OCR
Oxford Cambridge and RSA

GCSE

Design and Technology: Resistant Materials

General Certificate of Secondary Education **J306**

OCR Report to Centres June 2014

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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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OCR REPORT TO CENTRES

A561 Introduction to designing and making

Please read this report in conjunction with the report for A563.

Introduction

This session has seen the first entry of students in the revised linear format required by the new assessment framework. In most cases this would appear to have had only a limited affect, mainly logistical, as many centres have continued to complete this controlled assessment unit during the first year of the course and assessed it, along with unit A563, at the end of the course.

Entries have remained positive, with little change to the main requirements of this specification. It was encouraging to see that the majority of centres now have a clear understanding of the regulations relating to completing the work under "controlled assessment" conditions. However, there is still evidence that some of the work presented for moderation did not comply with the levels of control stated for this unit of work in the specification. Disappointingly, there was evidence once again of direct teacher guidance in the candidate portfolio work.

Centres are again reminded that candidates are required to select a theme set by OCR in the specification for this subject as part of the control guidance for the unit. Once selected, the candidate will then need to identify a specific product or starting point that is associated with the theme to complete a product analysis. For example, if the chosen theme is 'Travel' a candidate may decide to design and make a hand-held game which can be used 'on the move'. Centres must be careful not to provide this level of detail to their candidates as creativity and independent thought may be compromised if they all work to the same brief.

It is also worth reminding centres that one of the main requirements of this unit is to design and make a **prototype product primarily constructed using "Resistant Materials**". It should be seen through the design process as an opportunity for the candidates to show some creativity in their work, which may necessitate a different approach to teaching the candidates for it to be successful.

Administration

It has been interesting to see the increase in the number of centres that are now using either the repository or other forms of electronic storage to enter candidates' work, with PowerPoint presentations being the most popular. However, paper portfolios still remain the most common medium and, as a result, moderators were able to see a wide variety of work which generally showed a good range of presentation techniques.

Unfortunately this session, there has been an increasing tendency for centres to supply their candidate's marks after the stated deadline date of May 15th and to take a longer period than indicated to supply the sample required. Whilst there might be internal reasons within specific centres which causes this to happen, under all other circumstances the dates given in the specification should be adhered to, otherwise the moderation process could be delayed

It is worth noting that in order to complete the moderation process centres should also supply individual Controlled Assessment Cover Sheets for every candidate, or a CSF form with the sample of work that had been requested. Moderators require this information both to check on the standard of marking and to provide the feedback required to centres on how their candidates have performed.

Centres are reminded that there is a full range of documentation, including downloadable forms and other subject-specific support materials on OCR's website: www.ocr.org.uk.

Assessment

The assessment criteria should be used as "best fit" descriptors when they are applied to the candidates' work and marking should be positive. In order to support this, separate marks are not given for any of the individual elements of the assessment objective, only an overall numerical value taking into account the quality of all the work produced by the candidate against the related criteria.

Centres are therefore advised to look again at the three main levels of response as these have been modified on the latest specification for this cohort of entry – Basic Ability,
Sound Ability and High Ability should now be a first indication to use when assessing candidates' work.

Performance of Candidates

The more successful candidates' work tended to reflect the assessment strands written in the specification and they provided evidence across all of these areas to support the marks awarded by the centre. Some of the more common issues which affected candidates' achievement included:–

- A "range" of existing products being shown in the creativity section of the portfolio without the candidates concluding what trends or design features they had identified from their analysis. Presenting examples of these products with just a basic description, taken in many cases from a commercial catalogue, is not what is required in this assessment strand.
- Candidates not editing research information and providing summary conclusions as to what they had learned from producing these materials.
- Limited evidence of modelling techniques being employed to support the development of the design ideas.
- The lack of a written commentary to support the marks awarded on how they overcame technical problems in the making of the product.
- Limited photographic evidence in the record they needed to produce of the key stages in making the prototype.
- The evaluation being focused upon the product rather than the process of designing and making the prototype.

Creativity

The use of the word "creativity" as an assessment heading is still causing some confusion in centres. It is intended that the word creativity, as used in the assessment criteria, should be related to how the candidate shows this ability through the work they present in identifying trends or design features from their research work. Therefore creativity, as used in this assessment strand, should be related to how the candidate shows this ability in identifying the principles of good design and technological factors relating to materials / manufacturing in their research work.

By investigating the work of others candidates should be able to explain what they have learned during this process. Centres are therefore advised to prepare candidates prior to starting the controlled assessment on how to edit and present such information to the best effect. Work that is not relevant, informative or focused upon the theme selected by the candidates will not be credited.

The candidates' design brief is best placed at the end of this assessment criteria strand in the portfolio, as it will then allow candidates to be "influenced" by the information that they have included in this section of the work.

Candidates' work should include sizes of any items that will have an effect on the design, especially when the selected theme is lighting - e.g low voltage bulb sizes.

It is also good practice to ensure that candidates acknowledge sources of information used for the development of their portfolio work.

4.3.5 in the specification states: 'the teacher must be confident that the work they mark is the candidate's own' And 'Candidates may refer to research, quotations or evidence but they must list their sources'. There has been encouraging evidence this session that centres have prepared their candidates well for this assessment criteria strand. The work has been well-presented and there has been clear evidence that the candidates have edited information to show how they have identified trends or design features from their research work. They have been able to state what they have learned from this process, rather than just "going through the motions" to address the requirements of the assessment criteria.

Successful candidates clearly showed how they had selected their own problem area from the list of controlled assessment themes stated in the specification. They carried out a thorough analysis of at least one existing product and then by editing information from other similar research they were able to identify what were good design features and explained the significance of any trends in these existing products. By using notes, sketches and photographs they were also able to give examples of intended users and their likely needs when using the product. From this, candidates were then able to analyse the information that they had gathered before using this to generate a concise Design Brief that clearly identified the product and users.

Designing

Candidates should start this assessment by analysing their design brief and the conclusions that they made from their previous research before producing a detailed specification for their own prototype product. However, there has been a great variation in both the quality and content of the design specifications seen in the portfolios with a lot of very generic or vague statements being given that could apply to any product rather than specifically to the design that candidates wish to produce. It would be beneficial to produce this list of specifications as a series of bullet points that are relevant to the product being produced and which reflect the information presented in the creativity section of the portfolio.

It is essential that candidates include evidence of modelling to show how the product has developed from earlier designs and make informed decisions about materials and construction techniques in order to gain full credit for their work. It was noted that in this year's entry some centres have given candidates full credit in this assessment strand, when there has been little or no evidence of modelling in the portfolio, and in many cases this resulted in marks being compromised.

Centres are reminded that modelling is a necessary requirement of this unit and it is essential that candidates include evidence of modelling in order to gain full credit for their design work in this assessment strand.

Candidates used freehand sketching to illustrate their initial design ideas with basic annotation, which sometimes provided little in terms of detail or explanation. There were great variations In the quality of the work seen by the moderators and whilst the standard of work from a number of centres was very high indeed, some of the portfolios presented for moderation were poorly produced and because of the quality of detail contained within them it proved difficult to follow the candidates' design thinking in developing the prototype required.

Successful candidate portfolios include:-

- A clearly structured design specification.
- A range of design ideas which are supported by detailed annotation.
- Evidence of CAD should be seen for the higher grades.
- Modelling used to support the development of the final design solution.
- Reference made to the specifications when selecting the choice of the prototype product they intend to make.

Successful candidates having analysed their brief and the conclusions that they had reached from the research were then able to produce a clearly structured design specification which related to the product that they intended to design. Design ideas were presented using a range of graphic techniques, including the use of CAD, which were supported by detailed annotation. Modelling helped candidates to develop the final solution, where they were then able to give details of sizes, possible materials, likely construction methods and processes. Reference to the specifications then helped them to give reasons for the choice of the prototype product that they intended to make.

Making

In this context a prototype is defined as the first example of a product that could be further developed or modified. It is expected that should prototype should be: -

- a well-made working 3D product primarily made from “resistant materials” by the candidate.
- capable of being tested for its intended use.
- a developed CAM model to include a range of practical skills in its making.

Candidates were able to complete a “prototype” product within the allocated time for this unit. However, the use of CAM to produce the final product was evident in some of the candidates’ work submitted for moderation and centres are reminded that the assessment scheme indicates that a variety of processes should be used in the construction if this method is employed for manufacture.

The use of screen shots or CAD drawings to show “ownership” of this process was far more evident in this cohort of entry and is to be commended.

Further to this, the majority of candidates had planned the stages of making their product to some degree before starting to make the prototype. Centres are reminded that the assessment of this work should be taken into account when deciding upon the overall mark to award for the making process, as candidates cannot be awarded the highest marks if this work is not evident in the portfolio.

The work presented to record the key stages of making was in many cases limited and was usually just a few written notes. Photographic evidence is also required to support this process and where this was evident and detailed many of the candidates were able to achieve full marks.

Important: Centres are still awarding marks for how the candidates overcame any technical difficulties without there being any **formal written evidence recorded by the candidate in the portfolio**. Care must be taken here to ensure that candidates highlight this information in the record of the key stages of making.

Successful work that has been seen this session in candidates' portfolios included: –

- Planning which clearly shows the intended stages of manufacture before they started the practical work.
- A high quality prototype product suitable for the intended user, which has been produced using a variety of making techniques and, where CAM had been used, supporting evidence, in the form of screen shots, were included in the candidate's portfolios.
- A record of the key stages of manufacture in the form of comprehensive notes and photographic evidence produced by the candidate.
- Clear written evidence to demonstrate how candidates solved any technical problems in the making of the product.

Successful candidates made appropriate choices of materials, tools and equipment and worked skilfully and safely to produce a high quality prototype product suitable for the intended user. They showed evidence of having used a variety of making processes in producing the product and where CAM had been used as one of these techniques they provided supporting evidence in the form of screen shots which indicated understanding and ownership of the manufacturing system. Planning the stages of manufacture had clearly been produced before they started the practical work and candidates were then able to demonstrate their ability to solve any technical problems in the record they made of the key stages in creating the prototype through comprehensive notes and visual evidence.

Evaluation

Although there was evidence this session that a lot more centres have now focused their work to reflect the specification requirements for this assessment strand, it is still disappointing to see candidates who have based their evaluation on their prototype product and how it functioned rather than on modifications to improve the designing and making process.

Centres are therefore again reminded that the Specification for Unit A561 clearly states that the evaluation should be of the complete designing and making process and not just how well the final product functions in relation to the specification. Furthermore, any modifications proposed by the candidate should be of ways to improve the designing and making process only.

Successful candidates critically evaluated the processes involved in designing and making the prototype in this unit of work as opposed to the product itself. With reference to their initial planning, and the record they produced of the key stages in making their prototype product, candidates were able to reflect and suggest modifications to improve the design, modelling and prototyping processes using specialist terms, with a clear emphasis on the correct use of spelling, punctuation and grammar.

A563 Making quality products

General Comments:

Please read this report in conjunction with the report for Unit A561.

Introduction

In this unit, candidates are expected to further develop skills and abilities gained while undertaking Unit A561 in order to design and make a fully functioning high quality product. It can therefore be concluded that centres see this particular unit as the second controlled assessment portfolio, even though they can be taken in any order to suit the requirements of the candidates.

The type of theme/task selected needs to be challenging but realistic in terms of the resources and time available. Candidates should be encouraged to consider their own needs/requirements or those of an identified user group, as well as the situation in which the product will be used.

Centres should be aware that the focus of this unit should be on the making of a quality product and therefore be able to be completed within the 20 hours of controlled time. The majority of this time should be used by the candidates to produce the product rather than the portfolio of design work.

Centres are also required to ensure that candidates do not pursue the same 'theme' as for their work submitted in Unit A561. A full list of themes for each unit of work can be found in the specification.

Administration

There were a number of issues this year with centres taking longer than the time stated on the sample request forms to send back the work to the moderators. In some cases, this delayed the moderation process and centres are reminded of the need to be as prompt as possible in sending the work to the moderator.

Centres this session capitalised on the full range of options to present candidates' work and portfolios were sent for moderation in paper, repository or e-portfolio formats. However, It is worth noting that although the work produced by each individual candidate is expected to be in the same format throughout, centres may wish to use more than one method overall.

Two further issues were also identified during the moderation process and centres are asked to be aware of these issues when entering and presenting work for assessment:-

- A number of centres entered for the repository option (entry code 01) but did not upload work via OCR. Instead, centres sent paper folios or electronic files (entry code 02). Please ensure that the correct 01 or 02 code is used on the entry information.

- Some electronic files were difficult for the moderator to navigate, with "links" in the presentation to other parts of the portfolio rather than a clear progression of slides.

Encouragingly, many centres supplied notes separate to those on the Controlled Assessment Cover Sheets for each candidate along with a CSF form with the sample of work that had been requested. This helped the moderation process and is to be commended.

Centres are reminded that there is a full range of documentation, including downloadable forms and other subject specific support materials on OCR's website: www.ocr.org.uk.

Performance of Candidates

The more successful candidates' work tended to reflect the assessment strands written in the specification and they provided evidence across all of these areas to support the marks awarded by the centre. Again some of the more common issues which affected candidate's achievement included:-

- The presentation and annotation of the design ideas was of a more limited quality and this was not reflected in the marks awarded by a few centres.
- Little evidence of suitable modelling techniques that would support the development of the design ideas.
- Limited use of CAD in developing the design ideas and yet full marks were often awarded.
- The lack of formal detail (written notes) to support the marks awarded on how candidates overcame technical problems in the making. This is becoming a major concern and has been highlighted in every Report to Centre for this specification. There are still far too many centres that are not addressing this assessment requirement in the candidates' work.

Designing

This assessment strand has three separate marks than can be awarded –

- An appropriate and considered response to a brief and a detailed specification for a product produced as a result of analysis.

The majority of candidates provided a suitable "response" in terms of the content of the work that they presented in this assessment criteria strand, having previously identified their own brief from those themes stated in the specification. However, there are still some candidates who provide far more information than is required to fulfil the assessment criteria.

Centres are advised to look carefully at the allocation of marks in this section of the portfolio as an indication of the amount of work that should be produced by the candidates. Successful candidates were able to demonstrate a detailed response using only two or three A3 sheets.

A considered response could include:–
– Sizes of any items important to the design of the intended product.
– Relevant design features of other similar products.
– The needs of the intended user group.
– The nature of how and where the product is likely to be used

There has been a great variation in both the quality and content of the design specifications seen in the portfolios this session, with a lot of very generic or vague statements being given that could apply to any product rather than specifically to the design that candidates wish to produce. Good practice would be to produce this list of specifications as a series of bullet points that are relevant to the product being produced and which reflect the information presented in the creativity section of the portfolio.

- The production of a range of creative design ideas using a variety of techniques.

Freehand sketching is still the most popular method used by candidates to illustrate their initial design ideas with annotation which varied both in terms of content and quality. In this cohort of entry there was further evidence of CAD being used to support the development of the final design, with Google "sketch up" proving to be the most popular software used by the candidates.

However, some candidates who had used these techniques to present a final design for their prototype had failed to include evidence of any developmental work that they had clearly undertaken. In this instance, it is recommended that a series of screenshots of the work candidates had undertaken would have seen them gaining greater credit.

There are still some centres that have not understood the need for 2D and 3D modelling to be included as part of the design process and are awarding high marks without there being any real evidence in the portfolios to support this requirement.

It is essential that candidates include evidence of modelling work to show how the product has developed from their earlier designs and to make informed decisions about materials and construction techniques in order to gain full credit for their work.

- The use of detailed drawings and annotation to communicate these ideas.

The final mark in this assessment criteria strand should be used to indicate how well the candidate has communicated the details of the product they have chosen to produce for this unit. In some cases, it was difficult to see any evidence of the final product as candidates moved straight from a series of design ideas onto the planning required for production. Successful candidates were able to provide details of construction, sizes and materials at this stage of their portfolios, which then helped them to produce a suitable plan for construction of the chosen product.

Work that has been seen in candidate's portfolios includes:–

- Presentation of the design ideas using a range of graphic techniques, including the use of CAD, supported by detailed annotation.
- 2 and 3D modelling to help them develop the final solution where they were able to give details of sizes, possible materials and likely construction methods and processes.
- Reference to the specifications so as to help them to give reasons for the choice of the product that they intend to make.

Successful candidates Clearly showed how they had selected their own problem area from the list of controlled assessment themes stated in the specification. They were then able to produce a design brief for their intended product together with some supporting evidence to show what conclusions they had reached from any related research that they had previously conducted. A clearly structured specification resulted from this which was specific to the product that they intended to design. Design ideas were then presented using a range of graphic techniques, including the use of CAD, and were supported by detailed annotation. Modelling helped them to develop the final solution where they were then able to give details of sizes, possible materials, likely construction methods and processes. Reference to the specifications then helped them to give reasons for the choice of the product that they intended to make.

Making

There are three main requirements in this assessment criteria strand that the candidates need to address:–

- The planning and making of a Quality Product.

The planning that was seen in the portfolios varied considerably in content and detail, with a few centres giving very high marks for the quality of the making even though the planning provided by the candidates was felt to be very limited.

It was also evident that some centres presented the initial planning and the record of making as one section of work, but then marked this twice under the different criteria headings. Centres are therefore reminded that planning must be produced before manufacture and cannot be rewarded twice in the assessment of the work.

It is expected that candidates' planning shows each intended stage of manufacture along with health and safety issues, tools, equipment and processes required to make the product

Encouragingly, centres are also appearing to be more realistic in their expectations due to the obvious time constraints in this unit of work and although there were still some very ambitious projects attempted, these were far fewer than in previous sessions.

CAD/CAM, especially laser cutting, is now more widely incorporated into the practical work in both controlled assessment units with most candidates presenting evidence through the use of 2D Design/Corel Draw/Pro Desktop/Solid Works/ Sketch up software. Centres are reminded that where candidates use CNC techniques to produce the final product they should be used in conjunction with other construction methods as stated in the specification guidance. Further reference to this issue is also made in the report for Unit A561.

Centres need to be more aware of the importance of the marks in the following two assessment criteria strands as the six marks that can be awarded for evidence of this work is equal to the current grade boundaries for this unit.

- Recording the making of the product.

Some centres appeared to assess this work without using any discretion towards the statements in the marking criteria when it came to judging the details provided by the candidates. The work presented to record the key stages of making was in many cases limited and was usually just a few written notes. Good practice would be to provide photographic and written evidence to support this process and where this was evident and detailed; many of the candidates were able to achieve full marks for this section.

- Details of how candidates overcame any technical problems in the making of the product.

Important: In order to achieve the higher band marks for identifying how technical problems have been solved, candidates must provide written evidence in their portfolios. Out of all the assessment criteria strands, this was the one causing the most concern. It is recommended that centres ensure that candidates clearly state these issues in the record they make of producing the product or on a separate sheet in their portfolios.

Successful candidates made appropriate choices of materials, tools and equipment and worked skilfully and safely to produce a high quality product suitable for the intended user. They showed evidence of having used a variety of making processes in producing the product. Where CAM had been used as one of these techniques, candidates provided supporting evidence in the form of screen shots which indicated understanding and ownership of the manufacturing system. Planning the stages of manufacture had clearly been produced before candidates started the practical work and they were then able to demonstrate their ability to solve any technical problems in the record they made of the key stages in creating the product through comprehensive notes and visual evidence.

Evaluation

It was encouraging to note that candidates had a better understanding of how to complete a successful evaluation this year. By evaluating their products firstly against the specification, candidates were able to base their conclusions on the product and how it functioned having previously conducted a series of tests to see how it performed in use. From this candidates were then able to suggest modifications through notes and detailed sketches.

Centres need to be aware that in this assessment criteria strand, the quality of the candidates' spelling, punctuation and grammar throughout the portfolio should be taken into account when deciding upon the final mark to award. Differentiated statements in the mark scheme for this assessment strand are included to support this process.

Successful candidates showed evidence of having tested their completed product in use and compared this to their list of specifications. From this they were then able suggest improvements to their product using a series of notes and sketches. Throughout this assessment strand they also showed evidence of the correct use of specialist terms and showed accurate use of spelling, punctuation and grammar.

A565 Sustainability and technical aspects of designing and making

General Comments:

2014 is the first year that A565 has been examined, having been taught since September 2012. It is based upon two former specifications – A562 (Sustainable Design) and A564 (Technical Aspects of Designing and Making). As such, it reflects the format of both of the examinations that were based upon these specifications. There are two sections to the examination – Section A focuses upon the requirements of the former A562 and Section B focuses upon A564.

Section A is made up from fifteen one-mark questions and one twenty-mark question. The 15 questions consist of 5 multiple-choice questions, 5 questions requiring single-word or short phrase responses and 5 True/False questions. Section B consists of three questions, each of 15 marks.

Overall, the examination was tackled well by the candidates, and all questions were attempted by the majority. There was no one question that proved particularly challenging for the candidates. However, the examination did highlight some aspects that could be addressed in centres in future years:

- The “starred” questions – those that test the Quality of Written Communications (Q16(g) and Q19(f)) – require both subject-specific knowledge and a skill in presenting that knowledge in a concise but structured format, correctly spelled and punctuated. For many candidates, the lack of presentation and basic English skills was readily apparent.
- Unqualified responses to technical questions (e.g. “strong”, “quick”, “light”, “easy”) cannot be awarded. Even for one mark, a response must reflect the context of the examination and question; a reason for covering chipboard in plastic – Q19(b)(ii) – is not simply “to protect it” but – for example – “to protect it *from water/oil spillage*”.
- Every question has to be read carefully, and a response must focus upon the specific requirements of that question. Q18(b) requires an explanation of the term “tolerance”, but the frame of reference is that of dimensioning a drawing. Thus, responses that refer to strength, patience, resistance to loading and similar synonyms have no relevance to accuracy of drawing or manufacture.
- Instructions such as, “Name”, “State”, “Describe” and “Discuss” require different responses to obtain the best marks. “Name **one** plastic … ” (Q16(a)) should not elicit the response, “Plastic”; “Discuss ...” does not request a set of bullet points.

Comments on Individual Questions:

Q1-5 These are multiple-choice questions, requiring the correct response to be circled or otherwise strongly indicated; the published mark scheme will indicate the expected answer. Candidates must recognise the need to indicate their response clearly; more than one response circled, vague crossing out and decorative ellipses cannot be awarded. Centres should be concerned that not all candidates recognise the correct answer, even when printed on the page. Candidates' knowledge should cover the fact that – for example – a cotton plantation *is* a source of sustainable raw material (not all resistant materials start life as hard, rigid products; they can begin as plant seed oil or cellulose fibre). However, all five questions were generally answered well by all candidates.

Q6 Few candidates were able to recognise that the symbol relating to the recycling of glass, not just to recycling generally. “Bottle bank” or “Recycling” are too vague to be awarded and “litter bin” is just inaccurate.

Q7 This was attempted by the majority of candidates, although only about half of the answers seen were deemed correct; some candidates thought that the technology was “nanoparticles”, which is a very different science.

Q8 As in Q7, many candidates attempted the question, but many gave “materials”, “manufacture”, “measures” or other words beginning with “m”; none of these sensibly completes the sentence, if the candidate had read the whole response. This highlights the point made above, in that some candidates do not have a strong enough grasp of written English to recognise that an answer may be grammatically or logically incorrect.

Q9 Very many candidates knew the correct response; although “rites” would have alternative meanings, this mis-spelling was accepted.

Q10 “Culture” was a very common, acceptable response, although the mark scheme does list some alternatives; “ethical” is clearly not relevant, and “ethnicity” was considered to be an individual, rather than a national, attribute.

Q11-15 These questions are “True” or “False”, and many candidates recognised all the statements for what they were. Centres should question the reason why a third of candidates do not know what the letters CFC stand for, or that just under half of the candidates do not know the difference between anthropometrics and ergonomics.

Q16(a) Almost any thermoplastic was accepted, but polypropylene was not though to be appropriate here; no thermosetting plastic was awardable. The third of candidates who did not name a specific plastic were not credited with “plastic”, “thermoplastic” or “bottles”.

Q16(b) Many candidates understood the term “shatter resistant” as being a plastic that did not break into many small, sharp pieces. An equal number, however, thought that the term meant impact resistant, unbreakable or inflexible and could not be credited with these responses.

Q16(c) Many candidates read and recognised the caption in Fig. 1, and were able to interpret “clear” into a see-through straight-edge that would allow the work to be visible through it. The third of candidates that did not read or comprehend the caption merely repeated the answer from Q16(b).

Q16(d) Local manufacture does not always mean that a product may be viewed during its manufacture, or that it may be returned to the factory should it break. Fortunately, only a few candidates gave these possibilities as their responses, and the majority were able to correctly identify the various points necessary for awarding.

Q16(e) This question was reasonably well answered, although there was a degree of repetition by some candidates within their responses. There were few references to Health and Safety (goggles, face masks, other PPE), but there were several responses that focused upon factors such as air-conditioning, cool/comfortable working conditions and short working weeks, none of which are possible in industries that forge steel or work shifts.

Q16(f) This was generally very well answered, with ideas such as raised lettering, Braille dots, contrasting colours and wider/thicker rulers being the most common. Some candidates did, however, confuse visual impairment with physical impairment, and added handles or other aids to ensure the ruler could be gripped, which were not deemed awardable. Some excellent sketches were evident, which enhanced the responses.

Q16(g)* This is one of two questions testing both technical knowledge and presentation skills. Some responses showed a real aptitude for presentation of information. For the majority, however, technical details had to be gleaned from a single, long paragraph. There were no bullet points seen by the writer, however (which would gain only a Level 1 award). There were, however, many paragraphs that were a sequence of short, unrelated sentences; this method of avoiding bullet points should be discouraged within centres. Technically, most responses were satisfactory, but many candidates let themselves down by presenting this data in a haphazard fashion, and Level 2 was the most that a large number of candidates could be awarded.

Q17(a)(i) Most candidates were able to identify a suitable hardwood, although plywood was a little disappointing, as was pine and MDF.

Q17(a)(ii) The candidates' responses to this question were – to some extent – dependant upon those from 17(a)(i), and reflected their perceived properties of pine, plywood and MDF. The majority recognised the reason for using a hardwood as a speaker cabinet but – as seen in the preamble to this report – answers such as “hard” were unacceptable unless qualified by a suitable corollary.

Q17(b) The diagram confused some candidates, and good finger-joint sketches were not fully awarded as they were drawn on a vertical edge (on which the front panel is to be planted), rather than on the top, horizontal corner. There were, unfortunately, mitre joints seen, or finger joints with just one finger on one piece (bridle joint); some candidates just completed an isometric drawing of a box. On the whole, however, many good quality drawings were seen and were suitably awarded.

Q17(c)(i) Few candidates were able to identify a suitable drill bit for this purpose; “drill piece”, “28mm” or “saw” were not considered acceptable.

Q17(c)(ii) This question tested candidates' knowledge of cutting a hole in the centre of a piece of MDF. Very few described the use of a laser cutter or CNC router, the majority focusing upon “traditional” methods such as pilot hole, coping saw, file and sand(!)paper. A few cut the board in half and cut out two semi-circles, and others used tenon saws to cut the curved shape, but generally this question was correctly answered.

Q17(d) This question was very well answered, candidates recognising the advantages that spray painting gives.

Q17(e)(i) Virtually all candidates recognised that the symbol indicated the flammability of the contents.

Q17(e)(ii) Many candidates were aware of the need to keep the spray away from fire or face, but some let themselves down by stating “wear a mask” without qualifying the type of mask required. “Wear gloves” (or other items of PPE) was also regularly seen, but not thought relevant here unless qualified (“wear gloves to protect sensitive skin from liquid” would be awarded, for example).

Q17(f) Most responses indicated some form of rubber foot or pad, which would have gained one mark. For two marks the rubber pad would have to be fixed in some way (glue, screw, etc.). Methods of screwing the cabinet to the hard surface, adding wooden feet and the like were not accepted. Placing the speaker onto a non-slip mat was not credited as the question required a *modification* to the cabinet.

Q18(a)(i) Almost without exception, acrylic was the preferred answer from the candidates. There were very few thermosetting plastics mentioned.

Q18(a)(ii) This question highlighted the probability that many candidates are not really aware of dimensions of plastic sheets – or of measurements in a D&T environment. Responses of 10mm were credible but not creditable, but the answer of 150mm seen by the writer was not feasible on so many levels.

Q18(b) There were some candidates who were able to relate the term to the possibility of manufacturing the stand either under or over the stated dimension and still be usable. However, it was clear that many candidates were unfamiliar with drawing conventions such as scale or – in this case – tolerance. Some confused the two, and were prepared to discuss the tolerance of the *size of the drawing* in the context of scale. Many discussed the bearing strength or resilience of the product. Some answered on the basis of the waste allowance when cutting the shape from a sheet of plastic.

Q18(c) This was generally well answered, but some candidates let themselves down by not correctly naming a line bender/strip heater, or by using gloves in conjunction with a spinning cloth disk.

Q18(d) This form of question has been posed before, and candidates should now know how to answer this correctly. However, there were many who gave responses that related to evaluation of a finished item (strength, breaking strength, etc.), which is not what the question asked.

Q18(e) This question allowed candidates to express their design flair and come up with a novel product, and most rose to the challenge. Some, however, let themselves down by manufacturing in plywood, MDF or a hardwood, despite the specification requirement for softwood. Many answers did not give the required detail of construction such as fixings and fittings, security of opening/closing and the like.

Q19(a) The question asked why aluminium is a suitable material *for the legs of the stand*. Thus, the many responses relating to the metal's ductility, malleability or other physical, working properties were deemed to be irrelevant. Non-corrodibility was, however, judged to be a useful property in a workshop, as was self-finishing and lightness of weight. Candidates clearly knew about aluminium, but were unable to relate their knowledge to the question.

Q19(b)(i) This was well answered generally, with only a few responding with chipboard (already given) or with a solid timber such as “pinewood” (usually married with “plywood” in the full response); MDF was the man-made board of choice.

Q19(b)(ii) Many candidates were familiar with this form of man-made board, and this question was also answered well but, as stated in the preamble above, answers such as “To protect it” were insufficiently qualified to warrant a mark.

Q19(c)(i) and (ii) Very few (less than 10%) knew the name of this form of KD fitting, and left the space blank. However, the majority (over 70%) may have seen (or even used) a fitting similar to this and were able to identify correctly the tool necessary to tighten the cam.

Q19(d) This proved a difficult question for some candidates, being unclear about the purpose of these, or any other KD fittings, and their place within the market. Again, “strong”, “cheap”, “quick” were unacceptable without correct qualification. Most could conceive of one useful alternative to screw fixing, but fewer candidates could come up with a second and viable reason.

Q19(e) Generally this question worked well for candidates, and most were able to check the correct reason for the shelf unit failing.

Q19(f)* As with Q16(g)*, this question tested the candidates' presentation skills and technical knowledge. Some answers showed a lack of subject knowledge, with most candidates thinking that man-made boards are made from sawdust or recycled/poor quality wood (rather than waste wood set aside for the purpose of board manufacture); equally, many thought that boards could not be recycled due to the glue component, or that they were intrinsically weak (without reference to the question). Almost everyone, however, recognised the unattractiveness of the boards and the need for coating or covering the exposed surfaces with something decorative. On the side of the natural timbers, many more candidates were more familiar with these (aesthetics, grain pattern – usually “grains” – available widths/lengths, etc.). A small minority of candidates read the question fully, and discussed the manufacture of products from both materials (although there was a general opinion that the boards were manufactured to suit the size of the finished artefact, not that the components were cut from larger boards). Thus – and unlike Q16(g)* – the presentation was enhanced by the technical content.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

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