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 2012

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.

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 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 second 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. i.e. 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 generally the same as seen in the last examination session – January 2012. 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.

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. There has been a significant improvement in the written response style question this session, with candidates giving detailed answers combining good subject knowledge with a clear, structured response.

It was noticeable this session, that where extra paper was required to continue a question response, many candidates failed to reference the question number thus compromising marks. 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 all six subject specialisms.

It was encouraging to see improvements in candidate performance across the Innovator suite this session. The following improvements were noted:

- Candidates appeared to be better prepared to 'tackle' the questions than in previous sessions.
- Candidates managed their time effectively, most attempted all of the questions and there were fewer No Response (NR) answers recorded.
- A better standard of response to the Quality of Written Communication questions was seen.
- More candidates demonstrated high levels of knowledge and understanding and were able to access the higher marks.

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 sketches large and clear enough to convey meaning**. It is equally important that notes should be clearly written and reinforce what appears in the sketches.

- **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 and Unit 3 both through postal and repository pathways. Most centres have been prompt in the dispatch of documentation to OCR and moderators, which is to be commended. **It is important that Centres return the request for portfolios within three days.**

Centres are reminded to 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 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 Interchange 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 in different files.

In general, Centres have been successful in applying the marking criteria for both Units 1 and 3. Centres are reminded to apply the mark scheme on a 'best fit' basis which may mean allocating marks across the assessment grid. 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.**

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.** (e.g. 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.

Resits – 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.

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. **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

The purpose of this unit is to give candidates the opportunity to design and make a prototype product.

Good work was in evidence as requirements and procedure are becoming more familiar and established in many centres.

The entry this session was comprised of work submitted as e-portfolios via a CD or memory stick, postal moderation (02) and from work submitted online to the Repository (01). It was pleasing to see work received from some new centres to the specification. A wide variety of work was seen by moderators, both in terms of quality as well as in approach.

Whilst most centres are coming to terms more with the requirements of the specification, there are still centres submitting work where candidates are being disadvantaged. The best work was seen where centres are less prescriptive to the Controlled Assessment task. Centres exerting a high level of prescription with teacher guidance and aids such as writing frames, often restrict the candidate outcomes. This is certainly true where centres supply a pre-prepared component, for example, a casting for a machine vice base. As a result, candidates are restricted in their design and the outcome is often of minimal content with the end products from all candidates very similar in appearance and function.

Administration

Evidence was seen of administration errors in such things as adding up candidate marks or transfer errors to the MS1 form. It would help if candidates/centres presented their portfolios in a logical order. There were a number of folders seen this session where checking had clearly not occurred and folders were presented for moderation in a very disorganised state.

Centres are reminded that each candidate's work, including those submitted electronically should have a cover sheet. The annotations on these prove useful during the moderation process and explain the awarding of marks given by the centre.

Too many centres are forgetting their responsibility regarding the provision of reasonably sized, good quality photographic evidence of the final outcome. Many centres are only providing images which are small and lacking in detail and which the candidates themselves have included in the folder. Centres who take the trouble to submit several good quality images of each candidates work, in addition to the candidate's folder, make the moderation process more effective and support the work of the candidate. Centres have to be contacted too frequently to supply images of the completed prototype as none have been included in the folder. Candidates are relying too much on poor quality camera phone images throughout their folders. Care needs to be taken here.

Creativity

Candidates from many centres are not doing justice to this section and are still producing the type and quantity of work seen in the Legacy Specification. Centres must look at guiding candidates to target the available marks. Work is being completed under this heading that is not required and this is not helping candidates to move forward into effective designing. This is not a hoop to jump through, but should be seen as providing a foundation of information that will inform their design thinking.

Candidates must be selective in what they include in this section. It is too easy to press the print button from an Internet search without any editing of the information. Far too much theory work linked to materials and mechanisms for example has been seen this session. This is out of context and is rarely directly related to the problem.

Candidates must ensure that work completed under this heading serves a purpose. It must be analysed, evaluated and conclusions drawn if the higher marks are to be achieved. The conclusions should clearly identify trends identified, together with highlighting common good design features that will guide or influence their own designing.

Candidates must acknowledge sources of information and images that are included in their portfolios.

Centres need to prepare candidates thoroughly for work in this section if the higher marks are to be awarded.

Candidates who did well in this section

- clearly identified the chosen problem.
- recorded their conclusions from relevant investigations and research.
- thoroughly analysed at least two existing products
- identified common good design features and explained trends in these products.
- used this work to produce a design brief clearly indicating the product, intended user(s) and situation.
- indicated sources of information.

Designing

It was felt that many candidates were struggling in this area of the folder and clearly lacked a basic grounding in drawing and presentation techniques. Candidates should be showing a range of techniques here, but too often, all that was seen were a few badly drawn two dimensional free-hand sketches, which conveyed little information of the proposed design idea.

The number of candidates who have no dimensional working drawing is still a concern. It is important that the candidate shows the journey they have taken from initial sketches through to a completed practical outcome for the higher marks to be awarded.

A number of centres encouraged their candidates to use CAD effectively and many good examples were seen of 3D design and modelling, as well as some very competent working drawings, but these were in the minority.

Candidates could use modelling more effectively. It is not necessary to model a complete outcome, but often more useful information can be provided when modelling part of a design. For example, a well made model in MDF of a mechanism that forms part of a design solution, will provide more information than a corrugated card model of a complete product.

Centres who are very prescriptive in what they allow candidates to do are disadvantaging them, severely in some cases. Providing candidates with pre-formed components is acceptable, but the framework for this must still allow the candidate scope to produce a wide range of design ideas and outcomes. The work from several centres restricted candidates designing, because there was inadequate scope for producing a range of designs, not just for individuals, but also from the centre as a whole. Greater care must be taken here.

Candidates who did well in this section

- used their analysis of research to produce an effective, clear, objective design specification
- produced a range of well presented, annotated and evaluated ideas using a variety of techniques.
- developed a design effectively and used ICT where appropriate to aid their designing.
- used modelling to good effect to develop a design or aid design thinking.
- produced a good quality dimensional drawing.

Making

Some excellent work was seen this session, but centres are again reminded of the 20 hour time limit for the whole of the Controlled Assessment. It is clear that some centres struggle to work within this time scale and candidates are far exceeding this time frame.

Many good examples of completed work using engineering materials were seen. If candidates are using card and modelling materials such as foam board, then high quality work must be in evidence if the higher marks are to be awarded. At the other end of the ability range, all candidates still produced an outcome, which they received appropriate credit for, even when there was minimal folder work submitted.

Candidates work should include the use of a variety of techniques in making the prototype product. If utilising CAM, then other techniques should be included if possible, together with evidence of the CAD/CAM process with screen shots or printouts included.

Candidates generally plan their work well and take into account resources, time and health and safety issues. They need to show more evidence of practical understanding and ability to solve problems. Too often centres award maximum marks for this, but the candidate has shown no evidence in their folder of specific problems encountered and how these had been overcome.

The recording of the making continues to be well done by many candidates. Some centres however, need to encourage candidates to move away from photographing individual components of completed work, to providing an annotated photographic record of the making as it took place. Care must be taken by centres that there is no sharing of digital images where work of a similar nature is being undertaken by different candidates.

Photographic evidence of the completed practical outcome still continues to be an area of concern. Centres are reminded that a minimum of two reasonable sized, good quality images are required. Many candidates provided images that were far too small. Others lacked the quality required to convey the information required by the Moderator.

Candidates who did well in this section

- commenced with a realistic, effective design specification.
- planned their making effectively recording process, resources, time and safety issues.
- had evidence of what problems had arisen during the making and how these had been resolved. Candidates sometimes combined this with the forward planning to good effect.
- the work in progress was recorded with annotated photographic images.
- an effective, feasible, good quality prototype was produced

Critical Evaluation

Centres need to prepare candidates for this section as many centres are still allowing candidates to evaluate the finished outcome. This is not required for unit A541. Candidates need to evaluate the designing and making process only and do not need to evaluate the functionality and effectiveness of the final product. Up to three marks can be awarded in this criteria section for the Quality of Written Communication (SPAG) throughout the folder.

Candidates who did well in this section

- effectively evaluated the designing and making process.
- were able to identify how the designing, modelling and planning stages could have been improved.
- used correct specialist terms throughout their folder
- used spelling, punctuation and grammar correctly in the whole of their folder.

A542 Sustainable Design

General Comments

Candidates accessed marks across the full range of questions. Section A was generally very well answered and all candidates were able to access parts of all the questions in Section B. A pleasing number of candidates demonstrated a very good understanding of sustainable issues, however, the one noticeable weakness for some candidates was a lack of any knowledge regarding primary, secondary and tertiary recycling. A large number of candidates were also unable to name a specific thermo-setting plastic.

Comments on specific questions

Section A

1 Most candidates gave the correct answer as non-renewable.

2 The majority of candidates gave the correct answer as greenhouse gas.

3 A majority of candidates responded correctly – a renewable energy resource.

4 A majority of candidates stated the correct answer – help to protect the earth's natural resources.

5 Most candidates gave the correct answer as – social issue.

6 This question was not well answered, and had a number of NR responses – globalization.

7 A very small number of candidates were able to name the "Global Unity" logo.

8 Most candidates were able to name a product made from recycled aluminium.

9 A minority of candidates correctly stated – risk assessment.

10 This question had a high percentage of NR, with some candidates correctly answering – CFC.

The majority of candidates answered the following true or false questions correctly. However, candidates should tick the box as stated in the question, and not use a cross.

11 Not all plastics can be recycled – true.
12 Sustainable products are all made from wood – false.
13 Cultural issues are not linked to the design of products – false.
14 Reforestation is good for the environment – true.
15 Geothermal energy harms the environment – false

Section B

16 (a) (i) Most candidates stated the correct answer – recycling logo, or mobius loop.

(a)(ii) A minority of candidates knew that the 1 referred to a type of plastic, and that the correct answer was polyethylene terephthalate or PET.

(a) (iii) Many candidates stated thermosetting plastic, but few could name a specific type.

(b) (i)(ii) (iii) A small number of candidates gave excellent descriptions of primary, secondary and tertiary recycling and scored full marks. A proportion of candidates also knew what primary recycling was. However, a significant number just described how to recycle using recycling bags, and could not distinguish between the three different types of recycling. It was also evident that the majority of candidates had no knowledge of either secondary or tertiary recycling.

(c) A small number of candidates wrote excellent responses, and scored marks in the Level 3 threshold. A significant number also wrote answers worthy of the Level 2 threshold and had a reasonably sound knowledge. However, many candidates wrote at length but had little knowledge regarding the sustainable design of plastic products, and so scored lower marks in the Level 1 threshold.

17 (a) This question was generally well answered and most candidates understood the concept of a managed forest.

17 (b) (i) A small number answered this question correctly – stewardship.

17 (b) (ii) Many candidates successfully sketched the FSC logo

17 (c) This question was not well answered by the majority of candidates with a number of candidates only referring to manufacturing issues, and this impacted on their ability to gain marks.

17 (d) Some candidates could describe some aspects of eco-design, but only a few gave a full explanation and gained full marks.

17 (e) Most candidates gained at least two marks for discussing the insulation properties of double glazing, and reduced energy bills. The more able went on to gain the full marks by discussing other benefits such as improved noise insulation, and reduced carbon footprint.

18 (a) The majority of candidates answered this question correctly.

18 (b) A large number of candidates gained full marks for describing two sustainable methods of generating electricity. However, some only gained half marks as they only named methods, and did not go on to give any further details.

18 (c) Most candidates were able to give at least one reason why manufacturers should reduce the packaging on products, while the more able gave two good reasons.

18 (d) (i) Many candidates gained at least one mark for relevant discussion. However, to gain the two marks they had to make reference to the CE or BS kite mark logo, which the majority did not.

18 (d) (ii) A well answered question, with most candidates able to identify two ways in which health and safety had been considered in the design of the two toys.

A543 Designing and Making Quality Products

Introduction

Good quality work was seen from many centres for this unit. Work was submitted to moderators electronically via a CD or memory stick, as well as the conventional folders for postal moderation (02).

There were some administration errors seen this session; for example, incorrect addition of candidate's marks, but this was minimal. Centres should note that if an OCR cover sheet is not attached to the candidate portfolio, then centre addition of marks cannot be validated.

Designing

Centres are reminded that candidates can commence this section of their folders with a Design Brief and an analysis of that brief which will lead to a Design Specification. They do not necessarily have to present research material.

Quality of design specifications varied considerably and too often, very subjective statements were included, for example, 'must not be too big', which results in problems later when the candidate needs to evaluate their product. Greater care should be taken when compiling the design specification, as it should guide the candidate during much of the Controlled Assessment task. Unfortunately, this is often not the case. Candidates write a specification and then do not appear to refer to it again or revisit it later in the process.

Design ideas varied greatly this session. The standard of hand-drawn sketches appears to be slipping on a year-on-year basis. However this said, many candidates this session were guided by their intuitive use of CAD and sketching programmes, such as Google SketchUp and ProDesktop producing some lovely work.

Modelling, either 3D or computer modelling was rarely used. Where it was, it was often in the form of a basic mock-up in card. **Modelling should be an inherent part of this Unit for Industrial Technology and should be used to confirm or inform important design thinking.**

Candidates who did well in this section-

- started proceedings from the safe base of a competent design specification.
- produced good quality, detailed and annotated designs by a variety of means.
- used their design specification to evaluate their designing.
- analysed these designs and clearly stated why they were progressing on to a particular idea, which they then went on to fully develop. This included sketches, CAD, modelling and a competent working drawing of their final developed design.

Making

Good examples were seen of high quality engineered products that had used a range of skills, processes and resources to execute. All candidates produced a product to some level, even though a few seen were not fully completed. Planning was almost exclusively presented in a table format. More use is also being seen of flow and Gannt charts, usually produced using ICT resources.

Candidates must include evidence of any problems that arose and how they were then overcome in the making, if the higher marks are to be awarded for this sub-section.

Candidates are required to provide evidence of their making, preferably in an annotated photographic format. It should show the making as it happened. Too many candidates are just showing a photograph of a completed component and then describing how it was made.

Candidates who did well in this section-

- planned their work thoroughly.
- used appropriate tools and resources effectively and safely to produce work of quality that used a range of skills and processes.
- recorded making at various stages as it progressed, using notes and good quality photographic images.
- recorded problems that arose during the manufacture and explained, using various methods, how they had overcome these issues to make progress.

Critical Evaluation

Centres appear more confident in guiding candidates with the evaluation in this unit. Candidates are required to evaluate the product outcome against their design specification and test their product.

Candidates need to show testing has taken place and provide a commentary/analysis of the results in order to achieve high marks for this section. Whilst most candidates appear to be able to do the former, the testing remains more of an obstacle. Candidates must show that testing has taken place. This can be by an explanation of what they have done, but more importantly, it should show evidence that testing has occurred. Photographic evidence is useful here, but depending on the option chosen, physical evidence could also be included in the folder. For example, a candidate could include examples of products that have been embossed or a strip of metal with punched holes.

The evaluation should highlight the limits of the function of the product and then go on to suggest strategies for how it could be improved.

Marks are awarded in this section for the correct use of spelling, punctuation and grammar (SPAG) throughout the folder, as well as for the correct use of technical terminology.

Candidates who did well in this section-

- evaluated against their specification.
- provided detailed evidence of trialling and testing the product.
- made constructive suggestions on how the product could be improved.
- used technical terms, spelling, punctuation and grammar correctly throughout the folder.

A544 Technical Aspects of Design and Making

General comments

It was evident that, in a number of cases, 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. Responses to some questions indicated a considerable variation in candidates' knowledge and understanding of basic processes used in the school workshop. Knowledge of processes used in industry was also quite limited in some cases.

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. Sketches used in the design questions were often of rather poor quality, making interpretation more difficult for examiners.

Comments on specific questions

1 (a) Most candidates scored well on this question, but in some cases knowledge of basic tools and their use was rather weak. Confusion between the two threading processes was fairly common and only a limited number of candidates paired the micrometer with the inside calipers for measuring internal diameters. Credit was given where candidates had referred to the use of the micrometer for accurate measurement.

(b) The majority of candidates were able to give one method of making marked lines stand out more clearly, but few gave two correct responses. The most common response was the use of marking blue/fluid, but this was often followed by a suggestion that 'pressing on harder' or 'going over it again' would be successful.

(c) Most candidates gave at least one benefit of using templates and jigs. The most frequently seen responses referred to the time saving factor and the consistency of accuracy resulting from their use.

2 (a) Knowledge and practical experience of plastic coating appeared to be very limited, and few candidates scored well on this question. A significant number of candidates did not offer a response at all, and in a number of cases injection moulding or vacuum forming was suggested as being appropriate.

(b) Responses to this question were rather varied, and only a limited number of candidates gained full marks by giving two appropriate methods of making the blade more durable. Making the tool thicker was accepted as a satisfactory response, but where using a different material was suggested, this was very rarely qualified.

(c) Most candidates had obviously noted the details on the diagram of the tool and scored well on this question. It was rather disappointing, however, to note that some candidates did not offer a response.

(d)(i) This question was not well answered generally, with many candidates simply stating that laser cutting was quicker and more accurate. Only the more able candidates made reference to the fact that no special tool-sets are required, and that the laser produces a cleaner cut with less waste being produced.

(ii) Responses to this question indicated that knowledge of batch production methods was rather limited, with most candidates gaining just one mark by making reference to the speed of production or the reduced costs involved.

Only a few candidates mentioned the relative cheapness of tooling used, the ability to make repeat batches, and the use of the machinery for different products.

3(a)(i) Responses to this question were quite disappointing, with few candidates scoring full marks. In most cases**,** a mark was lost where the candidate had failed to notice that the development (net) needed to fill the whole of the blank given, and incorrect orientation of the development was also quite common.

(ii) This question was well answered generally, with most candidates being able to name at least one appropriate hand tool. Where marks were lost, this was normally due to the candidate naming a machine rather than a hand tool, or not naming a specific type of saw to use.

(b) The majority of candidates scored at least one mark on this question by showing two holes for attaching the holder to a wall. The second mark was only awarded where the sketch showed a means of removing the holder easily, and this was often not taken into account.

(c)* Few candidates gained the higher marks on this question as the focus on 'making prototypes' was often ignored. Most answers were related to the more general benefits of using CAD/CAM, and some marks were gained where the ease of making changes and the ability to import into CAM were mentioned. In-depth knowledge of prototyping was generally limited, and references to 'rapid prototyping' in any form were very rare. Marks were awarded for well written answers, despite technical content often being weak (QWC).

4 (a) Responses to this question were very disappointing, particularly when so many candidates suggested that mild steel does not rust. The most common correct response gave mild steel as being recyclable, but only a very small number of candidates were able to give a second benefit to the environment.

(b)(i) This question related to one of the basic engineering processes, and was quite poorly answered on the whole. A number of candidates seemed to be unaware of the need to drill a hole before tapping a thread, and many suggested drilling the hole to the same diameter as the thread. Only the higher scoring candidates referred to the tapping size drill, the taper tap, and the use of cutting grease/fluid.

(ii) Most candidates gained at least one mark on this question, with the most popular correct responses being the use of a self-locking/nyloc nut and the application of thread sealant.

(c) A significant number of candidates did not attempt this design question, but those that did often provided quite original solutions to the problem. The standard of sketching was poor in some cases, but mostly the designs were annotated and easy to interpret.

5 (a) This question was generally well answered, with most candidates giving at least one relevant specification point for the pedal bin. The most frequently given specification point related to the need to be easy to clean, and the provision of a seal to prevent smells was also often referred to.

(b) A surprisingly high proportion of candidates failed to score on this question, with a significant number offering no response at all. The correct response of injection moulding was given by less than half of the candidates, with vacuum forming being a common incorrect response.

(c) Knowledge of mechanisms appeared to be very limited and few candidates scored any marks for this question. Whilst almost all candidates attempted the question, the vast majority of responses showed simple connections that were completely unworkable.

(d)* The majority of candidates attempted this question with most scoring one or two marks. The most commonly considered points were the cost of setting up production and the training of staff, but only the higher achievers referred in any detail to the issues relating to multi-material manufacturing.

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

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