planning and designing chemical experiments/investigations, using reference material and including risk assessments, to test a hypothesis or to illustrate particular effects
- recording systematic detailed observations and collecting data
- selecting information from a variety of sources and presenting detailed information appropriately, in a variety of forms
- processing and analysing chemical information/data (using calculations, significant figures and units, where appropriate)
- making reasoned predictions and generalisations from a range of evidence/information
- drawing valid conclusions and giving explanations supported by evidence/justification
- critically evaluating experimental procedures by identifying sources of uncertainty, suggesting and implementing improvements
- drawing on knowledge and understanding of chemistry to make accurate statements, describe complex information, provide detailed explanations and integrate knowledge
- communicating chemical findings/information fully and effectively
- analysing and evaluating scientific publications and media reports

Assessment

Purpose

The purpose of this assessment is to generate evidence for the Added Value of this Course by means of a project–report.

Assessment overview

Assessment should take place when the candidates are ready to be assessed.

In this assessment the candidate will carry out an in-depth investigation of a chemistry topic. The topic will be chosen by the candidate, who will individually investigate/research the underlying chemistry of the topic. The candidate must discuss the selection of possible topics with their assessor to ensure that time is not wasted on researching topics that are unsuitable. This is an open-ended task which may involve a significant part of the work being carried out without supervision.

The project–report offers challenge by requiring skills, knowledge and understanding to be applied in a context that is one or more of the following:

- unfamiliar
- familiar but investigated in greater depth
- integrating a number of familiar contexts

Prior to starting this assessment candidates should have started a chemistry investigation. This would normally be as part of their *Researching Chemistry* Unit. In that Unit, candidates are required to plan and carry out a chemistry investigation. They should keep a record of their work as this will form the basis of their project–report. This record should include details of their research, experiments and recorded data. Typically this may include a series of related experiments using at least two different techniques.

The project–report submitted to SQA must have a logical structure and must be clear, concise and easy to read.

The project–report should be between 2000 and 3000 words in length excluding the title page, contents page, tables, graphs, diagrams, calculations, references, acknowledgements and any appendices. The word count should be submitted with the project–report. If the word count exceeds the maximum by 10%, a penalty will be applied. It should be written in the past tense and the impersonal voice should be used.

Detailed advice on the content of the project–report is given in the *Advanced Higher Chemistry Project Assessment Task*.

Assessment conditions

Assessors must exercise their professional responsibility in ensuring that evidence submitted by a candidate is the candidate's own work.

This assessment will be carried out over a period of time. Candidates should start at an appropriate point in the Course. This will normally be after they have started work on the Units in the Course.

Evidence which meets the requirements of this Component of Course assessment will be between 2000 and 3000 words. The word count should be submitted with the project–report. If the word count exceeds the maximum by 10%, a penalty will be applied.

There are no restrictions on the resources to which candidates may have access.

Candidates must undertake the assessment, whatever the nature, independently. However, reasonable assistance may be provided prior to the formal assessment process taking place. The term 'reasonable assistance' is used to try to balance the need for support with the need to avoid giving too much assistance.

Coursework in Advanced Higher may involve candidates undertaking a larger amount of autonomous work without close supervision than they have previously undertaken. Assessors may provide guidance and support as part of the normal teaching and learning process. However, assessors should not adopt a directive role or provide specific advice on how to re-phrase, improve responses or provide model answers.

Assessor comments on the selection of a topic are appropriate before the candidate starts the task.

The requirements of the project–report should be made clear to candidates at the outset.

The project–report will be conducted under some supervision and control. This means that although candidates may complete part of the work outwith the learning and teaching setting, assessors should put in place processes for monitoring progress and ensuring that the work is the candidate's own and that plagiarism has not taken place.

Assessors should put in place mechanisms to authenticate candidate evidence. For example:

- regular checkpoint/progress meetings with candidates
- short spot-check personal interviews
- checklists which record activity/progress
- photographs, film or audio evidence

Evidence to be gathered

The following candidate evidence is required for this assessment:

- a project–report

The project–report will be submitted to SQA, within a given timeframe, for marking. The same project–report cannot be submitted for more than one subject.

General Marking Instructions

In line with SQA's normal practice, the following general Marking Instructions are addressed to the marker. They will also be helpful for those preparing candidates for Course assessment.

Evidence will be submitted to SQA for external marking.

All marking will be quality assured by SQA.

General Marking Principles for Advanced Higher Chemistry project-report

This information is provided to help you understand the general principles you must apply when marking candidate responses to this project-report. These principles must be read in conjunction with the Detailed Marking Instructions, which identify the key features required in candidate responses.

(a) Marks for each candidate response must always be assigned in line with these General Marking Principles and the Detailed Marking Instructions for this assessment.

(b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.

Overview of Marking Instructions

Assessment category and criteria	Marks
Abstract ♦ a brief abstract (summary) stating the overall aim(s) and finding(s) of the investigation	**1** **(1)**
Introduction ♦ account of underlying chemistry relevant to aims ♦ chemical terms/ideas are used accurately ♦ chemical ideas explained clearly ♦ underlying principles behind techniques used	**4** **(4)**
Procedures ♦ appropriate to aim(s) ♦ procedures clearly described in sufficient detail to allow the investigation to be repeated ♦ procedures are at an appropriate level for Advanced Higher complexity, two or more techniques/modification(s) ♦ controls and duplication used appropriately ♦ accuracy of measurements ♦ risk assessment	**1** **2** **2** **1** **1** **2** **(9)**
Results **Quantitative** ♦ relevant to aim(s) of the investigation ♦ raw data recorded and within limits of accuracy of measurement ♦ raw and processed results are presented in a clear and concise manner with appropriate use of tables, graphs, diagrams and calculations ♦ observations are detailed and suitably recorded **or** **Qualitative** ♦ relevant to aim(s) of the investigation ♦ raw and processed results are presented in a clear and concise manner using appropriate format ♦ observations are detailed and suitably recorded	**1** **1** **3** **1** **(6)** **1** **2** **3** **(6)**
Discussion (conclusion(s) and evaluation) ♦ conclusion(s) is/are valid and relate to aim(s) of the investigation ♦ evaluation of procedures and results includes comment as appropriate on: — accuracy of measurement — adequacy of replication/sampling — adequacy of controls — sources of uncertainties in relation to measurements — solutions to problems and modifications to procedures ♦ evaluation of results includes as appropriate: — analysis and interpretation of results — account of uncertainties described and consideration of uncertainties on outcome ♦ overall quality of the investigation	**1** **3** **3** **1** **(8)**

Presentation ♦ appropriate structure, including informative title, contents page and page numbers ♦ references cited in the text and references listed in standard form, acknowledgements, where appropriate	**1** **1** **(2)**
Total marks	**30**

Detailed Marking Instructions for the project-report

These Detailed Marking Instructions provide the basis on which the General Marking Principles should be applied. The following table shows how the 30 marks are allocated to each of the categories against which the evidence will be assessed.
The project–report should be between 2000 and 3000 words in length. The word count should be submitted with the project–report. If the word count exceeds the maximum by 10%, a penalty will be applied.

Category	Expected response	Max mark	Additional guidance
Abstract	♦ a brief abstract (summary) stating the overall aim(s) and finding(s)/ conclusion(s) of the investigation	1	♦ A brief abstract (summary) must immediately follow the contents page and should be under a separate heading. The 'abstract' must contain a clear statement of the main aims(s) and overall finding(s)/conclusion(s) of the investigation and must be separate from and placed before the 'introduction'. The overall findings must be consistent with the conclusions given in the 'discussion' and should relate to the aims. ♦ For example, if the aim of the investigation is to determine the actual quantity/mass of a substance then the main findings must include the values (or percentages) obtained, eg if the mass of vitamin C in a fruit or fruit juice, or the acidity in wine is to be determined, then the values must be stated in the main findings as well as in the conclusions later on in the project–report. However if the aim is to compare the quantities of vitamin C in different fruit juices then actual values need not be given here. It would be acceptable to say, for example, that 'type X contains most vitamin C whereas type Z has least vitamin C'.

Introduction	♦ account of underlying chemistry relevant to aim(s) ♦ chemical terms/ideas are used accurately ♦ chemical ideas explained clearly ♦ underlying principles behind techniques used	**4**	♦ This section is marked holistically and is an opportunity to give marks for 'quality'. Think in terms of 4/3/2/1/0 marks (markers will have to use professional judgement and comments from markers on the record sheet would be helpful here). ♦ 0 marks may be awarded here. It should be fairly easy for candidates to get 1 mark here but progressively more difficult to get 2, 3 or 4 marks. ♦ Look for some interesting information which the candidate has obviously found out from doing some background reading. While the emphasis is on 'chemical' information, it may include 'historical' information as well but the marks are for chemistry. ♦ Appreciation of underlying chemistry/terms accurately described/brief outline of relevant background theory/chemical significance of chosen topic. ♦ Look for formulae, equations etc which demonstrate that the investigation is obviously a chemistry one. ♦ Terms must be used accurately and ideas must be clearly explained. Allow minor errors but not if these are fundamental to the chemistry behind the investigation. ♦ Look for underlying chemical principles behind the investigation/background theory of techniques used. ♦ Theory may be given elsewhere in the project–report, eg in the 'procedures' section, but marks for good chemistry written elsewhere in the project–report are given under this category. ♦ If a fundamental error is perpetuated throughout the project–report then a maximum of 2 marks can be awarded in this section. However should this fundamental error have consequences in other sections of the project–report then follow through should apply. ♦ An example might be an equation wrongly balanced in the 'underlying chemistry' leading to an error in the mole ratio and therefore calculations and processed results would also be wrong.

			This may finally produce an incorrect 'conclusion' and possibly an error in the 'evaluation'. ♦ Candidates should use their own words wherever possible. ♦ Downloading directly from the internet or copying directly from books may suggest that the candidate has not understood the chemistry involved and will be considered as plagiarism. Where the vast majority is believed to have been copied verbatim then the candidate is not demonstrating understanding and should be marked accordingly. Diagrams and complicated structural formulae copied and pasted from an internet source are perfectly acceptable, especially when the reference is cited in the text and listed at the back of the project–report.
Procedures	♦ appropriate to aim(s) (**1**) ♦ procedure(s) clearly described in sufficient detail to allow the investigation to be repeated (**2**)	**9**	♦ In broad terms, the procedures should allow the aim(s) to be achieved. If there is no stated aim(s), this mark may still be awarded if the aim(s) is obvious from the title of the project-report. ♦ At least one procedure must be clearly described. If more than one procedure is carried out, then the major one used in the investigation must be described. The procedure should be described well enough for another competent Advanced Higher Chemistry candidate to be able to repeat the procedure from the description. ♦ The project–report should be written in the past tense and impersonal voice. If the project–report is not written in past tense and impersonal voice, eg if written as a set of instructions in the imperative voice, then a maximum of 1 mark can be given for 'procedures'. Consider use of first person on one occasion only as a minor error. ♦ Bulleted/numbered points are only acceptable if statements are in sentences and are meaningful and coherent, ie must make sense if numbers or bullet points were to be removed, but must not be a list of instructions.

	♦ procedures are at an appropriate level for Advanced Higher complexity, two or more techniques/ modifications (**2**)		♦ It would be appropriate in this section for candidates to include labelled diagrams or photographs of assembled apparatus. ♦ Looking for concentration of solutions, temperature used etc. The student may have included this information with the results but it is marked here. Ignore the omission of a small number of minor details. Use professional judgement here. ♦ Treatment of the topic must be at Advanced Higher level for first mark, ie the complexity of the design of the experiments. The second mark is available for two or more techniques/modifications to procedures in the light of experience/control experiments. ♦ Look for modifications to original plan and some original thought on the part of the candidate rather than simply following a set of instructions. Any modification in light of experience as candidate does the investigation. ♦ This includes dilution of solutions to get better titration values or changing solvent in chromatography experiment if the first one hasn't been effective or changing a titrant or an indicator to get a better result/end-point. Acceptable if modification carried out is mentioned later in the project–report, eg in the 'evaluation' section, but it would be helpful if commented upon by the marker. Original thought on the part of the candidate might be that he/she explains why something different was carried out rather than, for example, simply following a recipe. If a modification is carried out, the original results before the modification should be given where practicable. An example where this would not be practicable would be if the colour change occurred during a titration after adding just a drop or two of titrant. In this case a reason for doing the modification must be stated rather than giving the results. ♦ However, raw results need to be given for the modification. Not

			getting good results so standardising the solutions may be considered a modification (in the light of experience, for example, a candidate may have had to dilute a solution to get better titration results). In this and in similar situations the original raw results should be given, where practicable, as well as the results after the modification. It will not count as a modification if the procedure was carried out wrongly to begin with and the modification involved carrying out the procedure the way it should have been done. For example, measuring out a volume for titration using a measuring cylinder then changing to using a pipette when a pipette should have been used to begin with. ♦ It is not appropriate for a student just to give a blanket statement that a modification has been carried out. For example 'the concentration of the solution was diluted because of low titration results' would not be acceptable. However, giving a table showing low results or even stating that after an initial trial in which the titration result was lower than, say, 5 cm^3 then the concentration of the solution was diluted would be acceptable. Without a table of results, the candidate should give a value of some sort. For example, stating that the titres were less than 1 cm^3 would be acceptable. Another example might be a candidate stating that the modification involved changing the solvent in a chromatography experiment. In this case the candidate would have to give a reason for having to change the solvent and also state what the original and replacement solvents were. ♦ Where a second technique has been carried out there must be evidence that it has been done by the candidate. Do not count as two techniques if one has been carried out by a university technician. This should be obvious from the description of the procedure given in the project-report. Refluxing followed by

	♦ controls and duplication (**1**)		distillation done as part of an organic preparation would not count as two separate techniques. However going on to do a melting point determination or carrying out thin-layer chromatography of the product would be considered a second technique. ♦ Carrying out a procedure in duplicate when practicable — not just repeating titrations to get concordance. Duplicates must be done, where practicable. If more than one technique is used then there must be duplicates for the majority and certainly for the major technique. Markers may need to use discretion here about which is the major technique and should comment on the record sheet. If two techniques or procedures have been carried out then there should be duplicate results for both unless it is obvious that one is the 'major' procedure and this has been duplicated. ♦ However, if titrations are being carried out to determine a quantity of substance in an actual product, eg if the mass of vitamin C in fruit or fruit juice, or the acidity in a bottle of wine is being determined, and the candidate starts with two samples from the same fruit or fruit juice or bottle of wine, then this should be accepted as the procedure being duplicated. Candidate must have actually done something to get this mark — not good enough just to state, say, in the 'evaluation', that duplicates have been carried out. Need to see evidence in the results given. ♦ This mark is for accuracy of measurements in the 'procedures' section, not in the 'results'. For example, in preparing a standard solution to be used in a titration later. Choosing correct apparatus to achieve aim of experiment or to give measurements of appropriate accuracy, eg pH paper/pH meter or adding acid from burette/measuring cylinder. Also look for candidates using measuring cylinders for dilutions when standard flasks would be more appropriate. May be able to mark

	♦ accuracy of measurements (**1**) ♦ risk assessment (**2**)		this from looking at list of apparatus given by candidate. Candidate must have used the correct apparatus etc for all procedures described, but allow one minor error. ♦ Number of decimal places etc, appropriate to measurements taken, apparatus used in procedures (eg making up standard solutions etc) rather than in results data. For example, weighing out 5 g of substance, rather than, say, 5·03 g when preparing a standard solution would not gain this mark, ie accurate value must be specified where accuracy is required or is critical. The accurate value may be given here or later in the project–report such as in the 'results' or even in the 'evaluation' section. ♦ If titration values are very low using ordinary burettes and no modification was made then no marks should be awarded. In general less than 5 cm^3 would be considered too low a titre value. However professional judgement has to be used here for special circumstances such as titrations carried out as part of an investigation into chemical kinetics or blank titrations. Calibration graphs drawn incorrectly or not given in the project–report would not gain the mark here. ♦ Candidate should state the majority of appropriate safety measures taken during their experimental work for both marks. Where a candidate has only given minimal safety measures taken during their experimental work then 1 mark would be appropriate. It is taken for granted that candidates will follow general safety rules, such as wearing safety glasses/goggles. Appropriate safety measures including knowledge of hazards associated with chemicals and hazards associated with experimental procedures should be included. Candidates would be expected to detail precautions that should be taken to minimise risk, eg when a fume cupboard should be used. Full risk assessments are not required.

Results — Quantitative	♦ relevant to aim(s) of the investigation (**1**) ♦ raw data recorded and within limits of accuracy of measurement (**1**) ♦ raw and processed results are presented in a clear and concise manner with appropriate use of tables, graphs, diagrams and calculations (**3**)	**6**	♦ Your decision to mark this category as quantitative or qualitative should be made to benefit the candidate with respect to the number of marks awarded. ♦ Ideally raw data should be given for all techniques or procedures. However, professional judgement should be used where more than one technique/procedure has been used. Must be raw results for main technique/procedure used and majority of techniques/procedures should be covered. For example, if four techniques/procedures are used, it would be acceptable to include raw data for three out of the four but not for two out of the four. However if there are four techniques/procedures used, and two are major compared to the other two which may be considered as trivial ones, then accept raw results from only the two major ones. ♦ Must give, for example, initial and final burette readings as well as calculated volumes. ♦ Interfacing data in the form of graphs acceptable as raw data but not if unclear what graph (or spectra) is showing. Graphs, spectra etc must be labelled clearly and correctly. ♦ When using the tare button on a balance, the recorded mass is considered as raw data. When a balance is tared to zero when weighing this should be stated in the project–report. Number of decimal points quoted in the results should be appropriate to measurements taken and apparatus used. For example, burette readings should be to one decimal place, except for an initial reading of 0. Also accept a statement that the burette was zero-ed before each titration. ♦ This mark may apply to both raw results and final results and would not be awarded where an inappropriate number of significant figures are given in the final results or the mean is calculated incorrectly. ♦ Graphs, tables etc set out properly.

	♦ observations are detailed and suitably recorded (**1**)		Graphs should be line of best fit where appropriate and should be of suitable dimensions in terms of size and scale. This is particularly true if a value or measurement is to be taken manually from the graph. However it is acceptable if drawn using a computer package and the value or measurement is calculated from the graph by the computer. Look for correct headings, units etc. Labelled photos are acceptable in place of diagrams. Calculations should be clearly set out and done correctly. One sample calculation is adequate rather than similar ones repeated throughout the project–report. ♦ Look for, at least, two operations. If two are correct, ignore minor errors in others except when that particular operation is crucial to the investigation, for example, in a repeated calculation. Main procedure/operation must be covered correctly here. ♦ Graph drawn incorrectly would only gain a maximum of 2 marks in this section when the values read from the graph are crucial to the investigation, even if another two operations are done correctly. ♦ If an error such as a non-concordant rough titre is included in average of titration results, then no mark awarded here. ♦ Look for descriptions of colour changes, precipitates forming etc. Must be at least one observation recorded for the mark. However this may also be found in the 'procedures' or 'discussion' sections and the mark awarded here.
Results — Qualitative	♦ relevant to aim(s) of the investigation (**1**)	**6**	♦ The results are relevant to the aim(s) of the investigation and readings (raw data) are recorded. Accept chromatograms, photographs, diagrams and statements of results as raw data. An example of a final result might be a white solid or colourless liquid etc.

	♦ raw and processed results are presented in a clear and concise manner using appropriate format (**2**) ♦ observations are detailed and suitably recorded (**3**)		♦ Initial and final masses and other relevant measurements. Is the data presented properly and clearly? ♦ Must be in an appropriate format including lab report. Chromatograms, photographs and diagrams may also be acceptable as raw data and interpretation of spectra would be acceptable as processed results. ♦ Including colours/colour changes/shapes of crystals/precipitate forming/redissolving/melting points/yield/percentage yield etc. It is almost inevitable that there will be some quantities given and these should be recorded within appropriate limits of accuracy. Some of these may appear in procedures, but should be given credit here. ♦ Should be looking for at least three 'observations'. However where a major observation has been omitted then a maximum of 2 marks can be given in this section.
Discussion (conclusion(s) and evaluation)	♦ conclusion(s) is/are valid and relate to aim(s) of the investigation (**1**) ♦ evaluation of procedures (**3**) includes comment as appropriate on:	**8**	♦ Ideally, conclusion(s) should be under a separate heading. If conclusion(s) given after each experiment, but not tied together in this section, then no mark awarded. ♦ Candidates must include overall **conclusion(s)** that are relevant to the aims(s) of their investigation and supported by data in the project–report and which are **valid** for the experimental results obtained. All aims given in the 'abstract/summary' must be covered in the 'conclusion'. Do not penalise for extra conclusions which are valid but do not relate to original aim(s). If a mistake is made in processing results, making them invalid, then use follow through here. Markers will have to use professional judgement here. ♦ This is an opportunity for the candidate to review and evaluate the procedures used in a positive way as well as suggesting modifications and/or improvements which might have given better results.

	— accuracy of measurement — adequacy of replication/ sampling — adequacy of controls — sources of uncertainties in relation to measurements — solutions to problems and modifications to procedures ♦ evaluation of results (**3**) includes as appropriate: — analysis and interpretation of results — account of uncertainties described and consideration of uncertainties on outcome		Look for sources of uncertainties in relation to individual pieces of apparatus/how problems were dealt with/modifications to procedures/controls or sample size/'magic numbers' without explanations. ♦ Not everything has to be covered but main sources of uncertainties must be covered. ♦ The candidate may not have done the procedure correctly but has shown that he/she realises this in the 'evaluation'. ♦ Again this part is meant to be discriminating and is an opportunity to award 'quality' marks. Markers may find it helpful to make mental notes of what might be expected here as you read through the investigation: — 'most important aspects of evaluation covered' = 3 marks — 'some important aspects of evaluation missing' = 2 marks — 'minimal evaluation' = 1 mark — 'no meaningful evaluation' = 0 marks ♦ Look for a meaningful/valid analysis and interpretation of the results. ♦ Look for awareness of accuracy of measurements/sources of uncertainties in relation to measurements or individual pieces of apparatus. Can get this mark for correct uncertainty values in apparatus/techniques. Have experimental results been interpreted correctly? Correct follow through from main sources of uncertainties. Candidate has considered the effects of uncertainties in apparatus and techniques in procedures and considers the effect on the result. The candidate may have done this quantitatively — uncertainty calculations — but this is not necessary. Where uncertainty calculations are presented properly this would cover the above two aspects (analysis and effect of uncertainty) and therefore may be worth 2 marks.

	♦ overall quality of the investigation (**1**)		♦ It is usually easier to mark evaluation of procedures and results together to get a mark out of 5. ♦ The evaluation is meant to be an overview by the student of what he/she has done in the investigation. It is a review of the positives as well as the negatives. Sources of error, possible improvements, accuracy of equipment and of measured values should be discussed. The effect of these on the final results should be considered. For example, if it was difficult to see the end-point in a titration and therefore the titre values may be out by 0·2 cm^3, what effect would this have on the value of the final calculated result? ♦ Markers should look for an overall conclusion and evaluation. If conclusion and/or evaluation have been done in the wrong place and no overall conclusion/evaluation is given at end then a maximum of 6 marks for this whole section. ♦ This is a final quality mark for the standard of the investigation — not just the 'discussion' part of the project–report. This is for a good investigation well worked through, taking particular account of the chemistry involved and synthesis of argument.
Presentation	♦ appropriate structure, including informative title, contents page and page numbers (**1**) ♦ references cited in the text and references listed in standard form, acknowledgements, where appropriate (**1**)	**2**	♦ The project–report structure should be easy to follow. ♦ A title, contents page and structure are essential — the contents page must show page numbers and the pages throughout the project-report must be numbered. Occasional missing page numbers (eg on graphs) should not be penalised. ♦ At least three references must be cited correctly in the main body of the project–report and the same ones also listed correctly at the back of the project–report. Any additional references cited or listed incorrectly should not be penalised. Any standard form of referencing is acceptable.

			♦ When citing a reference in the text, the author's surname and the year of publication should be given, as in the exemplar below: The reduced form of indigo is soluble and colourless while the oxidised form is insoluble and blue (Brown et al., 2001). ♦ References may include books, journals/periodicals and websites and should be listed near the end of the project–report. Note that it must not be the same book/website referred to on two or three occasions even if the reference is to different page numbers. The candidate must find at least three references, ideally at the planning stage. ♦ If a candidate puts in 'et al' wrongly, then ignore, as most candidates are unlikely to have been taught Latin.
	Total marks	**30**	

Administrative information

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History of changes

Version	Description of change	Authorised by	Date

Security and confidentiality

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