

Examiners' Report

June 2012

GCSE Design & Technology Product Design
6GR02 01

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Introduction

It is clear that most candidates use their exam time well, and this year there is no real evidence that responses were rushed due to insufficient time. Centres and candidates should be congratulated for their thorough preparation for the exam. Centres should note that the amount of space provided in the question paper is more than we would expect any answer to take. Most candidates use this space wisely; however, there are still some candidates that use additional pages. Centres should assist candidates during their exam preparation to write concisely.

Examiners want to see that candidates know the information and can organise it effectively to answer the question set, rather than write as much as possible in an attempt to ensure their response will gain some marks somewhere in the script.

One aspect that is still disappointing is that there are still some candidates who believe that it is acceptable to respond to all questions with generic, generalised answers; such as "strong, fast, quick, cheap etc..." These are low knowledge level responses and show only a basic understanding; therefore gain low marks.

Those candidates who read the question and respond with specifics, gain more marks than those who write "around" the subject with generic responses.

Once again it is pleasing to see that the standard of responses this year were, on the whole, very good. It is clear that the vast majority of candidates are well prepared for the exam and have a sound knowledge of the material.

Question 1 (a)

This question is aimed at testing the candidate's understanding of the application of materials; specifically folding boxboard, and the ability of folding boxboard to create a package and contain the contents. It is NOT seeking generalisations about folding boxboard or any other card based material. Therefore, cost is not an issue here.

This is a knowledge based "give" question, so a single word or single phrase would be acceptable.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

Answer ALL the questions. Write your answers in the spaces provided.

- 1** Figure 1 shows a drinks carton made from a packaging laminate of folding boxboard, aluminium foil and polyethylene.



Figure 1

- (a) Give **one** reason why folding boxboard is used in the packaging laminate.

(1)

it has good folding properties- it wont crease or split.



ResultsPlus

Examiner Comments

A good response, scoring top marks. This candidate gave specific information about the properties of folding boxboard, showing good knowledge.



ResultsPlus

Examiner Tip

Avoid generalisations in responses: there are better answers than "strong", "cheap" and "light".....

Answer ALL the questions. Write your answers in the spaces provided.

- 1 Figure 1 shows a drinks carton made from a packaging laminate of folding boxboard, aluminium foil and polyethylene.

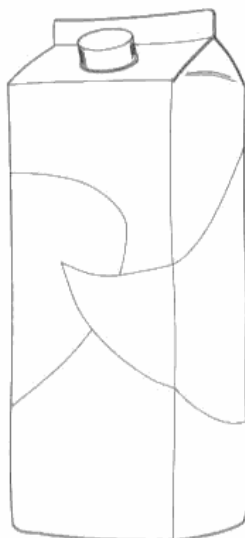


Figure 1

- (a) Give **one** reason why folding boxboard is used in the packaging laminate.

(1)

it can be printed on.



ResultsPlus

Examiner Comments

This candidate gave a poor response; "*it can be printed on*" is too general, and therefore gained no marks. Whilst it is true that folding boxboard can be printed on, it is a better surface for printing than recycled board or corrugated board for example.

Question 1 (b)

This question focuses on using aluminium foil as a barrier in packaging, to increase shelf life and act as an impervious barrier.

This is an "explain" question, and therefore requires a valid point and a relevant (and related) explanation. It is not sufficient to write single word answers, or two unrelated points or bullet points responses.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given. In the case of "explain" questions candidates do not have to write responses exactly as they are written in the mark scheme. It is possible to gain marks by writing a valid point and linking it to an explanation listed from another bullet point.

(b) Explain why a thin layer of aluminium is used in the packaging laminate.

(2)

Aluminium is water proof and will stop the package content from dissolving the board. The aluminium is more hygienic. Aluminium will also give a longer shelf life.



ResultsPlus Examiner Comments

In this case the candidate has given a clear valid point "waterproof" and linked it to "will stop the package content from dissolving the board".



ResultsPlus Examiner Tip

With "explain" questions, always look to give a valid point and then explain that valid point. Avoid simple responses.

(b) Explain why a thin layer of aluminium is used in the packaging laminate.

(2)

The thin layer of aluminium is used because to protect the drink inside the carton



ResultsPlus Examiner Comments

In this case the candidate has given a clear valid point "protects the drink inside the carton", BUT does not explain how the aluminium protects the drink. Therefore only 1 mark (out of 2) is awarded.



ResultsPlus Examiner Tip

With "explain" questions, always look to give a valid point, AND explain that valid point. Avoid simple responses.

Question 1 (c)

This is a knowledge based "give" question. It is therefore similar to a "state" question; so a single word or single phrase would be acceptable. It is testing the candidate's understanding of properties of materials; in this case polyethylene coating on packaging.

The question focus here is on understanding the different types of properties; aesthetic and functional. It is expected that candidates will be able to tell the difference between these types of properties. Generic responses were not awarded marks. Equally, it is expected that candidates know the difference between aesthetic and functional categories of properties, and write the response in the correct 'box'.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

(c) Give **one** aesthetic and **one** functional reason why the packaging laminate has a polyethylene surface coating.

(2)

Aesthetic The polyethylene surface coating will give the carton a glossy and visually attractive surface finish.

Functional The polyethylene surface will protect the graphics printed on the carton.



ResultsPlus Examiner Comments

This candidate gave a good response and gained 2 marks (out of 2). The responses correctly identifies the aesthetic and functional properties and lists them in the correct places.



ResultsPlus Examiner Tip

In preparation for the exam; use the "aesthetic" and "functional" sub-headings to create a table for descriptions of all materials.

(c) Give **one** aesthetic and **one** functional reason why the packaging laminate has a polyethylene surface coating.

(2)

Aesthetic *is cheap and durable material*

Functional *helps ~~contact~~ the promote the brand with the logo, and promote company*



ResultsPlus

Examiner Comments

In this response the candidate has focused on generalisations rather than specific properties. For example, "is cheap and durable". Cost is not a property and durable isn't an aesthetic property. In this case the candidate received 0 marks (out of 2).



ResultsPlus

Examiner Tip

In preparation for the exam use the "aesthetic" and "functional" sub-headings to create a table for descriptions of all materials.

Question 1 (d)

This question asks for advantages of using computer aided design (CAD) to design packaging. Candidates should focus on this application of using CAD to design rather than general information about CAD. Equally, this is an "explain" question and therefore requires a valid point and a relevant (and related) explanation. It is not sufficient to write single word answers, or two unrelated points or bullet points responses.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given. In the case of "explain" questions candidates do not have to write the responses exactly as they are written in the mark scheme. It is possible to gain marks by writing a valid point and linking it to an explanation listed from another bullet point.

(d) Explain **one** advantage of using computer aided design (CAD) when designing packaging.

Zoom in and out for added accurate detail. (2)

An advantage of using CAD includes its ability to quickly create a design with its vast set of graphics tool, also ~~see~~ the designer can manipulate the design simplistically. Multiply the file and send it for intercom internet.



ResultsPlus

Examiner Comments

In this response the candidate received 2 marks (out of 2). A clear advantage of CAD is given and in this case it is explained; ie "using vast set of tools..... the designer can manipulate the design".



ResultsPlus

Examiner Tip

In these questions, candidates should try to avoid the 'obvious' responses. Candidates often only receive half marks in "explain" questions by taking the easy response route. For example, saying "CAD is accurate....." or "CAD is fast....." can both be difficult to explain with sufficient detail.

(d) Explain **one** advantage of using computer aided design (CAD) when designing packaging.

(2)

It is an inexpensive process and so it therefore is more economical for the company, which a 2D form model would not be in comparison.



ResultsPlus

Examiner Comments

In this response the candidate received 0 marks (out of 2). The candidate used a 'low level' response. In this case trying to explain that CAD is cheap.... its not. There are better answers to questions than cost!



ResultsPlus

Examiner Tip

In these questions, candidates should try to avoid the 'obvious' responses. Candidates often only receive half marks in "explain" questions by taking the easy response route. For example, saying "CAD is accurate....." or "CAD is fast....." can both be difficult to explain with sufficient detail.

Question 1 (e)

Candidates must read this question carefully in order to understand its meaning. This is especially true when questions focus on applying knowledge, rather than general recall. In this case, the question focuses on the British Standards Institute (BSI) provision of packaging regulations. Candidates should be responding about how these regulations affect package design, and not by thinking they have been invited to "write all you know about BSI".

This is a "state ways" question, so a single sentence would be acceptable, single words are not acceptable.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

(e) British and European quality standards organisations produce voluntary and *design* statutory regulations for packaging designers.

State **three** ways these regulations effect the design of packaging.

(3)

- 1 The packaging must do its job, for example a food packaging must keep its food fresh and ~~cont-~~ained.
- 2 The packaging must be safe, no toxic ~~poison~~ such as lead, as in the design packaging.
- 3 The packaging must be appropriate, no offensive information, or generally anything anyone could take offence to.



ResultsPlus

Examiner Comments

In this response the candidate has answered in clear sentences with detailed information. They have detailed clear ways in which regulations are used in the design of packaging. This is a well structured response. The candidate gained full marks.



ResultsPlus

Examiner Tip

During exam preparation ensure candidates use past papers to really understand exam paper language and the meaning 'behind' exam questions.

(e) British and European quality standards organisations produce voluntary and statutory regulations for packaging designers.

State **three** ways these regulations effect the design of packaging.

(3)

- 1 ~~The design has to be identifiable but the relevant information~~
~~is to be dispatched around the entire container. Colours.~~
- 2 Pictures
- 3 Wording.



ResultsPlus Examiner Comments

In this response the candidate has answered with single word answers. There is some relevance behind the responses. However, they are not explained enough to gain marks. The candidate gained 0 marks.



ResultsPlus Examiner Tip

During exam preparation ensure candidates use past papers to really understand exam paper language and the meaning 'behind' exam questions.

Question 1 (f)

Often, questions at AS level involve "completing the table". These often require short phrase responses, and in this case the addition of accurate drawings. This question is focused on specific aspects of quality control in printing, and requires candidates to "state" what happens if these aspects of quality control are not applied.

This is a knowledge based "state" question, so a single word or single phrase would be acceptable.



It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

In questions that require a drawn response, the mark scheme often show the correct answer and alternatives that are acceptable.

(f) Quality control checks are made during the printing of the carton package.

Complete the table below by:

- stating **one** effect of the problem
- drawing the quality control printer's mark associated with that problem.

Problem	State one effect of the problem	Draw the quality control printer's mark associated with the problem
Bad register	The printing The print is not inline with page and is printed outside the edges of the paper. (1)	
Colour variation	The colours taken Inconsistent colour when printing, batch or mass printing, poor quality. (1)	



ResultsPlus

Examiner Comments

This candidate gives good quality responses. The written sentences show clear understanding and application. The drawings are clear. In this case they do not need to be annotated. This answer gained full marks.



ResultsPlus



Examiner Tip

When drawing responses; draw large clear diagrams, use an HB pencil only and do not shade the drawing.

(f) Quality control checks are made during the printing of the carton package.

Complete the table below by:

- stating one effect of the problem
- drawing the quality control printer's mark associated with that problem.

Problem	State one effect of the problem	Draw the quality control printer's mark associated with the problem
Bad register	This could be that the packaging doesn't print/register properly, causing disruptions. (1)	 (1)
Colour variation	This could be that the colour scheme is effected by lack of colour ink in the printer making it faulty. (1)	 (1)



ResultsPlus

Examiner Comments

Quality Control is an important aspect of the specification. Thorough preparation for exams in this area is essential. In this case the candidate writes about registration and colour schemes, but the question is asking for specific detail not generalisations. This response gained 0 marks.



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Examiner Tip

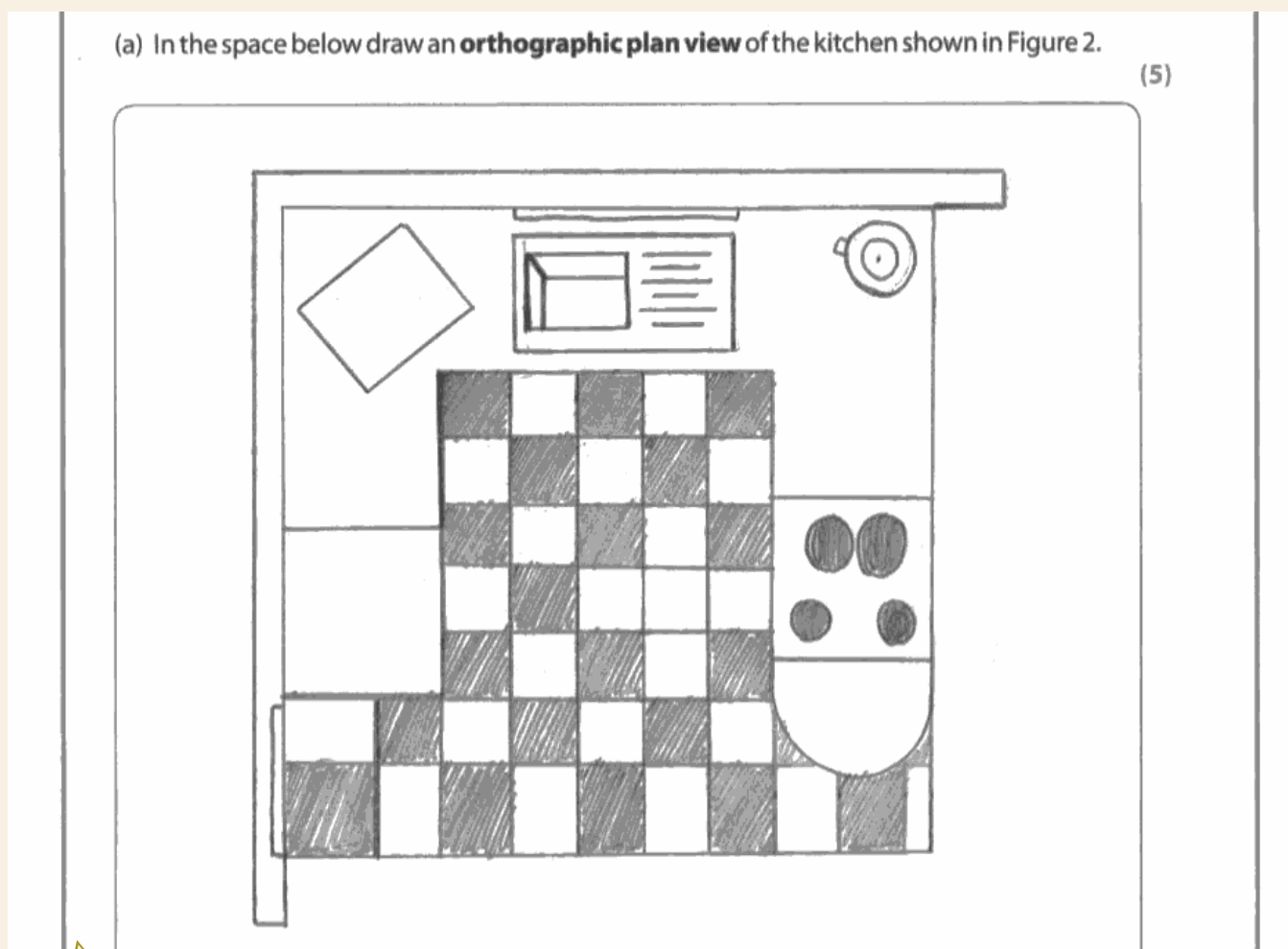
Note. This candidate has annotated the question, highlighting the important words and phrases. This is good practice.

Question 2 (a)

This question allows candidates to show their drawing skills whilst in an exam situation. The question asks the candidates to "draw", therefore candidates should endeavour to draw as neatly as possible. Candidates need to practise drawing for AS exams.

This question focuses on translating a planometric drawing into an orthographic. In this case, it clearly specifies in the question a "plan view". Therefore, no other view or drawing is needed. Candidates that drew other views, or used other pictorial drawings were not awarded marks.

The "ideal" response required candidates to draw a plan view. This needed to show walls (drawn as double lines), the door and window, the worktops and appliances and also the floor tiles. It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given and the alternatives that are acceptable.



ResultsPlus Examiner Comments

This orthographic plan view is very well drawn. All major features are in place, and it is an accurate translation of the planometric drawing. This received full marks.

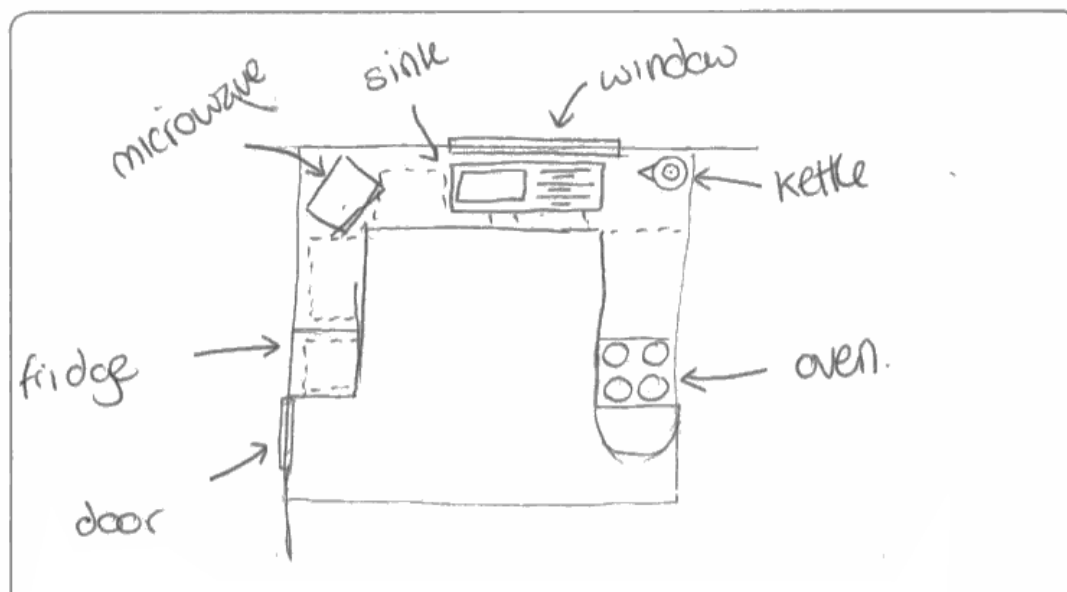


ResultsPlus Examiner Tip

Candidates should ensure they practice drawing in exam conditions. Their drawings should be clear, well lined in, and only drawn using HB pencil.

(a) In the space below draw an **orthographic plan view** of the kitchen shown in Figure 2.

(5)



ResultsPlus

Examiner Comments

In this case the candidate has correctly drawn a plan view. Whilst they have annotated the drawing, the question doesn't ask for this. Nevertheless, it only received 3 marks (out of 5) as the walls are not shown as double lines and there are no floor tiles drawn.



ResultsPlus

Examiner Tip

Candidates should ensure they practise drawing in exam conditions. Their drawings should be clear, well lined in, and only drawn using HB pencil.

Question 2 (b)

The specification lists numerous materials and processes, some of which may not be commonly used in schools. This question requires the candidates to have knowledge of one of these materials, ie layout paper.

This is an "explain" question and therefore requires a valid point and a relevant (and related) explanation. It is not sufficient to write single word answers, or two unrelated points or bullet points responses.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

(b) The designer's original plans were drawn on layout paper.

Explain **one** property of layout paper that makes it suitable for this use.

(2)

It is translucent which makes it ideal to use for tracing as it very thin.



ResultsPlus Examiner Comments

In this case the candidate has given a clear valid point "translucent" and linked it to "ideal for tracing". This means the candidate received full marks.



ResultsPlus Examiner Tip

With "explain" questions, always look to give a valid point and then explain that valid point. Avoid simple responses.

(b) The designer's original plans were drawn on layout paper.

Explain **one** property of layout paper that makes it suitable for this use.

(2)

The layout paper is easily recycleable, if any mistakes made in planing (in this case).



ResultsPlus Examiner Comments

In this case the candidate does not explain any properties of layout paper. Hence no marks.



ResultsPlus Examiner Tip

Candidates must ensure they thoroughly read the question and give the correct responses. In this case properties, not just general points.

Question 2 (c)

This question is aimed at using PINE in the manufacture of modelling prototype kitchen units. It is NOT a general "write all you know about pine" question. In addition, statements about "softwood" are not relevant, as this doesn't explain why pine is used here.

This is an "explain" question so candidates should provide a valid point and then give a valid reason to support that point.

(c) The designer modelled the prototype kitchen units using pine.

Explain why pine is a suitable material for modelling the prototype units.

(2)

Its easy to work with unlike many other woods
it can be cut easily and shaped relatively well.
it also has a very attractive surface finish.



ResultsPlus

Examiner Comments

The candidate gives a good response; stating both the ease of working with wood and its ability to be finished well. Full marks are gained.



ResultsPlus

Examiner Tip

Throughout exam preparation ensure candidates are not only learning material knowledge but also its applications and reasons for use.

(c) The designer modelled the prototype kitchen units using pine.

Explain why pine is a suitable material for modelling the prototype units.

(2)

As it is a soft wood, it is easy to manipulate,
and cut.



ResultsPlus

Examiner Comments

In this response the candidate received 1 mark (out of 2). Whilst the candidate correctly identifies Pine as a softwood, this is not the reason why Pine is used in this application. They correctly identify Pine as easy to manipulate and cut.



ResultsPlus

Examiner Tip

During exam preparation candidates should list properties as well as being able to explain why materials are used in certain situations.

Question 2 (d)

This is a knowledge based "state" question, so a single word or single phrase would be acceptable.

This question focuses on procedures to ensure employee safety in the workplace, not just general health and safety, or health and safety in the workshops.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

(d) Employers must safeguard the risk of injury to employees in the work place.

State **two** procedures used in the work place by employers to ensure employees' safety.

(2)

- 1 Wearing eye protectors when needed, to stop debris going into employees eyes.
- 2 Wearing face masks when needed, to stop the employee's breathing in potentially harmful gases, particles, materials.



ResultsPlus Examiner Comments

In this response the candidate does identify that employees need to wear personal protective equipment, but they do not mention whether this is provided for them by employer. Therefore, this response gained 0 marks.



ResultsPlus Examiner Tip

When questions ask for multiple responses, candidates should not use the same type of answer, in this case the candidate uses two personal protective equipment responses.

(d) Employers must safeguard the risk of injury to employees in the work place.

State **two** procedures used in the work place by employers to ensure employees' safety.

(2)

- 1 Employees are given the appropriate training.
- 2 Employees are given the appropriate safety equipment such as ^{certain} clothes or safety goggles.



ResultsPlus Examiner Comments

A good response. This candidate gives two clear answers, both are different showing a broad knowledge. Also, it is clear that the employer is providing the training and personal protective equipment. Full marks.

Question 2 (e)

"Outline" questions require a response that is based around full detailed sentences. In this case three separate points are needed for full marks.

This question focuses on concepts of quality assurance (QA). Candidates should not be explaining quality control (QC) only. The question is about QA i.e., the monitoring of the whole process of which QC is a part.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

It is useful to refer to the published mark scheme when looking at the examples, to see clearly where marks are given.

(e) Quality assurance systems are used throughout the design and manufacture of the kitchen units.

Outline the key concepts of quality assurance (QA).

(3)

QA is the thorough planning of a product from start (design) to finish (customer use). QA regulates the raw materials which will be used in the product, to ensure that they are of a high quality. QA will thoroughly check the designing and development stage of the product in question. QA involves the individual QC checks. QA is a plan, guideline and procedure to which individual events construct and ensure the product has met and surpassed customer satisfaction.



ResultsPlus
Examiner Comments

This candidate has a clear grasp of quality assurance; the idea that it involves all aspects "from start to finish". Also, that QA involves quality control and affects customer satisfaction. This response gained full marks.



ResultsPlus
Examiner Tip

Candidates are advised to read the question fully and really try to understand what is being asked, rather than "jump" in and write everything they know about a topic.

(e) Quality assurance systems are used throughout the design and manufacture of the kitchen units.

Outline the key concepts of quality assurance (QA).

(3)

Quality assurance makes sure that the product that has been made meets the BS2 and CE standards and that they are at high standards.



ResultsPlus

Examiner Comments

This response acknowledges that quality assurance leads to higher standards, but this is not the key concept of QA. This gained no marks.

Question 3 (a) (i)

This type of question can be answered in many ways, the response must include BOTH drawings and annotation. Without either drawing or annotations, full marks cannot be gained. Detailed sketches are required in order for candidates to gain marks.

It is essential that candidates have knowledge of industrial materials.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

3 Figure 3 shows typical packaging for electrical products.

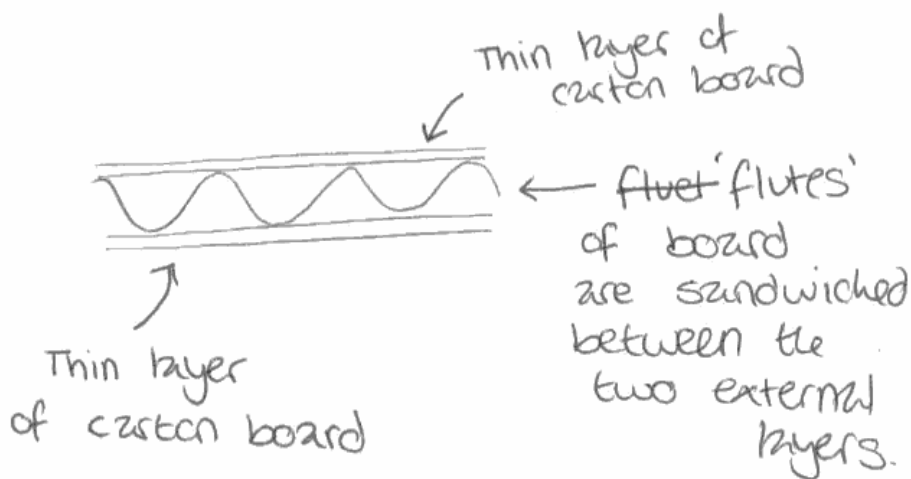


Figure 3

(a) The package boxes are made of corrugated board.

(i) In the box below draw an annotated cross section of corrugated board.

(2)



ResultsPlus
Examiner Comments

This question must show a cross section of corrugated board. It must show the flutes and be labelled accordingly. This response is clear and detailed.



ResultsPlus
Examiner Tip

Candidates should prepare for exams by practising drawing processes, as well as responding to questions in written form.

3 Figure 3 shows typical packaging for electrical products.

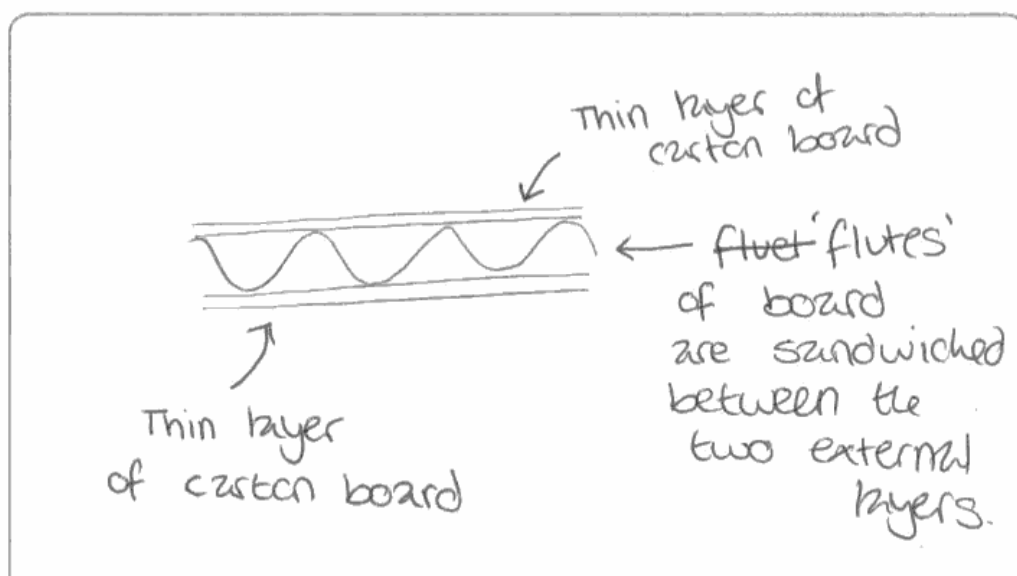


Figure 3

(a) The package boxes are made of corrugated board.

(i) In the box below draw an annotated cross section of corrugated board.

(2)



ResultsPlus
Examiner Comments

This question must show a cross section of corrugated board. It must show the flutes and be labelled accordingly. This response is clear and detailed.

Question 3 (a) (ii)

This question focuses on using corrugated card in packaging i.e., protection of product etc. The question is about the application of corrugated card, and WHY it is used here, NOT generalisations about corrugated card.

As an "explain" question, the response should be full sentences i.e., a point with a valid linked explanation of that point.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(ii) Explain why corrugated board is used to package electrical products.

(2)

As it can be recycled, its cheap and light weight, also because it has a good strength ratio for its weight, and ~~because~~ because it doesnt conduct electricity.



ResultsPlus Examiner Comments

A sound response with the candidate giving some valid reasons why corrugated card is used for packaging. However, this response only gained 1 mark as the valid points were not explained, just listed. For example, if the candidate had expanded the lightweight concept this could lead to 2 marks.



ResultsPlus Examiner Tip

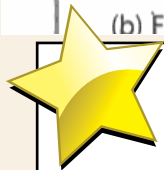
During exam preparation candidates must ensure they are aware of the meaning of the key words: state, explain, describe, evaluate etc

(ii) Explain why corrugated board is used to package electrical products.

(2)

Corrugated card has very good impact resistance so it will protect the electrical products when shelved and at any transportation point. It is also cheap ~~and~~ therefore when used frequently does not when in bulk which makes it perfect for ~~batch~~ ^{mass} production products.

(b) Figure 4 shows a commercially available packaging pot.



ResultsPlus Examiner Comments

A good response gaining full marks. This candidate clearly develops the concept of corrugated card having impact resistance, and so protecting the product.



ResultsPlus Examiner Tip

Candidates should practice short answer responses during their exam preparation. Ensure detailed sentences are used to structure responses.

Question 3 (b) (i)

This is a knowledge based question asking the candidate to "complete the table". The question focus is nets and names of net features. Single word or short phrase answers are acceptable for this type of question.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

	A	Tab	



ResultsPlus

Examiner Comments

Descriptions in these questions are not needed. In this case the candidate has given a single word response. However, this gains no marks as the true name for this part is "glue tab".



ResultsPlus

Examiner Tip

As well as preparing for longer questions, short responses for processes, techniques and components are often used at AS level.

	A	glue tabs	



ResultsPlus

Examiner Comments

This response gains full marks, the candidate clearly identifies "glue tab".



ResultsPlus

Examiner Tip

As well as preparing for longer questions, short responses for processes, techniques and components are often used at AS level.

Question 3 (b) (ii)

This is a knowledge based question asking the candidate to "complete the table". The question focus is nets and names of net features. Single word or short phrase answers are acceptable for this type of question.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

	B	Closure tab.



ResultsPlus Examiner Comments

Whilst this candidate has clearly applied a logical approach to answering this question and realised this helps the closure of the lid, this response gain no marks as the correct name is "upper tuck".



ResultsPlus Examiner Tip

As well as preparing for longer questions, short responses for processes, techniques and components are often used at AS level.

Question 3 (b) (iii)

This is a knowledge based question asking the candidate to "complete the table". The question focus is nets and names of net features. Single word or short phrase answers are acceptable for this type of question.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

	c	Dust flap.



ResultsPlus Examiner Comments

This candidate gained full marks with the correct identification of the net feature.



ResultsPlus Examiner Tip

As well as preparing for longer questions, short responses for processes, techniques and components are often used at AS level.

Question 3 (c)

This is an "explain" question and therefore requires a valid point and a relevant (and related) explanation. It is not sufficient to write single word answers, or a collection of unrelated points.

The question focuses on the use of flexography when printing on corrugated card i.e., why flexography is used. It is asking specifically about flexography, and not another printing method. Cost, and the fact it is mass production printing method are irrelevant, as is it's a direct print method. The notion here is that flexography uses a flexible roller, quick drying ink, keeps the card flat and so does not crush/warp the card etc. The question is about application of flexography NOT generalisations about the printing method.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(c) Information is printed on the packaging using the flexography printing process.

Explain **two** reasons why flexography is an appropriate printing process for use on corrugated board.

(4)

1. flexography is cheap to use when used on a mass scale of products. It also gives a nice aesthetically pleasing finish to the product which is a pro due to the ~~pen~~ low cost.
2. flexography is environmentally friendly compared to other printing processes.



ResultsPlus
Examiner Comments

This candidate gains 0 marks. Whilst there are some correct points, this candidate has not written valid points about the reason why flexography is used on corrugated card.



ResultsPlus
Examiner Tip

Whilst it is essential that candidates learn a wide range of information about techniques and processes, it is also vital that they read the question and write only about what is asked for in the question.

(c) Information is printed on the packaging using the flexography printing process.

Explain **two** reasons why flexography is an appropriate printing process for use on corrugated board.

(4)

- 1 It is a fast drying primary process so it ~~add~~ it will not soak into the card.
- 2 It is can be printed on a range of surfaces so card works well and the quality finish is good.



ResultsPlus

Examiner Comments

This candidate gains two marks for the first reason. There is a clear point of fast drying ink, and the notion that it will not soak in. The second explanation could be true of many printing techniques.



ResultsPlus

Examiner Tip

Ensure candidates can write specifics about each technique and process, not just generalisations that can be applied to any process.

Question 3 (d)

This is a "discuss" question that requires a response based around full and detailed sentences. In this case, three separate points are needed for full marks.

The question focuses on using paper pulp trays for packaging, instead of trays made from other materials. The other material used most commonly in packaging is polymer. Using Polymer trays involves environmentally sensitive issues of using finite resources, adding to greenhouse gases, using energy for vacuum forming etc.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(d) The product tray is manufactured using recycled paper pulp.

Discuss the environmental impact of using recycled paper pulp packaging.

(3)

The This way using the recycled paper pulp helps the environment out and saves energy, because this is recycled it will be cheaper for company's and ~~to~~ be manufactured by using much less energy than normal paper pulp. By doing this it effects the environment by saving energy.



ResultsPlus Examiner Comments

This response is too vague. Whilst the candidate mentions that there are environmental issues and energy saving, they don't explain what these are. This response gained 0 marks.



ResultsPlus Examiner Tip

Candidates must ensure they write about specifics. For example, if you are stating there are energy savings, explain what these are.

(d) The product tray is manufactured using recycled paper pulp.

Discuss the environmental impact of using recycled paper pulp packaging.

(3)

Using recycled paper pulp decreased the use of other materials for example polymers (PE) which are running out, ~~cost~~ are not very cost effective to extract and manufacture from oil. Paper pulp can be recycled many times and as this is a low quality component, the pulp doesn't have to be high quality. Paper pulp is always going to be available as more trees will be planted (Total for Question 3 = 14 marks)

Which take ~~back~~ in the CO₂ produced through the manufacture. Paper pulp does not have to go through all the fourdrinier process here.



ResultsPlus

Examiner Comments

This is a good answer; gaining full marks. The candidate refers to multiple valid points.



ResultsPlus

Examiner Tip

Candidates must ensure they write about specifics.

Question 4 (a)

This is a "discuss" question that requires three valid points only. This should be a straightforward question, and candidates should answer this question with specific advantages of the laser cutter, not generalisations.

Specific points could be: ability to repeat, no human error, tools do not wear out as no contact.

Generalisations are "quicker, cheaper, easier".

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

4 Figure 5 shows an acrylic shop sign for a high street retail chain.



Figure 5

(a) The lettering is cut using a CNC laser cutter.

Describe the **advantages** of using laser cutters to cut out the lettering rather than hand cutting and traditional finishing processes.

(3)

It is quicker to cut it using a laser cutter as doing it by hand is labour intensive & time consuming. Also it will cut exactly where needed, being more accurate as there is no risk of human error. Plus it could easily & quickly cut more for other signs to go on different branches in different locations.



ResultsPlus

Examiner Comments

This candidate receives full marks. It is a clear and well defined response showing understanding and application of knowledge to the question.



ResultsPlus

Examiner Tip

Read the question and apply knowledge rather than "rolling out" pre-determined general responses.

- 4 Figure 5 shows an acrylic shop sign for a high street retail chain.



Figure 5

- (a) The lettering is cut using a CNC laser cutter.

Describe the **advantages** of using laser cutters to cut out the lettering rather than hand cutting and traditional finishing processes.

(3)

Because using a laser cutter is a lot more accurate, it is much quicker (saves time) and it cuts through almost any material.



ResultsPlus

Examiner Comments

The candidate gained 2 marks for this answer. Whilst they have used general terms of "accurate" and "quicker", in this context these are true, and so gain marks.

However, candidates should not assume that the mark scheme will always award marks for these phrases.



ResultsPlus

Examiner Tip

Do not rely on general terms.
Learn specific points.

Question 4 (b)

As an “outline” question, candidates need to write three valid points only. The question focuses on the use of acrylic as a material for signage. Responses should focus on this use, not just generalisations about acrylic. Acrylic isn’t really lightweight, nor cheap (there are lighter materials and cheaper ones!).

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(b) Outline why acrylic is a suitable material for exterior shop signs.

(3)

Acrylic is a durable material as it is thermoplastic and is available in large sheets making it easier to cut out shapes/letters. It ~~is~~ has a good strength to weight ratio making it ~~easy~~ long lasting. It is also waterproof making it resistant to environmental changes. Also with the addition of colour pigments it can be a range of aesthetically appealing colours.



ResultsPlus Examiner Comments

A strong, clear response gaining full marks.



ResultsPlus Examiner Tip

Candidates should be careful not to classify everything as “strong”. Similarly, they shouldn’t just ‘roll out’ general properties, but really apply the properties to the material and situation described in the question.

(b) Outline why acrylic is a suitable material for exterior shop signs.

(3)

- lightweight therefore it is easy to ~~use~~ hang
- chemical resistant
- can be illuminated



ResultsPlus Examiner Comments

This response gained 0 marks. Whilst there are some aspects of the answer that are correct, using single word or very short bullet points answers is not acceptable.



ResultsPlus Examiner Tip

Candidates should understand a wide range of materials. Use the material properties to structure answers to questions that put the material in different applications/situations.

Question 4 (c)

This is a knowledge based question. Questions at AS that involve "complete the table" often require short phrases or single word responses. Whilst the question focuses on symbols located on tensol adhesive, these symbols are commonly found in other applications and are likely to be seen by candidates in the school workshop (and at home). In this case they are from the "hazardous" range of symbols.



It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(c) The acrylic letters are joined to the acrylic backboard with acrylic cement (Tensol 12) adhesive.

Health and safety warning symbols are displayed on the adhesive containers.

Complete the table below by giving the meaning of each of the warning symbols.

(2)

Symbol	Meaning
	The acrylic cement is hazardous & dangerous. Contents are poisonous.
	The contents are dangerous / hazardous



ResultsPlus Examiner Comments

Descriptions are not needed with this type of question. In this case the candidate has given a clear short response that is direct, but only gained 1 mark (for the top meaning), as the bottom table response states "hazardous" which is the generic description for a whole range of symbols; the question requires specific meaning.



ResultsPlus Examiner Tip



The exam paper is printed in black and white, so practice symbol recognition in black and white.

- (c) The acrylic letters are joined to the acrylic backboard with acrylic cement (Tensol 12) adhesive.

Health and safety warning symbols are displayed on the adhesive containers.

Complete the table below by giving the meaning of each of the warning symbols.

(2)

Symbol	Meaning
	toxic
	irritant



ResultsPlus
Examiner Comments

This candidate was awarded full marks.
Both descriptions are correct.



ResultsPlus
Examiner Tip

The exam paper is printed in black
and white, so practice symbol
recognition in black and white.

Question 4 (d)

As this is a "state" question, it is expected that the answer is in sentence form, and not just a single word response.

The question focuses on storing Tensol adhesive; a potential issue that will take place in most schools. The focus is on 'storing' not using Tensol adhesive. Control measures are the measures put in place to prevent risk of injury and harm.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

(d) Storing solvent based acrylic cement correctly is essential to comply with the Control of Substances Hazardous to Health (COSHH) regulations.

State **two** control measures for storing solvent based acrylic cement.

(2)

- 1 Highly visible writing, signs and instruction must be shown where they are stored. For instance writing should be in bright colour like yellow.
- 2 People must be informed about the ~~safe~~ storing of the solvent based acrylic cement



ResultsPlus

Examiner Comments

This candidate received full marks. It is clear that they have good knowledge and have written detailed specific responses.



ResultsPlus

Examiner Tip

During exam preparation candidates must focus on gathering specific information.

(d) Storing solvent based acrylic cement correctly is essential to comply with the Control of Substances Hazardous to Health (COSHH) regulations.

State **two** control measures for storing solvent based acrylic cement.

(2)

- 1 Eyes: if it goes in your eyes then seek doctors advice.
- 2 Nose and Mouth: ~~if it~~ To make sure you don't breathe in the fume which contains VOCs (Volatile Organic Compounds), wear a ~~mask~~ mask.



ResultsPlus

Examiner Comments

Whilst there is accuracy to this response, the candidate should be focusing on "storage". These answers seem to focus on 'using the adhesive' rather than 'storing'. The candidate received 0 marks.



ResultsPlus

Examiner Tip

With health and safety questions that ask for control measures, candidates must not use two responses from the same 'group'. For example, here the candidate uses two personal protective equipment responses.

Question 4 (e)

This question allows the opportunity for candidates to write at length.

It provides the opportunity for candidates to show they have a sound understanding of processes.

In this case it is a "describe" question, so requires four valid and detailed points within the answer. The vinyl cutting process is a specific process for creating signage that can be applied to vehicles. General descriptions of "cut using a laser cutter" are not relevant.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

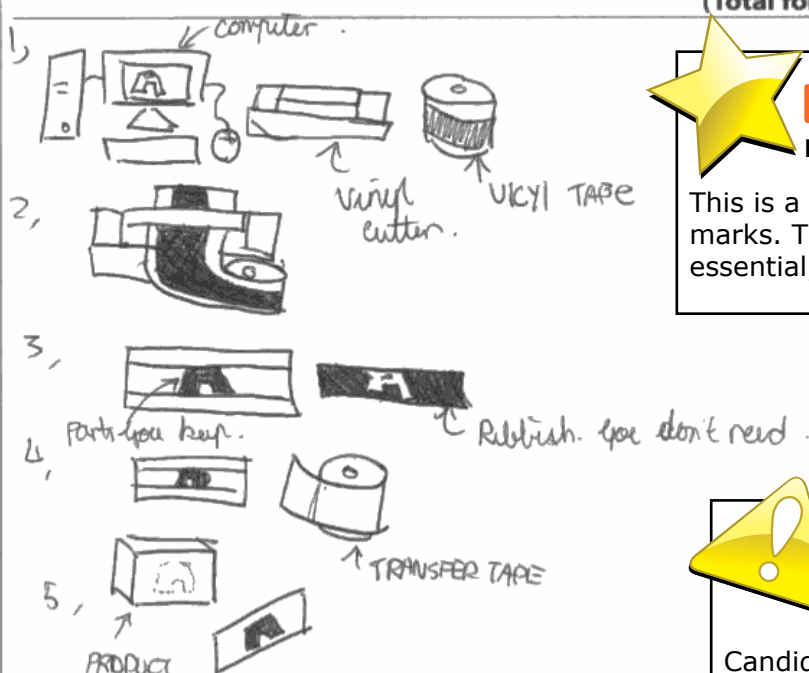
*(e) The shop logo is also reproduced on delivery vans using self adhesive vinyl.

Describe the process of producing and applying CAD/CAM produced vinyl signs.

(4)

First, you will need to go onto the programme linked to the vinyl cutter e.g. "2D design". You make your designs on the computer, then you send it to the vinyl cutter. ~~After~~ Before you use the cutter you need to feed it with vinyl tapes. After it has been cut out, you pull the parts you don't need off the stickers that you use a transfer tape to tape over the vinyl. Which then put the parts you need on the transfer tape then you just carefully apply the tape to where you want the vinyl bits to be and run your fingers over it, and it will stick onto the product.

(Total for Question 4 = 14 marks)



ResultsPlus
Examiner Comments

This is a well defined answer. It achieved full marks. The addition of the images whilst not essential, add to the clarity of the answer.



ResultsPlus
Examiner Tip

Candidates should practise longer answer questions, so they can plan and structure responses to achieve maximum marks.

*(e) The shop logo is also reproduced on delivery vans using self adhesive vinyl.

Describe the process of producing and applying CAD/CAM produced vinyl signs.

(4)

The graphics are firstly printed onto the vinyl using flexography, the sheet is then cut using a laser cutter operated by CAM.

The desired portion is then attached onto a sheet of contact adhesive, then finally the graphics are covered with a transfer sheet.

When attaching the graphics onto the desired place, the area is first cleaned. Once there is no dust or dirt where you wish to place your vinyl image, the transfer sheet is removed, leaving the vinyl image in place.



ResultsPlus

Examiner Comments

This response gained 0 marks. There is a confusion between printing, laser cutting, CAD and CAM etc.



ResultsPlus

Examiner Tip

Candidates must ensure they are aware of all processes outlined in the specification.

Question 5 (a)

Evaluation questions require candidates to answer fully, using detailed justified responses that flow in paragraph form. Short responses for evaluation questions gain little credit. Candidates must ensure they include advantages and disadvantages for maximum marks. In this case, only presenting one 'side' of the argument results in 4 marks rather than a maximum of 5.

The focus of this question is the use of carbon fibre. Candidates do not have to balance their answers with issues concerning steel.

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

5 Figure 6 shows a modern carbon fibre racing bike.



Figure 6

*(a) Evaluate, using both advantages and disadvantages, the use of carbon fibre in the manufacture of racing bike frames as opposed to steel.

(5)

Carbon fibre has an excellent strength to weight ratio, this means the bike can be both sturdy & light, ensuring it goes much faster than if steel was used. As the carbon fibre is strong, it can hold the weight of a person without cracking under pressure. Steel is as well strong, but it would corrode over time as its prone to rust, meaning it would not last as long as carbon fibre. Carbon fibre is very expensive, where as steel is relatively inexpensive, so steel is actually a lot cheaper than carbon fibre. Carbon fibre is also very hard to repair when broken, where as steel is more easily repaired. So, if carbon fibre breaks, it would most likely not be able to be repaired where as steel would. Overall, carbon fibre is the better material as it is lighter than steel which means the bike can go faster, but carbon fibre does not have a high impact resistance so can break easily & can't be repaired where as steel can.



ResultsPlus

Examiner Comments

This candidate gains full marks. They have answered in a clear and detailed way, with advantages and disadvantages.



ResultsPlus

Examiner Tip

During exam preparations candidates should practise longer questions to ensure they can answer in a structured, planned fashion.

5 Figure 6 shows a modern carbon fibre racing bike.



Figure 6

*(a) Evaluate, using both advantages and disadvantages, the use of carbon fibre in the manufacture of racing bike frames as opposed to steel.

(5)

Carbon fibre is a composite material, which is a mixture of different materials in order to create beneficial properties for the material. An advantage of using carbon fibre in the manufacture of the racing bike is that it is incredibly strong and durable, compared to steel. This is because carbon fibre has a ~~high~~ good weight to tensile strength ratio. Another advantage is that the carbon fibre frame is lightweight, which allows high speeds to be reached. Also the carbon fibre frame is unlikely to corrode or rust. However, the disadvantages of the carbon fibre in the use of the bike frame is that it is a very expensive material to use for products such as racing bikes that may be batch produced. Another disadvantage of the carbon fibre in use of manufacturing bike frames from it, is that the colour of carbon fibre is so far limited to black.



ResultsPlus
Examiner Comments

A detailed response gaining full marks. Candidates must ensure they write in the space available, and not 'over run' as this candidate has.



ResultsPlus
Examiner Tip

During exam preparations candidates should practise longer questions to ensure they can answer in a structured, planned fashion.

Question 5 (b)

This question tests the candidates wider knowledge of materials; in this case duralumin. As an "explain" question, it requires a JUSTIFIED response, ie the candidate must give a valid lead point then give a relevant justified reason.

It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

Figure 7 shows a duralumin chain set for the carbon fibre racing bike.



Figure 7

(b) Explain **two** advantages of using duralumin for the chain set on carbon fibre racing bikes.

(4)

- 1 lightweight - it is much lighter than other materials, which is important as racing bikes tend to be very light
- 2 Doesn't rust, so in bad weather the chain will stay in good condition e.g. rain, mud. Also it is ~~cheaper~~ less expensive, and will give good performance.



ResultsPlus Examiner Comments

This candidate only received 2 marks out of a possible 4. In the first explanation point, they correctly identify the "lightweight" property, but fail to explain this. Similarly, in point two, the "doesn't rust" aspect is correct but isn't expanded upon.



ResultsPlus Examiner Tip

During exam preparation practice "explain" questions. Many candidates do not thoroughly explain their answers in exams and therefore receive only half marks.

Figure 7 shows a duralumin chain set for the carbon fibre racing bike.



Figure 7

(b) Explain **two** advantages of using duralumin for the chain set on carbon fibre racing bikes.

(4)

- 1 Duralumin ~~is a alloy~~ has a high strength to weight ratio. This means that it ^{is} ~~has~~ a very strong material which means it is able to withstand harsh conditions (e.g. rain, mud) and can cope with lots of pressure (e.g. during races when chain is put under a lot of stress)
- 2 Duralumin does not rust very easily which is again an important factor in bikes. This means the bike is resistant to most weather conditions



ResultsPlus

Examiner Comments

The candidate has given full explanations and therefore receives full marks. An excellent response to the question.



ResultsPlus

Examiner Tip

During exam preparation practice "explain" questions. Many candidates do not thoroughly explain their answers in exams and therefore receive only half marks.

Question 5 (c)

This question allows the opportunity for candidates to write at length to show they have a sound understanding. In this case, as a "discussion" question, candidates are required to give five valid points within their answer.

The question is clearly directed at the benefits of using 3D surface modelling CAD. There should only be reference to benefits and specifically on 3D surface modelling CAD not just wider issues of CAD. Candidates do not have to balance their answers with issues of 2D CAD, nor do they have to compare (although there may be benefit in this for clarity and therefore they will gain marks for valid points).

It is useful to refer to the published mark scheme when looking at the examples, to clearly see where marks are given.

* (c) During the design of the frame, the designer used 3D surface modelling computer aided design (CAD).

Discuss the benefits of using 3D surface modelling in comparison to using 2D CAD.

(5)

By using 3D surface modelling you can visualise the product as it would be seen by the customer. This therefore allows you to be able to determine ergonomics, which can easily be edited. You will be able to get third party views on the product without having to produce a scale or model prototype meaning that 2D CAD designs are also inexpensive to produce. Finally, because the design has already been produced on CAD you can instantly begin production of either a rapid prototype model or the product itself as most modelling and ~~production~~ manufacturing machinery is operated by CAD or CAM. ~~safe zone~~



ResultsPlus

Examiner Comments

A good strong answer, gaining full marks, showing good understanding of the concept.



ResultsPlus

Examiner Tip

Candidates must plan answers to ensure they cover all valid points, and do not repeat points and generally 'waffle'.

*(c) During the design of the frame, the designer used 3D surface modelling computer aided design (CAD).

Discuss the benefits of using 3D surface modelling in comparison to using 2D CAD.

(5)

This allows you to see 360° around the product. Meaning that you will have all of the components on one model making it easier to see the final product than 2d. The modelling will also be able to have strength testing done on it whilst still in the designing stage, this allows you to see where modifications are needed and how strong key features of the frame are without having to build it. You can also send this one model ~~instead of many~~ to different buyers and designers so that they can look at it all and have their input into its design without having to send over numerous files of different angles. You can also present your ideas and model easily to the client. Or send it if they have the same software. It is also a lot less time consuming which will keep the cost down.

(Total for Question 5 = 14 marks)



ResultsPlus

Examiner Comments

A sound answer gaining full marks.



ResultsPlus

Examiner Tip

On longer questions, candidates do not have to give 'introductions' or 'conclusions' unless the question requires them to do so. Be concise.

Paper Summary

The AS exam should allow the candidate to show a variety of skills: short written responses, long answers, sketches to explain manufacturing processes and detailed drawings to show their graphic ability.

As such, candidates should practice all of these techniques in their exam preparation. In addition, it is essential that candidates prepare and use specifics in their answers.

We hope information contained here helps candidates in their preparation for future exams. Candidates who focus on details generally gain more marks than candidates that respond with generalisations; strong, cheap etc.

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