OCR
RECOGNISING ACHIEVEMENT

GCSE

Design and Technology: Industrial Technology

General Certificate of Secondary Education **J304**

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

OCR Report to Centres

June 2013

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, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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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OCR REPORT TO CENTRES

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 is the fourth year of the Innovator Suite.

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.

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

Written Examinations – 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 generally the same as seen in the January 2013 series. There are variations within the subject specialisms and centres would benefit from reading the individual subject reports for this unit.

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. There was also a significant improvement in the extended response style questions this series, with candidates giving detailed answers combining good subject knowledge with an ability to produce a structured response.

In **Section A** of the papers most candidates across the suite attempted to answer all questions, with few candidates giving no response (NR), although these do still occur. Candidates should be encouraged to attempt these types of questions if unsure, rather than giving no response at all.

Candidates generally demonstrated an improved understanding of sustainable design, but were often still hampered by their exam technique. Misunderstanding or misinterpreting the question, or not reading the question carefully enough was evident throughout the suite of papers. Candidates must be encouraged to take notice of the key word in the stem of the question to identify whether the question requires them to explain, describe, discuss, state, name or give.

There was less duplication of answers seen during this examination session, although one area of concern is that of the 'scattergun' approach to answering questions. Candidates need to be aware that where one answer is asked for and multiple answers are given by the candidate, candidates will lose the mark for the correct answer if an incorrect answer is also given. Some candidates approached these questions by supplying multiple answers, writing everything they can think of about the subject. Examiners cannot credit the one correct response out of several provided in a question which explicitly asks for '**one** reason' or '**one** example' because the candidate has not adhered to what has been asked for. It would be unfair on other candidates who had several possible answers in mind but addressed the question and selected their one final answer to provide rather than 'hedging their bets'.

Section B of the papers showed a greater range of responses in terms of quality and teachers need to ensure they read the subject specific reports for further detailed feedback on specific issues and individual question performance.

Candidates need to be careful that they do not repeat the question in their answer or repeat the same point within their answers.

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. Many candidates did manage to use subject specific terms in their answers, but at times lacked sufficient depth and tended to be repetitive which compromised marks.

Hand writing at times was difficult to decipher and candidates need to do everything possible to ensure that their writing is legible. Centres are reminded that candidates are marked on spelling, punctuation and grammar on this question.

It was noticeable that where extra paper was required to continue a question response, many candidates did not reference the question number on the extra sheets used. It is important that centres instruct candidates how to highlight where they are continuing an answer on a different page in the examination script to ensure that examiners are clear where an answer continues on a separate page in order that the candidate's full response is considered.

Centres need to be aware that questions may appear on the back page of the examination document and candidates should be encouraged to check carefully that they have completed ALL questions.

Unit 4

For this examination series of the Innovator Suite entries were seen from all six subject specialisms. The overall performance of candidates was varied across the suite once again this series.

Some key areas which Principal Examiners have highlighted as giving scope for improvement are as follows:

- Candidates should attempt every question.
- It is important that candidates read the questions carefully to determine exactly what is required before attempting an answer. It can be helpful for candidates to highlight what they consider to be the 'key' words or instructions.
- In those questions that require candidates to produce sketches and notes, it is essential that answers are made as clear, detailed and technically accurate as possible.
- There were many instances where examiners were unable to decipher illegible handwriting and poor quality sketches.

Controlled Assessment – Units 1 and 3

Most centres have been prompt in the dispatch of documentation to OCR and moderators, which is to be commended. **It is important that centres despatch the portfolios to the moderator within three days of receiving the sample request.**

Centres are reminded to forward form CCS160 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.

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

Centres must ensure that if candidates are entered through the repository (01), the portfolios must be uploaded via the OCR Repository and **NOT** sent through to the moderator on a disc. The preferred format of files presented for this type of moderation needs to be PowerPoint, PDF or Word, with work saved in ONE file only and numbered, not as individual sheets saved as different files.

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 must ensure that candidates clearly label each file using the marking criteria section headings; this facilitates a more effective completion of the moderation process.

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.

JCQ documentation on Controlled Assessment (September 2011 – August 2012) clearly states that any guidance given to candidates must be clearly recorded. *4.5.2 When marking the work, teachers/assessors **must not** give credit in regard to any additional assistance given to candidates beyond that which is described in the specification and **must** give details of any additional assistance on the appropriate record form(s).**This includes providing writing frames specific to the task.** (eg outlines, paragraph headings or section headings).*

In light of the information given above, centres need to take care when using writing frames in the controlled assessment portfolios.

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.*

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.** Marks were compromised here this examination series.

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. **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

General Comments

The majority of the centres entering candidates followed correct procedures. The work of most candidates was presented as conventional paper portfolios. A number of centres submitted their work to moderators as e-portfolios. A small number uploaded work to the OCR Repository.

Centres must ensure that marks are submitted to OCR by the deadline date of May 15th, as well as ensuring that the work is submitted promptly on receipt of the email from OCR requesting samples. A copy of the MS1 should be sent to the allocated Moderator for the unit. It is also required that a copy of the Centre Authentication Form CCS160 is enclosed.

A CCS/A541 showing individual breakdown of the marks should be included with the work of each candidate sent for moderation. These should include comments supporting the centre's marking. A copy of the CSF form is also useful to the moderator.

Centres are reminded that they should not be using ‘directive teaching’ for the Controlled Assessment tasks. The work should be that of the candidate only. It should however, be done under supervision, so that a level of control is maintained over the candidate's work. There was evidence this series that some centres were teaching using a whole class approach and this was reflected in similarities in the work the candidates were submitting. These were more obvious in aspects of research work and the specification.

The use of writing frames is not recommended as it restricts the creative potential of the candidate and can constitute malpractice if too much guidance or prompting is provided within the template. Candidates should, where possible, be offered the full range of tasks/themes. It is clear that many centres only offer one task to their candidates. Again, this can restrict the creativity of individual candidates.

There is still a tendency for some centres to over-mark the work. In some cases, this was excessive and resulted in significant adjustments being made to centre marks.

Creativity

Work under this heading is probably the weakest in the majority of portfolios submitted. Candidates are often insufficiently focused and many fail to 'make links between good design and technological knowledge, relating products to users' needs'.

Candidates tend not to identify trends in existing solutions, which compromises informed decision making in their own design thinking. This can be easily done by summarising their research and stating how they are going to use information gathered to develop their designing. It was noticeable this series that far too much irrelevant research is included and that many candidates offer no analysis of this work. Research work should be focused and have a purpose if the higher marks are to be achieved.

Designing

Quality of work submitted varied greatly in this section. What is ideal is a clear and concise design brief and design specification originating from research, together with a range of ideas produced by using a variety of techniques. This should be supported by modelling and then developed to culminate in a working drawing that would provide the detail required to make their prototype. More work is being seen where design ideas are only produced using a graphics package, such as Google SketchUp.

Good examples of design work were seen this series, and such work illustrated creative ideas and explored and then developed these creative ideas using a range of communication techniques. Excellent use was made by many candidates of programmes like ProDesktop to design, develop and 3D model their ideas. Candidates using this type of software invariably had high quality working drawings to make their prototypes from.

More and more, candidates are not developing their designs using either modelling or drawing techniques. It raises the question as to how they progress from a rough freehand sketch without detail or dimensions, into making a practical outcome.

Making

At least two or three good quality images of the completed prototype are required for each candidate. Photographs were not always clear and large enough to convey the quality of the final work adequately. In some cases, no photographs of the work were included at all. This causes delay in the moderation process as centres have to be contacted individually to provide these missing images.

Centres should encourage candidates, through their planning, to identify appropriate materials, tools and processes within their portfolios.

All candidates submitted some evidence of making, even if in some cases there was little, if anything, in their portfolios. Many candidates produced quality prototypes using resistant material and engineering techniques. Others only produced a very crude corrugated cardboard mock-up of their design. Although candidates must remember that this is a prototype, material selection and use must be thought out carefully if the prototype is to have any value as a first example of a working product being designed and developed.

Candidates should record the making of their prototype as it happened, which should be annotated to put the photograph into context.

Solving technical problems as they arise should be recorded in writing in the portfolio. This can be done effectively as a final column in a planning sheet, for example. **Evidence of this aspect MUST be shown in the folder;** often, there is no direct evidence of this, presumably because it is felt to be implicit in the work.

Critical Evaluation

Despite previous comments in past reports, many candidates persist in evaluating the finished product and not the processes involved in designing and making the prototype. They should suggest modifications to improve the modelling and prototyping processes they have used. Specialist terms are often inaccurate or absent altogether. Centres must ensure that candidates are fully aware of what the evaluation in this unit should be comprised of, in order that they have maximum access to the marks available.

A542 Sustainable design

General Comments

Candidates accessed marks across the full range of questions. Section A was generally well answered, and candidates were able to access parts of all the questions in Section B. Many candidates exhibited a sound knowledge across the whole range of questions, and demonstrated a very good understanding of sustainability issues.

Surprisingly many candidates did not realise that evaluation is the final stage of the design process. Many candidates are still unable to name one of the three main categories of recycling; primary, secondary or tertiary.

Comments on specific questions

Section A

1. Most candidates gave the correct answer as geothermal.

2. Most candidates gave the correct answer as not sustainable.

3. A majority of candidates responded correctly – rethinking.

4. A majority of candidates stated the correct answer – thermoset plastic electric sockets.

5. Most candidates gave the correct answer – respond to environmental changes.

6. This question was well answered – refuse.

7. A small number of candidates were able to identify one type of recycling such as primary.

8. Most candidates correctly stated global company.

9. Many candidates did not name evaluation as the final stage of the design process.

10. This question was quite well answered - product life cycle.

The majority of candidates answered the following true or false questions correctly.

11. Carbon offsetting generates low cost electricity – false.

12. Sustainable wood is not biodegradable – false.

13. Toxic materials can harm the environment – true.

14. Ferrous metals cannot be recycled – false.

15. The eco footprint of a product measures impact on the environment – true.

Section B

16 (a) Many candidates did not name an appropriate plastic as required by the question, answering "thermoplastic". It is important to name a specific material fit for purpose, in this case PP (polypropylene) would have been a good response.

(b) Many candidates did not to justify their answer. Simply stating that a material is recyclable is insufficient for two marks as it is not an explanation of an environmental advantage. By adding that this reduces landfill, for example, a second mark was available.

(c) Many candidates again gave short responses with little content. Candidates generally stated that cast iron will rust and wood may rot, but they did not add further detail necessary to gain full marks.

(d) Aluminium was given as a correct answer, but candidates need to be made aware that aluminium alloy is the correct material term. Furthermore, candidates should be made aware that "rust" is not a feature of aluminium alloy, which is corrosion resistant. Therefore, answers such as "does not rust", should be discouraged.

(e) Generally candidates answered this question well, and knew that transport over distances increased carbon footprint. Some candidates noted that cutting down the rainforest was also contributing to global warming. However, many candidates did not gain full marks, as they did not respond in sufficient detail to justify the three marks available.

17 (a) (i and ii) Generally not very well answered**.** Many candidates did not get to grips with this question and ignored the clear references to "handmade" and “different culture".

(b) A significant number answered this question well gaining full marks. Almost all candidates successfully identified safety improvements with clear labelling.

(c) Most candidates successfully listed three aesthetic features of a product, indicating that aesthetics is a well-understood concept.

(d) A majority of candidates showed a good knowledge of the aims and objectives of Fairtrade, and could explain its importance to a consumer.

18 (a) Most candidate identified two technological advances of the digital camera.

(b) (i) Generally well answered, with some well-explained reasons for reducing packaging.

(ii) Many candidates stated “reduce the packaging” as an answer. This was excluded as a response as it simply repeated information which was in the question. Other candidates gave viable card/paper alternatives, thus avoiding the use of plastics.

(c) Most candidates provided constructed paragraphs with discussion. However, in general candidates did not to give specific examples, and particular ways in which environmental impact had been reduced in particular products. In the main candidates responded too vaguely, and had they applied their discussion to specific products would have achieved higher-level responses.

A543 Making quality products

General Comments

Work was submitted using paper portfolios, e-portfolios and the OCR Repository. There were many examples of good quality work in evidence. However, centres must read the individual moderation reports from the previous examination series' and also, the Report to centres for each unit. In some cases, this is not being done as the work from centres contains the same errors which occurred in previous years.

Portfolios should not be sent for moderation in individual plastic sleeves containing work that cannot be seen from the outside. There were several instances where candidates had put multiple sheets into single sleeves which risk being overlooked when the work is assessed.

Writing frames should not be used to help direct candidates as this does not allow creativity. It has been evident that some centres are using 'directive teaching' methods for the Controlled Assessment, as strong similarities are evident in the work of the candidates.

Designing

There was more superfluous work seen in the portfolios of many candidates this series. Large quantities of research are not required in this unit. Candidates should demonstrate an appropriate response to a brief and produce a suitable Design Specification for a product as a result of analysis. The specification should be specific and contain points which are objective and can be measured against the final product.

Candidates too often produce quantities of research and investigation but draw no conclusions from it. Without that important step, their research and findings will not inform their designing. Evidence was too frequently found where none of the research produced had any bearing on what the candidate designed.

After identifying users' needs, candidates should then evaluate how trends in existing products fulfil the needs of the user.

Candidates should demonstrate a wide range of skills in communicating their design ideas, for example, freehand sketches, CAD, section and exploded drawings, orthographic drawings.

Design proposals should be evaluated and a final design should be developed using drawing and 2D and 3D modelling. Many candidates had quality working drawings, but there are still many candidates who are jumping straight from a design idea into making.

Making

Planning is usually done well by the majority of candidates although correct terminology is often lacking. Candidates should identify appropriate materials, tools and equipment and processes within the planning element of their portfolio.

Candidates must demonstrate their ability to solve technical problems as they arise and evidence of this must be written in the folder if a mark is awarded. This could be recorded as an add-on to their 'planning for making'. They should also record the key stages of their making, as it occurred, using clear photographs and annotation. The product must be completed to a high standard, be functional, creative and innovative as well as fulfilling the requirements of the Design Specification if higher marks are awarded. This was not always the case.
Evidence must be provided in the candidate's portfolio of the making processes as they occurred. What is not required here are photographs of completed components prior to assembly. The photographs should be annotated and be 'close-ups' in order to show clearly the task/process that is taking place.

It is important that the digital images/photographs included in the folder are of sufficient size and quality to give a clear indication to the moderator of the quality and standard to which the work has been produced.

Examples of well engineered products were seen from many candidates, which is to be commended.

Critical Evaluation

Candidates are generally competent at evaluating against their specification, but often do not develop this as far as they could. The product should be fully tested and any improvements and conclusions identified as part of their evaluation. Evidence should be included in their portfolios to substantiate the marks awarded. This could be photographic and written evidence or actual physical evidence. For example, on the embossing task, samples of embossing that the candidate has produced could be fixed into their portfolio. Candidates should use correct terminology when evaluating their work.

A544 Technical aspects of design and making

General comments

The majority of candidates attempted all of the questions on the examination paper and some very good responses were seen. It was evident, however, that candidates had not always read questions carefully, resulting in inaccurate or inappropriate responses. It is most important that candidates take time to read through the question paper thoroughly before attempting to answer questions, in order to avoid such basic errors. Where a question specifically asks for an example, candidates must ensure that one is given if they are to score full marks for their response.

Responses to some questions again indicated a considerable variation in candidates' knowledge and understanding of basic processes used in the school workshop. This variation was even more noticeable in questions relating to processes used in industry, where knowledge was quite limited in many cases.

Sketches produced for responses to the design question were generally of limited quality. It is most important that sketches are clear and suitably annotated, as examiners must be able to readily interpret a candidate's design ideas.

Comments on specific questions

1(a)(i) All candidates attempted this question, but few gained high marks on it. Very few candidates were able to identify the spring washer and, in a number of cases, the rivet was referred to as a 'pop' rivet. The self-tapping screw was commonly named simply as a screw. This was accepted as a suitable response.

(a)(ii) Most candidates scored well on this question, but in a number of cases the allen key was not correctly identified.

(b) Some good responses to this question were seen, although a number of candidates did not attempt it at all. The most popular benefit quoted was that of the savings produced by buying in bulk and reference was also made to the benefit to manufacturers of not needing specialist machinery to make components themselves.

2(a) Most candidates were able to give two ferrous metals from the list and gained full marks on this question. In some cases, however, it seemed that detailed knowledge of materials was rather limited, as non-ferrous metals and plastics were also given.

(b) Responses to this question were rather mixed and only a limited number of candidates gained full marks by giving appropriate materials and reasons for use. The most frequent reason for loss of marks was in responses relating to the lathe chuck guard, where candidates often appeared to have selected materials at random. This was particularly disappointing, as candidates could be expected to have had personal experience of lathework during the course.

(c) This question was poorly answered, with most candidates naming processes that were completely inappropriate for the product chosen. It was mainly where a candidate had chosen the kitchen sink that the correct process of presswork was named. In other cases, responses were generally too vague or incorrect.

(d) This question was well answered in many cases, but a significant number of candidates did not offer any response. Most responses were related to the use of thermochromic materials to produce colour change in response to changes in temperature, the most common example being children's mugs. In a number of cases, a mark was missed by not giving the example asked for in the question.

3(a)(i) Most candidates scored well on this question, although a surprisingly large number did not attempt it. In some cases, the names given to the parts of the injection moulding machine were inexact, but marks were allowed where the response was suitably descriptive.

(ii) As with part (i), a surprisingly large number of candidates did not attempt this question, and many were only able to name one other plastics moulding process. Where candidates had given two appropriate processes, the most commonly mentioned was vacuum forming.

(b)* Most candidates attempted this question, but responses were varied and very few scored more than half marks on it. The majority of responses were based around the fact that shaped parts are easy to produce by plastics moulding processes, but only the higher achieving candidates mentioned other benefits. A small number of very good responses made reference to the reduction of material wastage and the ability to make large numbers from one mould.

Marks were awarded for well written answers, despite technical content often being limited. (QWC).

4(a) The majority of candidates scored well on this question, particularly in the early stages of the process. Where marks were missed, this was often due to the fact that candidates had not recognised the need to thread the holes with an M4 tap. In a number of cases the holes were simply re-drilled using a 4mm drill.

(b)(i) Most candidates answered this question correctly, but a significant number had not taken into account the fact that the question asked for a method that did not use heat. Riveting was the most frequently given correct response, and the use of 'superglue' was also referred to in a number of cases.

(ii) A significant number of candidates were unable to name even one industrial process that could be used to cut out the aluminium alloy backplate. Most candidates gained at least one mark on this question, with laser cutting and milling being the most commonly seen responses. Presswork was also given by some candidates, and it was pleasing to see a small number of responses mentioning water-jet cutting.

(c) Responses to this design question were limited and, in some cases, it appeared that candidates had little understanding of the term 'jig'. Marks were awarded where a candidate's design clearly met the specification points given in the question. Very few candidates scored more than half marks for their response.

5(a)(i) Most candidates were able to give at least one benefit that related to the user of the display unit, but some responses included benefits that were less specific. The ease of removal from the unit was the most popular choices of benefits and the fact that the leaflets could be more clearly seen was also often mentioned.

(a)(ii) Responses to this question were slightly better than those for part (i) and more than half of the candidates scored full marks on it. Most candidates gave the ease of manufacture and the reduction in material as the two main benefits to the manufacturer.

(b) In most cases the responses to this question were quite disappointing, with candidates simply stating that thermoplastics can be recycled. Very few responses related the reduction in waste and energy usage to environmental benefits.

(c)* Responses to this question were generally quite weak, and a significant number of candidates did not attempt the question at all. A small number of responses made reference to the fact that less storage space is needed, and some pointed to traffic disruption as a disadvantage, but knowledge of JIT was very limited overall.

As with all QWC questions, marks were awarded for well written answers despite technical content being limited.

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