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Examiners' Report

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GCE Design and Technology
Production Design 6GR02 01

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Introduction

As with previous series, it is clear that the majority of candidates prepare very well for their examination and are able to demonstrate their knowledge and understanding well through their responses, be that in the form of written responses or annotated sketches.

Those candidates who read the questions fully and respond with specifics relating to the topic of the question gain more marks than those who write around the subject with generic responses which have a vague link to the question topic. Whilst it is becoming less common, there are still some candidates who believe that it is acceptable to respond to questions with generic, generalised answers, such as 'strong, fast, quick, cheap' and so on. These responses show only a basic understanding of limited aspects of the subject and therefore they can only gain low marks.

Candidates need to demonstrate their knowledge and understanding of the subject which they are being questioned about and to present this effectively to answer the question set, rather than write as much as possible in the space provided to gain marks, hoping the answer meets some aspect of the mark scheme. Related to this, whilst it is clear that most candidates use the time in the exam well, some candidates still find the need to use additional pages to complete answers. The spaces provided in the examination paper are designed to be larger than we would expect any answer to take. Most candidates use this space wisely, but as additional pages continue to be used, candidates are advised to write more concisely.

Although the quality of sketching has shown some further improvement, it was disappointing again to see some very low level drawing skills evidenced in candidate responses to the question where a third angle orthographic drawing was required. Many candidates seemed to find it difficult to transfer the skills which they have developed for their internally assessed work to examination questions.

Question 1 (a)

This question generally was answered well by the majority of candidates. The most popular response being the reference to tracing paper being translucent and being used to transfer designs and copier paper being opaque and used for general printing. It was noticeable that some candidates stated that tracing paper was used for 'tracing' which gained no credit as this was implicit in the question, similarly 'copying' gained no credit for copier paper.

As an 'identify' question two properties for each material and one example of a use for each material were required. One word or short answers are acceptable for such questions.

- 1 (a) Paper and board are used for a wide range of graphic products, with the selection of specific types of paper or board being decided by their properties.

Complete the table below by identifying **two** properties of each material, and **one** specific example of the use of each material.

Paper type	Material properties	Example of use
Tracing paper	1) transparent 2) thin in thickness (2)	tracing over an object/image (1)
Copier paper	1) Opaque 2) Good to print on (2)	Printing documents onto (1)



ResultsPlus Examiner Comments

In this response the candidate has gained full marks.

For tracing paper, the candidate has identified two properties – transparent and thin in thickness, along with an appropriate example of use – tracing over a design.

For copier paper, the candidate has stated that it is opaque and good to print on, which is an interpretation of 'good quality prints possible' as is seen in the mark scheme. Printing is an acceptable use of the paper.



ResultsPlus Examiner Tip

Avoid repeating key words that feature in the question as single word responses. For example in this question 'tracing' would gain no credit for tracing paper; a more specific application of tracing is needed as shown in this answer.

Question 1 (b)

The specification lists numerous materials and processes, some of which may be commonly used in schools, whilst others may be more frequently found in industry. This question requires the candidates to have knowledge of one of the processes found in industry which is the production of mechanical pulp.

As an 'outline' question candidates needed to provide responses that related to the stages of producing mechanical pulp. Short sentences are therefore acceptable, with many candidates achieving multiple marks from within one sentence where they have made salient points.

Some candidates provided full descriptions of the activities both before and after the pulping stage; these aspects of responses gained no credit. It is important that candidates read and understand what questions are asking prior to attempting to answer.

(b) Pulp is used in the production of paper and board.

Outline the process of producing mechanical pulp.

~~From the virgin wood~~ ^{bar}

(4)

Debark the cociferious trees then soaks the logs in water to soften the fibres then pound them into chips 2mm each. The mechanical forces ^{from each other} seperates the ligins. Then the wood is screened and processed so that any fibres/chips that are bigger than the designated 2mm then it is used for lower quality paper or processed again.



ResultsPlus Examiner Comments

This candidate has provided a concise response that relates only to the process of producing mechanical pulp.

Four marks have been awarded as follows:

- debarking
- soaking the logs in water (saturating)
- pounding into chips 2 (m) (m) each
- screening

Whilst there are some errors in the terminology used by the candidate, it is clear from their response that they have a good understanding of how mechanical pulp is produced and have therefore been awarded full marks.



ResultsPlus Examiner Tip

Answers are always marked positively and credit will be given providing the overall context of the response is correct.

Question 1 (c)

This question focusses on the advantages of using chemical pulp for the production of paper. As an explain question an initial advantage of chemical pulp was required, with a linked statement relating to how this improves the quality of paper.

The focus of the question was on the quality of the paper that is produced as opposed to the relative quality of chemical pulp. A minority of candidates responded with answers that explained why chemical pulp had improved qualities over mechanical pulp, but a large number of candidates were able to provide a justified answer that linked, for example, the longer fibres present in chemical pulp resulting in higher grade papers.

(c) Explain **one** advantage of using chemical pulp instead of mechanical pulp in the manufacture of paper.

(2)

Chemical pulps remove more lignin than
mechanical pulp so the paper doesn't yellow with
age.



ResultsPlus

Examiner Comments

This candidate has provided an appropriate lead point 'chemical pulp remove more lignin' (1 mark) which is linked to 'paper doesn't yellow with age' (1 mark). As is often the case, these two points are not linked directly in the mark scheme, but as the expansion relates to the lead point, both marks have been awarded.



ResultsPlus

Examiner Tip

When a question asks for an explanation, there should be an initial point made which is then either justified or expanded upon.

Question 2 (a)

Often at AS Level, candidates are presented with questions that require them to 'complete a table'. These often require short responses, and for these responses to be linked together in some way. The focus of this question is on health and safety issues relating to the use of computers for design purposes.

The majority of candidates provided two hazards and two control measures in their answers to the question, although in some cases the control measures may not have been appropriate.

In some cases control measures were repeated, with many responses of 'take a break' being presented. More specific answers such as 'have breaks away from the monitor' or 'stop typing' were acceptable for two marks, however repeating 'take a break' only gained one mark.

- 2 When producing graphic products there are a number of health and safety issues that should be considered.

(a) Complete the table to identify **two** potential health and safety risks when using computers for design work for long periods of time. For each risk suggest an appropriate control measure.

Risk	Control measure
1) repetitive eye strain injury. (1)	take regular breaks away from the computer. (1)
2) back / neck strain (1)	use a chair that is designed for computer comfort or just take regular breaks to stretch muscles. (1)



ResultsPlus Examiner Comments

Four marks have been awarded. The candidate has stated two relevant risks of using computers for design work for long periods of time.

For each risk an appropriate control measure has been stated that relates to the risk. Whilst the term 'fully adjustable chair' has not been used, the description of a 'chair that is designed for computer comfort' has been awarded one mark.



ResultsPlus Examiner Tip

Where questions are of this form, in this case two risks and control measures are asked for, the responses must be linked and be appropriate.

No marks would be given for a control measure that did not reduce the stated risk. For example, if the candidate stated 'RSI' as a risk, and then 'use a filter to reduce glare', the mark for the control measure would not be awarded.

Question 2 (b)

The focus of the question is on the reasons why an employer would keep completed risk assessments. The question was concerned with the retention of completed risk assessments, rather than the process of carrying one out.

Many candidates tended to answer the question relating to the carrying out of risk assessments, thus gaining zero marks.

Where candidates achieved marks they did this as a result of considering the need to retain records for future reference, for example as part of an investigation or if similar activities were carried out again.

As an explain question candidates were expected to identify a valid initial point and then expand this with a linked justification.

(b) Explain **one** reason why it is important to keep completed risk assessments.

(2)

It is very important to keep completed risk assessments as they will allow you to apply them again if ever undergoing the same task. This will help to reduce all possible risks when completing the task, resulting in a higher safety measure.



ResultsPlus Examiner Comments

The candidate has achieved two marks for a linked response that considers the fact that the same task may be carried out again. This is linked to being able to apply the same risk assessment again. The response is an interpretation of the second bullet point in the mark scheme, therefore both marks have been awarded.



ResultsPlus Examiner Tip

Candidates are reminded that for explain questions, in order to gain all of the marks available, there must be a linked response given. This would consist of an initial statement and a subsequent expansive comment which either offers greater depth or a justification for the point made.

Question 3 (a)

This question focussed on how thermochromic pigments are used to display the charge on the side of a battery. As an Explain question, candidates were again expected to provide two valid lead points supported by valid expansions.

There were some good responses but only a small proportion of candidates achieved full marks. Most candidates understood that the pigments respond to changes in temperature, and provided a linked expansion, but only a small proportion of all candidates achieved full marks.

Some candidates thought that the heat from the user's hand was the stimulus for the changes in the state of the pigments, which gained no credit.

A minority of candidates offered generic responses, such as 'shows the charge', or 'reveals a colour bar', which gained no credit.

black → clear

- 3 Smart materials and technologies are used to enhance graphic products by either improving the aesthetics or the function of the product.

(a) Explain how thermochromic liquid crystals are used to indicate how much charge is remaining in a battery.

(4)

- A normal ink is printed to give colour bars on the battery surface
- Thermochromic ink printed on top. This is usually black when cool
- As the battery is used, it releases heat energy
- The heat changes the thermochromic colour from black to clear
- This then allows you to see gradually see the normal ink beneath to indicate how much colour is left



ResultsPlus Examiner Comments

This candidate has achieved four marks. Although this is an explain question, the candidate has provided a series of statements that all link together to provide a good explanation of how thermochromic liquid crystals are used to indicate how much charge is remaining in a battery.

The response includes reference to a colour bar being printed with normal inks on the battery, which is printed over with thermochromic ink that is normally black.

A further two marks are awarded for heat changing the ink from black to clear and then being able to gradually see the normal ink below.



ResultsPlus Examiner Tip

This is a concise answer in which the candidate presents their response logically. Answers such as this demonstrate the knowledge of the candidate clearly.

Question 3 (b)

As a Discuss question candidates were required to provide an overview of how RFID tags in smart labels impact upon the supply chain. Candidates needed to give answers that included a consideration of the various parties from manufacturer through to end user, although the majority tended to focus on either the retailer or the manufacturer.

A significant proportion of candidates performed well on this question, with common responses tending to focus on the ability to track the location of products, reduced time for stock counting, the ability to automate stock control and tags containing information.

This was an example of a question where candidates tended to write everything they knew about RFID tags, with many providing extended responses that described how the tags work including differences between active and passive tags. In these cases only one or two marks were awarded as a result of reference to the ability to track products and that tags can contain information. Furthermore, credit was not given for candidates who described how RFID tags are used for security purposes in libraries and similar establishments.

(b) 'Smart' labels that have radio frequency identification (RFID) tags can be used as an alternative to bar codes for labelling products.

Discuss how the use of 'smart' labels containing RFID tags impacts on the supply chain from manufacturer to end user.

(5)

RFID tags can be used by the manufacturer for tracking of pallets of raw materials and finished products. It allows them to quickly identify what a material is and its quantity allowing for a more efficient process. The same RFID tags can also be used to track containers which may travel by sea. Distributors can use RFID tags to identify popular products by tracking them and can also use them as security tags to detect theft. RFID tags can be used by the user to detect what a product may consist of.

(Total for Question 3 = 9 marks)



ResultsPlus

Examiner Comments

This response has attracted four marks, with four relevant points being identified from the mark scheme. As a discuss question, a series of valid points are required with some consideration of negative impacts being expected for full marks.

This candidate has achieved marks for 'tracking of pallets', 'identify what a material is', 'track containers which may travel by sea', and 'identify popular products'. Some points within the response are repeated, but these do not detract from the quality of the answer.



ResultsPlus

Examiner Tip

It is important to fully read the question before giving an answer. In this case many candidates made the mistake of answering the question which they thought they had been asked, rather than the actual question set. These tended to be descriptions of how RFID tags operate as opposed to the impacts of 'smart' labels containing RFID tags impacts on the supply chain.

Question 4 (a)

This question focussed on the process of applying a vinyl cut sign to the side of a vehicle. Candidates tended to perform relatively well on this question, with a large proportion of responses gaining four or five marks.

Where candidates performed less well they tended to focus on how the signage is designed and then cut using a vinyl cutter, as opposed to how the signage is then applied.

Candidates demonstrated a lack of knowledge of some of the technical terms related to the process, for example 'weeding' and 'application tape', but in many cases these stages were described to achieve some credit.

Some of the lower achieving candidates gained only one mark as a result of making reference to the use of a 'squeegee' to remove bubbles of air from underneath the vinyl.

Whilst this is an Outline question that required candidates to present a series of relevant points that relate to the application of a vinyl sign to a van, in order to gain full credit these needed to be in the correct order.

Outline the process of applying vinyl cut signage.

Application

(4)

The design would be created on CAD software and checked to make sure it suits its function. It can then be cut out on a vinyl cutter; ^{each colour separately.} The ~~cut~~ ~~cut~~ ~~cut~~ waste material must be removed leaving just the sign and/or any text. Using application tape it can then be lined up on its surface, one layer at a time before the application tape is removed leaving just the signage which can then be pressed on to ensure it has been stuck firmly to the van.



ResultsPlus

Examiner Comments

The initial two lines of the response attract no marks as these relate to the design and manufacture of the signage.

This candidate then makes four valid statements related to applying the signage; 'cut out on the vinyl cutter, each colour separately'; 'the waste material must be removed'; 'using application tape it can then be lined up on the surface'; 'one layer at a time before the application tape is removed'.

The candidate has gained full marks even though the response has some repetition and omits some descriptive statements.



ResultsPlus

Examiner Tip

Candidates are reminded that for outline questions, in order to gain all of the marks available, there must be the same number of points made. For this question this would mean that candidates need to identify four discrete points and include them in their response.

Question 4 (b)

This is an Explain question and therefore requires a valid point and a relevant and related explanation for both an advantage of using 2D CAD to produce the signage and a disadvantage of using 2D CAD for the same process.

In order to achieve both marks for each of the aspects, candidates needed to provide a justification for the advantage or disadvantage. A valid point without expansion will only gain one mark.

Many candidates were able to explain advantages of using 2D CAD, for example the ability to manipulate and edit images allowing for improved development times. Candidates however struggled with disadvantages with many making comparisons to 3D CAD applications which were not required. Common disadvantages tended to relate to training and software costs or software requiring updates.

(b) Explain **one** advantage and **one** disadvantage of using a 2D image creation software package to design the graphics for the van.

(4)

Advantage

By using a 2D image creation software, it allows designers to create more accurate designs compared to technical drawings as they can zoom in to pixels to create greater detail.

Disadvantage

The software will have a high initial set up and operational cost due to licensing, therefore the cost per unit will be relatively greater as the graphics for the van will most likely be one off production, increasing the unit cost.

(Total for Question 4 = 8 marks)



ResultsPlus

Examiner Comments

This candidate has achieved two marks for the advantage and a further two marks for the disadvantage.

There is a link between the ability to produce accurate designs and being able to zoom in to pixels to create greater detail.

The disadvantage links the initial set up cost with the unit cost of signs. Each explanation is thorough and justified.



ResultsPlus

Examiner Tip

Where headings are given, as in this question, marks are only awarded for responses which relate to that particular heading. This is the case for advantage and disadvantage questions.

Question 5 (a)

This question focusses on the vacuum forming process, with candidates being asked to produce an annotated sketch to describe the process.

The question required more than a simple labelled diagram in order to achieve full marks.

This was generally very well answered, with the majority of candidates showing an understanding of the process and therefore gained the full 4 marks.

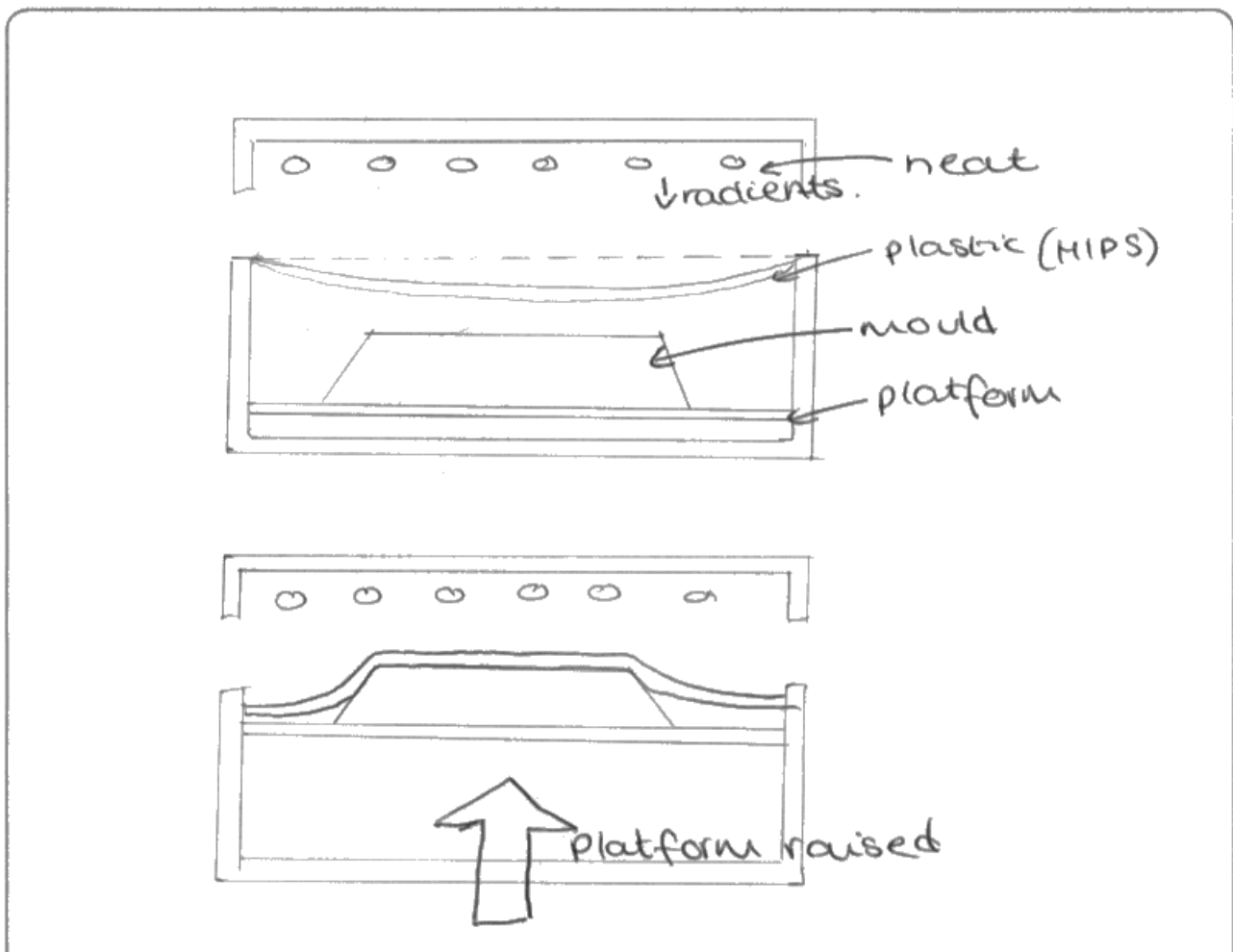
There were some good descriptions involving the design of the former, although this was not required as the question made reference to the former. Candidates produced some good diagrams with either detailed labels explaining the steps or step by step descriptions written supported by a range of diagrams.

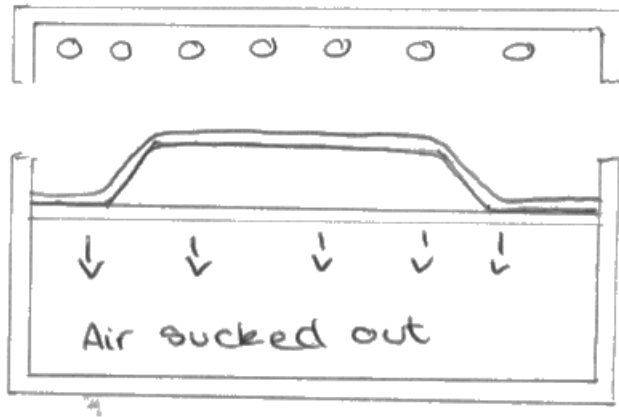
Some candidates did not mention some of the fundamental aspects of the process, for example placing the former on the platen, clamping the thermoplastic or applying heat.

One stage of the vacuum forming process is to produce a former.

(a) Describe, using annotated sketches, the other stages of the vacuum forming process.

(4)





ResultsPlus Examiner Comments

This candidate has presented their description as a series of individual sketches.

The sketches are clear and show clearly four stages of the process, namely the placing of the mould on the platen, heating the HIPS until it becomes flexible, raising of the platform (platen) and then sucking air out.

The annotations allow the process to be understood.



ResultsPlus Examiner Tip

If a question asks for annotated sketches, a candidate's answer should include both annotations and sketches to achieve full marks. This particular candidate has used annotations effectively to describe the process of producing the sign. The stages are clearly indicated, with the annotations and sketches complementing each other to provide an appropriate level of detail.

Question 5 (b)

This is an Explain question, where candidates were expected to respond with one advantage and one disadvantage of using vacuum forming for the production of a 3D shop sign. As an Explain question, an initial statement and a related expansive comment are required for each in order to gain full marks.

A large proportion of candidates knew that vacuum forming is able to produce a hollow forming or that the formers can be reused as advantages. In many cases the advantages were expanded upon with appropriate justifications.

Common disadvantages included the slow manufacturing time due to the heating and cooling of the material, or the fact that complex shapes are difficult to produce due to the need to have draft angles.

Some candidates tended to achieve only two marks by identifying an advantage or disadvantage, as opposed to explaining these, or by giving multiple advantages and disadvantages.

(b) Explain **one** advantage and **one** disadvantage of producing the sign using the vacuum forming process.

(4)

Advantage

Vacuum forming is a quick and easy process which only requires the material and the ~~the~~ mould. It creates a seamless product at the end and is smooth. ~~The~~ process ~~is~~ which can be appealing and beneficial to some clients. The process is ideal for one off or batch production. ~~and~~ as each product will be identical. Since the ^{same} mould can be used repeatedly, minimising the risk of error and ~~to~~ ensures each product is uniform.

Disadvantage

The ^{3D} design for the product must be simple and at an angle. This is so the design can easily be released from the mould. So complicated and intricate designs cannot be accepted. Also the mould ~~can~~ needed can be very expensive to produce and the process is not suitable for mass production.



ResultsPlus

Examiner Comments

This candidate has achieved full marks for their response. There is an appropriate advantage that is justified and a disadvantage that is also justified.

The advantage considers the ability to reuse the mould, linking this with reduced unit costs.

The disadvantage references the design being simple and at an angle so that it can be released from the mould so complicated and intricate designs cannot be accepted.



ResultsPlus

Examiner Tip

Candidates are reminded that for explain questions, in order to gain all of the marks available, there must be a linked response given. For this question, this would consist of an initial advantage or disadvantage with a subsequent expansive comment which either offers greater depth or a justification for the point made.

Question 5 (c)

The specification lists numerous materials and processes, some of which may be commonly used in schools, whilst others may be more frequently found in industry. This question requires the candidates to have knowledge of one of these materials in the form of steel.

This question focussed on the reasons why steel is an appropriate material for the support brackets for the sign, rather than simply the properties of steel. A balanced response is required for this Evaluate question, with a consideration of functional, aesthetic and mechanical properties being required in order to achieve full marks.

This question was answered well with a range of responses being given by candidates. Those candidates who achieved higher marks tended to provide full and detailed responses that considered each of the types of property in detail with regards to the context. Where candidates did not achieve higher marks, this tended to be as a result of not including all three types of property.

There were some common errors regarding the aesthetic properties of steel, with candidates often stating that 'no surface finishes are needed' or that 'it has a high gloss or shiny finish' which when related to stainless steel was awarded credit. However when candidates simply stated that steel has these properties, no credit was given.

Rather concerning was that a very large proportion of candidates were under the impression that steel is a non-ferrous metal. Candidates are reminded that the AS specification does include some metallic materials and candidates need to have a knowledge and understanding of these in the same way as they do for papers and boards.

*hard to machine *high energy *early recycled *Strength & weight

* (c) The support brackets which attach the sign to the wall are made from steel. *does not corrode early

Evaluate the use of steel for the support brackets, with reference to aesthetic, functional and mechanical properties.

(6)

Aesthetically steel has a high quality surface finish as it is shiny so looks professional. It has a high strength compared to its weight and can withstand high tensile stress meaning it can support the sign. Functionally - it is hard to machine but it can be moulded into a variety of shapes allowing the perfect bracket shape to be produced. It is weather resistant so even though it is outside - it will withstand outdoor conditions. A disadvantage

of steel is that it uses high amounts of energy to be produced which is bad for the environment - however it can be recycled easily* so it is a sustainable choice as material.

It can look rusty after long periods of time.

*(as it is magnetic so can be sorted easily)



ResultsPlus

Examiner Comments

This candidate has provided a balanced evaluation that considers aesthetic, functional and mechanical properties of steel with reference to support brackets.

The candidate has made some errors, for example stating that it is shiny which would only be correct if stainless steel had been referenced. Also some terminology is incorrect, ie moulding rather than casting or forming. Nonetheless, the response attracts full marks.



ResultsPlus

Examiner Tip

When a question asks for an evaluation, it is important that the response includes all relevant factors, in this case each of the three types of property. Candidates will not achieve full marks, unless all aspects required for the evaluation are considered.

Question 6 (a)

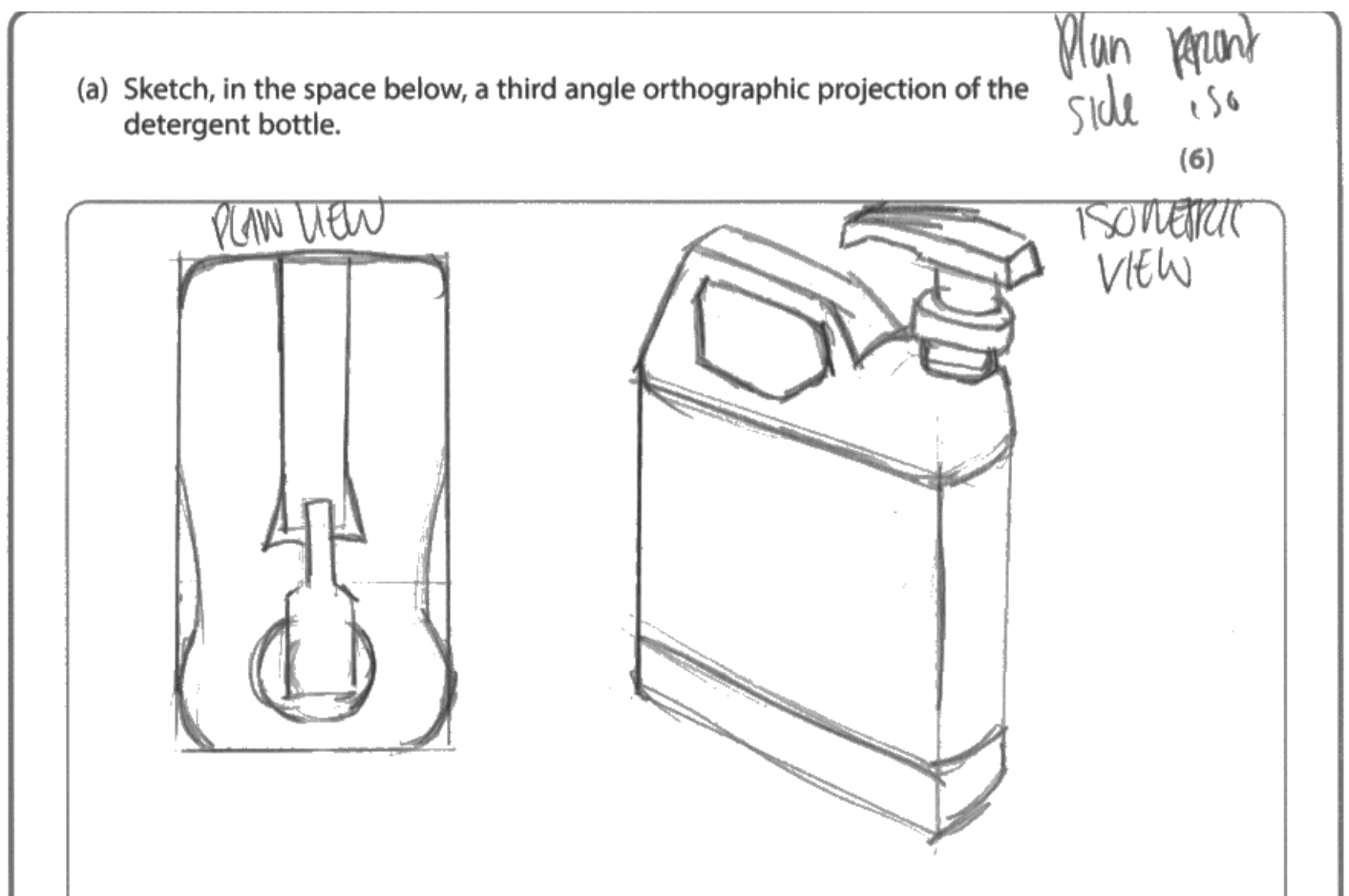
The purpose of this question is to examine the candidates' ability to interpret a given drawing and then to present the information in a different format. In this case, the question focusses on producing a third angle orthographic drawing from a given isometric drawing of a detergent bottle.

Candidates were expected to interpret the information and then produce an accurate drawing that included a front, end and plan elevation.

Generally this was answered well by most candidates, although only a small proportion achieved full marks. Where candidates did not achieve full marks, this was as a result of not showing accurate views of the bottle, with features being omitted or drawn inaccurately. In a large number of cases the end and plan elevations were drawn in the wrong location, or with inaccurate proportions.

It was disappointing to see some candidates unable to produce an orthographic drawing with a number sketching perspective drawings or simply copying the given illustration.

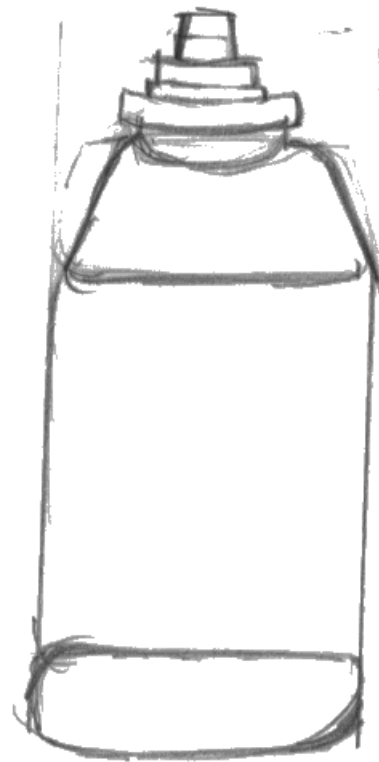
It was noted that overall the standard of drawing continues to improve, as has been the case in recent years.



SIDE VIEW



FRONT VIEW



ResultsPlus Examiner Comments

This candidate has achieved four marks for their partial orthographic drawing.

There are some errors in the drawing, including the incorrect orientation of the plan view and the inclusion of a 'vee' shape between the handle and the plunger on the top of the bottle.

However, the proportions of each view are good and all other details have been drawn with accuracy.

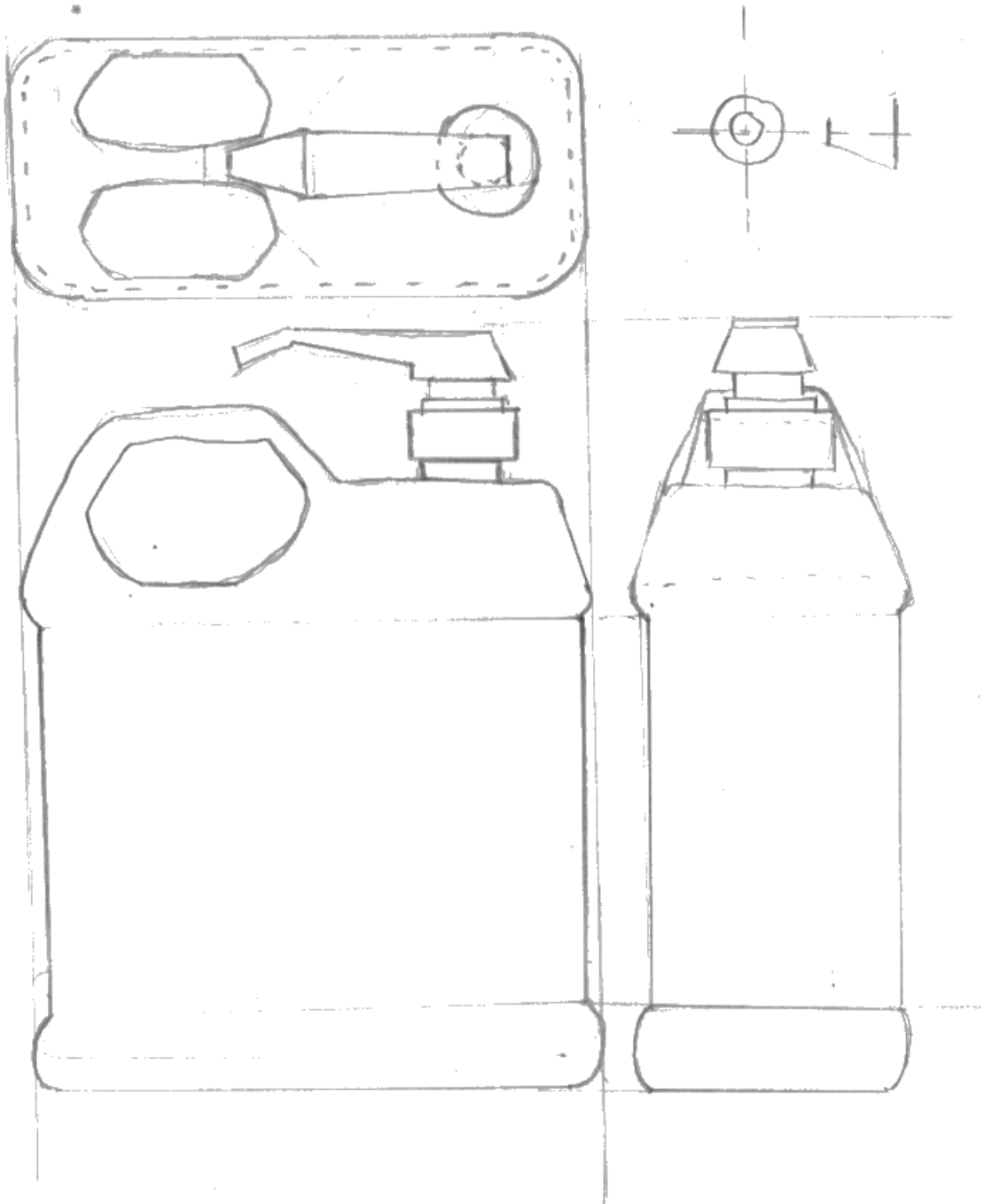


ResultsPlus Examiner Tip

Candidates should be able to transfer the skills they develop for their controlled assessment in order to answer drawing questions.

- (a) Sketch, in the space below, a third angle orthographic projection of the detergent bottle.

(6)





ResultsPlus

Examiner Comments

This candidate has achieved full marks.

The three views are drawn in the correct relative locations, with the proportion of each view being broadly the same.

The features of the bottle are drawn with accuracy, including the shape of the handle and the plunger.



ResultsPlus

Examiner Tip

For sketching questions it is important to make sure that the response is drawn to an appropriate size, as this allows the examiner to identify the features which are being looked for. In this example, the candidate has made good use of the space available for the answer.

Question 6 (b)

This question focussed on why HDPE is used for manufacturing blow moulded detergent bottles.

As an Explain question, candidates were required to give two valid lead points then give a valid justification for each reason. This question was answered reasonably well by a large proportion of candidates, although there were some candidates who included references to being able to blow mould the material despite this being a barred response as it was included in the question.

The better answers made reference to HDPE being chemically resistant, watertight or being durable and capable of not being damaged by impacts.

(b) The detergent bottle is manufactured using high density polyethylene (HDPE), which is suitable for blow moulding.

Explain **two** further reasons why high density polyethylene (HDPE) is used for the manufacture of the detergent bottle.

(4)

- 1 HDPE is lightweight. This means that extra weight won't be added to the liquid inside the bottle. This means the bottle will be easy to pick up and hold for use.
- 2 HDPE is durable and strong. This means that the bottle will hold it's inner contents very well and won't be easily damaged, ~~which is why it is used for~~ so leakage won't take place. Furthermore, detergent can be quite abrasive so it's very necessary for the bottle to hold this well for safety.



ResultsPlus Examiner Comments

This candidate has identified two reasons why HDPE is used for the detergent bottle. Each reason is justified, for example being 'lightweight' is linked to being 'easy to pick up and use' whilst 'durable and strong' is linked to 'holding the contents' and 'won't be easily damaged'.



ResultsPlus Examiner Tip

When a question asks for reasons why a material is suitable for an application, it is important to ensure that the identified qualities of the materials have a direct relationship to the application.

Question 6 (c)

This question focusses on quality control with regard to the injection moulding process, when candidates were asked to Outline the quality control activities that need to be carried out on both the materials and the equipment prior to the use of the equipment.

There were some good descriptions of checks that need to be completed, with many candidates concentrating on checks on materials that included checking the colour, quality and type of polymer.

The checks relating to the equipment tended to be somewhat more varied, with lower level responses simply stating 'check the equipment works' or similar. Where candidates achieved higher marks, individual aspects of the equipment were considered. For example, checking that heaters were able to melt the polymer, that the mould and/or Archimedes Screw are free from contaminants and that the cooling system functions correctly.

(c) The screw cap for the detergent bottle is produced by injection moulding.

Outline the checks that need to be carried out on the materials and equipment in preparation for the injection moulding of the screw cap.

(5)

- The pellets must be of the correct colour
- The mould must ~~be clean~~ ~~be free of contaminants~~ be free of breaches in the mould
- The pellets must be heated to the correct temperature.
- The mould must be clean
- The archimedian screw must turn freely.
- There must be the correct pressure of plastic going into the mould
- The mould must be full once ~~injection~~ ^{injection} has finished



ResultsPlus

Examiner Comments

Whilst a bullet pointed format is not suitable for a discuss or evaluate question, it can be used to good effect for an 'outline' question as is shown here. The candidate has provided a wide range of checks that need to be carried out on the material and equipment in order to achieve 5 marks.

The candidate has outlined some of the more obvious points, such as the colour of the polymer. They have also made reference to the correct pressure for injection which is a higher level consideration.



ResultsPlus

Examiner Tip

When a question asks for two factors to be considered, full marks can be achieved only if both factors are included.

Question 7

This question tests the candidates' wider knowledge of the uses of ICT in quality control, in particular computer aided inspection as a form of quality control.

This is an Evaluate question and therefore for full marks to be awarded, a balanced evaluation must be put forward. If only one side is presented, candidates could achieve a maximum of 5 marks.

Although some candidates performed very well, these were the exceptions rather than the norm. In far too many cases candidates described generic quality control checks rather than those related to computer aided inspection.

Many candidates could identify methods of carrying out QC using CAI, such as the use of sensors and probes. However responses were often limited to this, with some limited expansion relating to 100% sampling or increased levels of precision in measurements.

***7 Evaluate the use of computer-aided inspection as a part of quality control (QC).**

Computer aided inspection is helped when carrying out quality control checks for example as it can test if the ~~product~~ final product ~~is~~ is the right ~~size~~ dimensions as it can scan the product using lasers to get a very accurate measurement which is less ^{time} ~~time~~ consuming and more accurate than the naked eye ~~testing~~ looking for deformities. This also saves money because even though the setup costs may be high, the cost of labour over a long period of time will become more expensive. Human error is also taken out of the equation here, leaving no room for mistakes, however if the ~~machinery is off~~ CAI machinery is off calibration for example, every product would be read wrong, ~~as it~~ as it requires a human to set it up, so ~~the~~ human error is not completely taken away.



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Examiner Comments

This candidate has achieved 6 marks for an evaluation that includes both advantages and disadvantages of using CAI as a part of quality control.

For advantages the candidate has made reference to:

- the use of lasers for inputs
- reducing human error
- increased production rates due to the lack of human inspection

With regard to disadvantages, the candidate has referenced:

- high set up costs
- long payback times
- incorrect calibration



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Examiner Tip

When a question asks for an evaluation, it is important that both points for and against are considered. Candidates will not achieve full marks, unless both sides of the evaluation are considered.

Paper summary

Based on their performance on this paper, candidates are offered the following advice:

- Read questions thoroughly so that you understand the focus of each specific question.
- Produce neat and well presented sketches and drawings which make good use of the space available.
- Annotate diagrams and sketches with detailed information which adds further depth to the response, for example to show how a process is carried out.
- Use the drafting skills which have been developed for internally assessed work to answer questions which involve sketching or drawing.
- Remember that an 'explain' question requires a valid point and a relevant and related justification or expansion for each valid point made.
- Remember that an 'evaluate' question must include references to both cases, be balanced and offer a conclusion.
- Give answers which include only the information which is asked for and not everything you know about the subject.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

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