

Design and Technology: Industrial Technology

General Certificate of Secondary Education **J304**

General Certificate of Secondary Education (Short Course) **J044**

OCR Report to Centres

January 2012

J304/J044/R/12J

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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Overview

This report provides an overview of the work seen in the written examination Units 2 and 4 and the Controlled Assessment Units 1 and 3, for candidates who took the examination during this series. It precedes a more detailed report to centres from each subject area within the Innovator Suite and highlights general issues that have occurred across the suite of specifications.

This report has been prepared by the Chief Examiner, Assistant Chief Examiners, Principal Examiners and Principal Moderators and covers all specifications within the Innovator Suite. It should be read in conjunction with the examination papers, the mark schemes, and the marking criteria for assessment given in the specification booklets.

This is the first examination series in the third year for the new Innovator Suite.

A reminder: An important point for teachers to note about the Terminal Rule in relation to this suite of specifications and re-sits: The terminal rule is an Ofqual requirement. Candidates must be entered for at least two units out of the four (full course) at the time that they certificate. ie the end of the course.

Please be aware that the Ofqual rule states that marks scored for terminal units will be the marks used in the calculation of candidate grades. Therefore, if one of the candidate's terminal units is a re-sit and the mark is poorer than the original mark, the poorer mark will be used to calculate the final grade for that candidate.

Obviously, the terminal unit marks are then added to the highest marks scored in the other units making up the certificate.

Centres are reminded that it is also a requirement of Ofqual that candidates are now credited for their accurate use of spelling, punctuation and grammar across all four units.

It is pleasing to see that centres and candidates have continued to respond well to the new style of examination approach. Centres are to be commended for this.

It is obvious that Centres have benefitted from previous reports and training sessions available for the qualifications.

Written Examination – Units 2 and 4

Unit 2 – For this examination series of the GCSE Innovator suite entries were seen from all six subject specialisms:

The overall performance and range of results for Unit 2 was better than the last examination session – June 2011. It was pleasing to see that many candidates had been well prepared for the examination by Centres and clearly had a sufficient knowledge base to answer the questions. It has been encouraging to see that candidates have been able to access the higher marks.

Many of the candidates demonstrated a general awareness of the main points and issues linked to sustainable design and the 6Rs.

In **Unit 2 – Section A** of the papers most candidates across the suite attempted to answer all questions, with few candidates giving no response (NR) answers. It was noticeable that, at times, candidates had not read the instructions correctly and centres would benefit from explaining the correct examination requirements to the candidates. Candidates need to be encouraged to give an answer for the multiple choice style questions even if they are uncertain that they are correct. Centres are reminded that questions 1–15 cover the grade range from A* to U.

There was less duplication of circling answers seen during this examination session.

Important: Centres need to be aware that where a candidate has provided multiple answers to a single response question, no marks will be awarded.

Unit 2 – Section B of the papers showed a greater mixture of responses and teachers need to ensure they read the subject specific reports for further detailed feedback on specific issues and individual question performance.

Important: Candidates need to be careful that they do not repeat the question in their answer or write the same answer for several questions. Similarly candidates must not use certain terms as ‘stock’ answers. Such answers included:

- ‘Environmentally friendly’ and ‘better for the environment’ or ‘damages the environment’.
- To ‘recycle’ and ‘recycling is good for the environment’.
- ‘Cheaper’, ‘better’ and ‘stronger’.

The questions marked with an asterisk * provided candidates with an opportunity to give a detailed written answer combining good subject knowledge with an ability to produce a structured response. The response to the banded marked question this session was pleasing, with several candidates obtaining full marks, Candidates have benefited from centres preparing them for this type of question.

It was noticeable this session, that where extra paper was required to continue a question response, many candidates failed to reference the question number. It is important therefore, that centres teach candidates how to highlight where they are continuing an answer on a different page in the examination document.

Centres are reminded that candidates are assessed on spelling, punctuation and grammar on the banded mark scheme question.

It is also important to note that candidates need to ensure that they write legibly and within the areas set out on the papers.

Unit 4 – For this examination series of the Innovator suite entries were seen from the following subject specialisms:

Candidates responded reasonably well to the Unit 4 examination papers across the Innovator Suite. The papers were accessible to the majority of candidates, although there was still a small minority of candidates who did not attempt any of the questions at all.

Important: It was noticeable this session that candidates were relying upon knowledge from Unit 2 based around sustainable design, rather than technical understanding. This led to confused answers often compromising the higher mark.

The overall performance of candidates varied considerably across the suite. It was encouraging to see however, that most candidates demonstrated a good understanding of the technical aspects of designing and making across the specifications.

Important Note: Candidates need to:

- **Read through the complete question before attempting to answer.** The examination includes sufficient reading time for candidates to focus on the key points to address in their answers. It was pleasing to see that some candidates produced a 'plan of action' before giving their answer to the questions with a high mark allocation.
- **Look carefully at the mark allocation and available space for their answers.** Candidates need to be aware that there is a relationship between the space available and the length and quality of the expected answer, and thus the mark allocated.
- **Have a better understanding of the different command words used throughout the exam paper in order to respond appropriately to the questions.** Across the suite there were many answers that lacked detail and clarity. Terms such as 'cheaper', 'quicker' and 'easier' were often used and meant very little without qualification or justification.
- **Become familiar with the quality of written communication questions marked with an asterisk*.** These questions provide candidates with the opportunity to give detailed written answers combining good subject knowledge with an ability to produce structured, **coherent** responses and accurate spelling. Simply repeating the same point several times will not lead to the award of marks. A list of bullet points does not represent an adequate answer and will compromise the higher marks. Practice of this type of question which carries [6] marks is strongly recommended.
- **Respond to specification and/or bullet points accurately.** In design type questions this is important if the candidate is to achieve the maximum marks available.
- **Make their answers clear and technically accurate.** In questions that require candidates to produce sketches and notes, it is essential that answers are made as clear and technically accurate as possible. Marks may be compromised through illegible handwriting and poor quality sketches.

Controlled Assessment – Units 1 and 3

This examination series has seen portfolios for all subject specialisms being submitted for Unit 1 both through postal and repository pathways. Unit 3 entries have been seen in A521, A531, A541 and A561 this session only. Most centres have been prompt in the dispatch of documentation to OCR and moderators, which is to be commended. It is important that centres forward form CCS160 in particular to moderators. It is helpful if centres also include a record of the marks allocated to each candidate, for each of the marking criteria sections.

Important Note: Candidates producing paper portfolios should be entered for postal (02) moderation. Candidates producing their portfolio on a CD or memory stick should be entered for postal (02) moderation.

Centres must ensure that if candidates are entered through the repository (01), the portfolios must be uploaded via Interchange and **NOT** sent through to the moderator on a disc.

In general, centres have been successful in applying the marking criteria for both Units 1 and 3. However, it is still noticeable that some candidates were being awarded full marks for work that lacked rigour and depth of analysis. Words highlighted on the marking criteria grids such as 'appropriate', 'fully evaluated', 'detailed' and 'critical', which appear in the top mark band, were not always adhered to.

Centres are reminded to apply the mark scheme on a ‘best fit’ basis which may mean allocating marks across the assessment grid. For each of the marking strands, one of the descriptors provided in the assessment grid that most closely describes the quality of the work being marked, should be selected. Marks should be positive, rewarding achievement rather than penalising failure or omissions.

It was still evident that a significant number of portfolios, particularly for Unit 1, resembled the legacy format, especially in terms of the excessive research and inappropriate critical evaluation.

It is important that centres encourage candidates to organise the portfolio according to the different marking criteria strands as it enables the candidates to produce work that clearly shows an understanding of the controlled assessment requirements. Portfolios should be clearly labelled with the Candidate and Centre name and number, with the unit code and title also evident. (*Specification – 5.3.5 Presentation of work*) This is particularly important when the Centre submits work via the OCR Repository, where individual files are used to store portfolio work. Centres need to ensure that candidates clearly label each file using the marking criteria section headings; this facilitates a more effective completion of the moderation process.

Important: Centres are also reminded to ensure that the OCR cover sheet is included with each portfolio of work, **outlining the theme and the starting point chosen by the candidate.**

Many candidates included a bibliography or referenced their research sources, which was pleasing to see. **It is good practice to ensure that candidates acknowledge sources of information used for the development of their portfolio work.** 5.3.2 *Definitions of the Controls* section in the specification states: “*The teacher must be able to authenticate the work and insist on acknowledgement and referencing of any sources used*”.

Centres are to be reminded that the ‘*controlled assessment task must NOT be used as practice material and then as the actual live assessment material. Centres should devise their own practice material using the OCR specimen controlled assessment task as guidance.*’ *Specification – Section 5.2.2 Using Controlled Assessment Tasks.*

Results – Centres must remember that the theme, starting point and research aspects of the portfolio can be maintained. However, the remaining portfolio and final prototype should be redeveloped for submission.

Centres are to be commended on the amount of work produced for the portfolios in Units 1 and 3, which has been realistic in terms of the amount produced and the time allocated to each unit – 20 hours.

It is a requirement in the Making criteria that candidates “*demonstrate an understanding and ability in solving technical problems*”. Centres must therefore ensure that problems encountered are written into the record of making, for the higher marks.

4.1 ‘Schemes of Assessment’ clearly states that “*A Minimum of two digital images/photographs of the final product showing front and back views*” should be evident in the candidate portfolio. For Food Technology one digital image/photograph is required. **It is the centre’s responsibility to ensure that photographs are evident, are of a good quality and are of the candidate’s own work.**

A541 Introduction to designing and making

Introduction

This option received a small entry for this January session, with work only being submitted for postal moderation. Work was well presented and organised and many previous recommendations made in feedback from June 2011 had been acted upon.

Centres are again reminded that candidates should acknowledge the work of others in their folders and credit the sources of information obtained. Marks may be compromised if this is not evident in the candidate's portfolio.

It is required that centres attach a cover sheet (CCS/A541) to candidate's work. These are available to download from the OCR website. Teacher comments on these sheets can help the moderation process and can, at times, clarify issues that occur during moderation.

Creativity

It is pleasing to see that work is being reduced in this section, by candidates carefully focusing on perhaps just two products. Information should be presented concisely and the sources acknowledged. To enable candidates to score high marks in this section, there is a need to show clear evidence in the portfolio that common trends between researched products have been identified. This information should then be a resource for informing their design thinking.

Designing

Candidates need to show that they have considered their research and produce a Design Brief and Design Specification that reflects the previous work. Too many candidates still move into designing without considering their previous findings. Specifications need to be specific and the points included must have relevance. Bullet pointed lists are perhaps the best way of presenting these in order that candidates can clearly and quickly refer back to them during the designing process. Modelling is not always evident in developing design ideas.

Candidates that performed well in this section:

- Produced quality ideas showing a range of designs which were hand drawn using a range of presentation techniques.
- Supported designs with detailed design developments together with the appropriate use of ICT, which helped to give working and presentation drawings dimensional quality.
- Annotated work effectively, showing some level of detail and development in their designing.
- Evaluated their designs and offered reasons for the selection of a proposed idea.
- Used modelling as an aid to designing suitable solutions.

Making

Good quality outcomes were again evident this session.

Forward planning and the annotated photographic evidence of the making processes as they occurred continues to be well done.

Centres are reminded that candidates must show evidence in their portfolios of how they solved technical issues and problems during the making process. If marks are awarded for this, then there must be evidence in the folder. Candidates will be penalised if this evidence is not clearly shown. Many candidates successfully incorporate this as part of the planning and recording process. Candidates who are able to combine the planning, record of making and recording problems/modifications in one 'tabulated' format piece of work, are to be commended.

The inclusion of a minimum of two good quality digital photographs must be evident. These are in addition to any photographs that form part of the recording of the evidence of the making processes. They must be of a suitable size to show the finished prototype clearly. When centres have to be contacted to provide this information, it can delay the moderation process. Candidates that performed well in this section:

- Planned their work effectively in advance.
- Used appropriate processes, tools and materials.
- Produced a quality prototype.
- Included evidence to show how they had overcome issues and problems during the making processes.
- Recorded effectively the making process using annotated photographic evidence.

Critical Evaluation

Centres are reminded again that candidates should be evaluating the process (designing, modelling and making stages) and not the finished outcome and its fitness for purpose. Candidates are still having some difficulty coming to terms with this as it may not be the normal evaluation process they are used to.

Centres are reminded that marks are available in this section for the quality of written communication throughout the folder. A candidate could therefore be awarded a mark here, even when no evaluation has been produced. The use of specialist technical terms is still not always being evidenced effectively.

Candidates must be encouraged to make comments showing how they could improve the modelling, designing and prototyping process.

Candidates that performed well in this section:

- Evaluated the processes of designing and making the prototype.
- Showed thought about how those processes could have been improved.
- Used specialist terms correctly.
- Demonstrated accurate use of spelling, punctuation and grammar throughout the portfolio.

A542 Sustainable design

General Comments

Candidates in general performed reasonably well on Section A, and most candidates were able to access the majority of Section B questions. A number of candidates exhibited a sound knowledge across the whole range of questions, demonstrating a very good understanding of sustainable issues.

The extended written response question (*) provided candidates with an opportunity to give detailed answers, combining good subject knowledge with an ability to produce structured and coherent responses. There were a number of excellent individual points expressed, but many candidates failed to gain the higher marks.

Candidates need to improve their examination techniques by reading the written response question carefully, and responding to the instructions given in the question.

Section A

Questions 1–5

These questions required candidates to select the correct answer from four possible answers. One mark was available for each question.

Question 1

Most candidates gave the correct answer as – materials are reused when a product is no longer required.

Question 2

Most candidates gave the correct answer as – disposing of products in an environmentally friendly way.

Question 3

A majority of candidates gave the correct answer as – good for the environment.

Question 4

Most candidates identified the meaning of the symbol correctly – product has met EU standards.

Question 5

Virtually all candidates gave the correct answer as – business with poor working conditions.

Questions 6–10

These questions required candidates to respond with short answers of a single word or sentence. One mark was available for each question.

Question 6

This question was well answered and a significant number of candidates could name a non-renewable form of energy.

Question 7

This question was not well answered and only a few candidates stated the correct answer of reforestation.

Question 8

Candidates found this question challenging and only a small number of candidates understood the term anthropometrics.

Question 9

This question was well answered and most candidates could name a plastic that could be recycled.

Question 10

This question about geothermal energy was not well answered and many candidates simply stated ground, or earth which was not sufficient to gain a mark.

Questions 11–15

These questions required candidates to respond with true or false. One mark was available for each question.

Question 11

This question was well answered with a majority of candidates realising that recyclable products help the environment.

Question 12

This question was well answered with a majority of candidates realising that eco design minimises damage to the environment.

Question 13

This question was not so well answered with many candidates thinking that Fairtrade is to do with customer satisfaction.

Question 14

This question was well answered with most candidates realising that polypropylene is a sustainable plastic.

Question 15

This question was not as well answered and many candidates did not choose the correct option of false for the following statement – moral issues are always considered in the design of products.

Section B

Questions 16–18

These questions required candidates to respond with more extended writing, drawings or notes. 15 marks were available for each full question.

Question 16a

The majority of candidates scored at least three marks. However, many did not know what the dust mask symbol meant, confusing it with breathing apparatus.

Question 16b

Most candidates could give at least one reason why symbols are used to convey important information.

Question 16c (i)

Very few candidates could identify the European eco-label correctly.

Question 16c (ii)

The majority of candidates could not explain what message the eco-label conveyed to a consumer. Most gave vague responses regarding products being environmentally friendly.

Question 16d (i)

Only a few candidates identified the kite mark symbol.

Question 16d (ii)

A minority of candidates stated the correct answer – British Standards Institute.

Question 16d (iii)

Most candidates could explain at least two important facts relating to the use of the kite mark symbol.

Question 17a

Most candidates could offer at least one advance in technology that has enabled the development of the USB flash drive. However, many failed to read the question and did not respond with developments in computer technology or miniaturisation of components.

Question 17b (i)

A minority of candidates stated Ethical Trading Initiative.

Question 17b (ii)

This question was well answered with most candidates gaining at least one mark for explaining the purpose of the ETI. However, many confused Fair Trade with ETI, and so failed to score marks.

Question 17c

A well answered question, with many candidates gaining at least three marks for stating the advantages and disadvantages of the metal filing cabinet.

Question 17d*

This question required candidates to respond with an extended piece of writing. Candidates should be encouraged to respond to the question marked with a * using at least three paragraphs of writing. The response should use specialist terms, and accurate spelling, punctuation and grammar. Candidates should be encouraged to make a number of main points explaining each as fully as possible. Candidates should also write a simple conclusion to their work.

Many candidates provided well thought out and structured answers. However, a significant number failed to respond with more than a few lines. Nevertheless, it was pleasing to note that many candidates are now answering using paragraphs and avoiding "bullet point" style responses. Some candidates added the USB to their answer failing to read the question.

Question 18a

The awareness of obsolescence was limited, with few candidates providing correct responses.

Question 18b

Many confused obsolescence with fashion, but a number of candidates scored full marks.

Question 18c

This question was well answered by those who understood planned obsolescence, but a significant number of candidates had little awareness of this issue.

Question 18d

The majority of candidates scored at least three of the six marks for identifying stages in the life cycle of mobile phones.

However, answers varied in quality with some providing the name of a stage with no explanation, while others failed to give the name of the stage but were able to give descriptions.

A543 Making Quality Products

Introduction

There was a only a small entry for this January session and therefore, this report can only be brief and very generalised in the comments and observations made.

Folders were well organised and candidates had targeted the marks available effectively.

Designing

Candidates have responded well to previous guidance given to centres and have reduced the amount of research produced by effectively targeting the available marks. There were some candidates who had used CAD to produce ideas drawings of quality, giving the observer clear interpretations of the intended designs. These ideas were annotated and evaluated effectively in most cases. Where models were produced, most employed suitable materials and were effective at testing and prototyping the workings and suitability of the design in the higher achieving candidates. They served a clear and intentional purpose. Lower scoring candidates produced models in materials that were only suitable to achieve limited information, usually more of an aesthetic rather than a practical nature. CAD was used effectively by many candidates to produce detailed working drawings. These were however, not always produced to recognised B.S. formats.

Making

Many candidates produced quality products using appropriate resources, tools and processes. The making was generally well planned in advance and took into account all aspects of the planning process from tool/process selection to Health and Safety issues and considerations of time. The making processes were well recorded using both digital images and written explanations. Most candidates offered some evidence of problems that they had encountered during the making and had given detailed explanations as to how these problems had been resolved.

Critical Evaluation

Candidates evaluated against their specification points, although this was often in a very brief and superficial manner. Detailed testing and evaluating was less well covered. Candidates obviously need to test their outcomes against the set criteria, but in order to gain high marks in this section, this needs to be covered in some detail. This testing process should be documented. Too many candidates just state that they have tested their work and that it does/does not perform the intended task. What is required is photographs of this testing taking place, commentary on the success or failure of this testing and then physical and/or photographic evidence in their folder of this testing process. Candidates see the weaknesses in their designs more frequently now and are able to offer modification and improvements suggestions to the design that would result in a more effective product. Centres are reminded that credit should be given in this section for the overall 'Quality of Written Communication' throughout the folder.

A544 Technical aspects of design and making

General comments

It is most important that candidates read through the question paper carefully before attempting to answer questions. The examination allows ample time for candidates to fully answer all of the questions in an appropriate manner.

Responses to a number of questions indicated gaps in the candidates' knowledge and understanding of the specification content. This was particularly the case in the areas of 'Smart and modern materials' and 'Risk Assessment'.

Where a question requires candidates to produce a sketch as part of the response, it is important that the sketch is clear and suitably annotated to allow clear interpretation by the examiner.

Comments on specific questions

Section A

- 1
 - (a)(i) This question was generally well answered with many candidates gaining full marks. One notable exception was the suggestion that 'high speed steel' would be used for racing car bodywork; a number of candidates having taken the term 'high speed' in the wrong context.
 - (a)(ii) Although most candidates gained marks on this question, it was disappointing to see that some were only able to give one from the five possible answers. In some cases candidates had not taken account of the word 'metals' in the question and incorrectly gave one or more of the plastics materials in their responses.
 - (b) Knowledge of composite materials was very limited and a significant number of candidates either gave no response or scored no marks at all. Of the candidates who did give a response, only a small number gained full marks for this question.
 - (c) Knowledge of smart materials was also limited, and only a few candidates gained marks for this question. One reason for loss of marks was the failure to give an example in the description of use.
- 2
 - (a) Many candidates answered correctly by referencing the need to protect the mild steel body from rusting.
 - (b) Most candidates were able to give at least one advantage of the plastic-bodied wheelbarrow, but often the more obvious advantages were missed. The most frequently seen responses related to the handles being removable and the body not going rusty.
 - (c) This question was not well answered, and a significant number of candidates gained no marks at all on it. Some candidates had continued the theme of advantages to the user from the previous question, and made little or no reference to suitability for high-volume production.
 - (d*) Only the higher achieving candidates gained high marks on this question; many candidates presenting their responses as a series of bullet points rather than a discussion. Ease of recycling was a common thread running through most responses, as was the ability to form complex shapes, and the fact that plastics are available in different colours was also referenced in several responses.
- 3
 - (a)(i) Most candidates were able to give at least one advantage of belt drives over gear systems; the most frequently seen responses relating to cost and ease of maintenance. Other advantages, such as quiet and smooth running and belt slip to prevent damage or injury, were very rarely seen.

- (a)(ii)** Responses to this question were very limited with some candidates simply suggesting that the 'speed could be turned up'. Credit was given where a candidate had made reference to the correct positioning of the drive belt on the motor and spindle pulleys.
- (b)(i)** Candidates were required to describe a method of producing a smooth and accurate hole. Most candidates suggested drilling the hole and then filing or using emery cloth and therefore no correct responses to the question were seen. The drilling operation needed to be followed by a 'second operation' to produce the smoothness and accuracy, with either boring or reaming being acceptable responses.
- (b)(ii)** Few candidates scored marks on this question about tolerance with many relating their responses to 'tolerating' situations or forces. A few reasonable attempts were made, but only one response worthy of full marks was seen.
- (c)** The majority of candidates attempted this question and a number of good responses were seen; most of them referring to the reduced cost of buying components compared with making them 'in-house'. A number of responses were presented as simple bullet points rather than explanations, and full marks were only gained by a limited number of candidates.
- 4**
- (a)** Most candidates were able to give at least one reason why mild steel would be a suitable material for the support bracket. In a significant number of cases however, marks were lost where candidates had given simplistic one-word answers. Terms such as 'cheap' and 'strong' should always be qualified when included in any response.
- (b)** This question was generally well answered with most candidates gaining high marks by correctly identifying design faults and suggesting improvements. The most frequently seen responses made reference to the single fixing hole and the thickness of the mild steel used for the bracket.
- (c)** The majority of candidates achieved marks for this question but marks were often restricted by a failure to address all of the stated requirements of the jig. Poor sketching often made it difficult to identify features of the proposed jig, but marks were awarded where a jig suitable for use was presented, however simplistically.
- 5**
- (a)** Almost all candidates did well on this question with many gaining full marks. Although all of the processes listed were covered, drilling was by far the most popular choice of process and it was disappointing that so few candidates related their responses to centre lathe turning.
- (b)** Knowledge of risk assessment procedures was very limited and this question was generally poorly answered. Most candidates made further reference to safety precautions which, if clearly presented and relevant, were grouped together to give a single mark for 'suggested methods of protection'. Only a few candidates gave responses worthy of two or more marks.
- (c)*** The majority of candidates scored marks on this question. These were mostly in the mid-range of the marks available largely due to a lack of structure in the response. The cost of buying new equipment and re-training staff were points that were frequently raised as disadvantages, while increased output and a reduction in the workforce were the most commonly referenced advantages.

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